I.B. (PG) COLLEGE, PANIPAT

SESSION 2020-2021

Weekly Lesson Plan (Odd Semester) **(1st Semester)**

Name of the Paper:- Advanced Abstract algebra-I **CLASS : M.Sc. (Mathematics) Previous**

Name of the Teacher : Mansi bansal

WEEK	DATE	TOPICS
1	December (22-24) , (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
HOIDAY - 25.12.2020 (CHRISTMAS)		
SUNDAY - 27.12.2020		
2	December (28-31) January (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
		Class equation of a finite group
SUNDAY - 03.01.2021		
3	January (4-9)	Applications of a class equation
		Derived group
		Perfect group
		theorem on perfect group
		Zassenhau's lemma
		Normal series
SUNDAY - 10.01.2021		
4	January (11-16)	Scheier's refinement theorem
		Simple group and composition series
		Theorems on composition series
		Theorems on composition series
		Jorden Holder theorem
		Composition series of group of order p^n and abelian groups
SUNDAY - 17.01.2021		
5	January (18-19) (21-23)	Cauchy theorem for finite groups
		p-groups
		Sylow theory
		Sylow theory
		Sylow theory
HOLIDAY - 20.01.2021 (Guru Gobind Singh Jayanti)		
SUNDAY - 24.01.2021		

6	January (25) (27-30)	Problem discussion
		Characteristic of a ring with unity
		Prime fields
		Theorems on prime filed
		Field extension
HOLIDAY - 26.01.2021 (Republic Day)		
SUNDAY - 31.01.2021		
7	February (1-6)	Degree of an extension
		Algebraic and Transcendental elements
		Problem discussion
		Theorems on field extension
		Theorems on field extension
		Theorems on field extension
SUNDAY - 07.02.2021		
8	February (8-13)	Simple field extension
		Theorems on simple field extension
		Theorems on simple field extension
		Minimal polynomial of an algebraic extension
		Problem discussion
		Conjugate elements
SUNDAY - 14.02.2021		
9	February (15) (17-20)	Algebraic extension
		Finitely generated Algebraic extension
		Theorems on algebraic extension
		Theorems on algebraic extension
		Theorems on algebraic extension
HOIDAY - 16.02.2021 (Basant Panchami) / (Sir Chotu Ram Jayanti)		
SUNDAY - 21.02.2021		
10	February (22-26)	Algebraic closure and algebraically closed fields
		Splitting fileds
		Theorems on splitting fields
		examples on splitting fields
		Finite fields
HOIDAY - 27.02.2021 (Guru Ravidas Jayanti)		
SUNDAY - 28.02.2021		
11	March (01-06)	Normal extension
		Theorem Normal extension
		Problem discussion
		Seperable elements
		Seperable polynomial and seperable extension
		Theorems on seperable extension
SUNDAY - 07.03.2021		

12	**March (08-10) (12-13)**	Theorems on seperable extension
		Theorems on seperable extension
		Theorem of primitive element
		Perfect fields
		Galois extension
HOLIDAY - 11.03.2021 (Maha Shivratri)		
SUNDAY - 14.03.2021		
13	**March (15-20)**	Galois group of an extension
		Dedekiond lemma
		Fundamental theorem of Galois theory
		Frobenius automorphism of a finite field
		Klein's 4-group
		Diheadral group
SUNDAY - 21.03.2021		
14	**March (22) (24-26)**	Galois groups of polynomials
		Fundamental theorem of algebra
		Problem discussion
		Solvable groups
HOLIDAY - 23.03.2021 (Shaheedi Diwas/Martyrdum Day of Bhagat Singh, Rajguru & Sukhdev)		
HOLIDAYS - 27.03.2021 to 31.03.2021 (Holi break)		
15	**April (01-03)**	Derived series of a group
		Simplicity of the alternating group An (n>=5)
		Non-solvability of the symmetric group sn
SUNDAY -04.04.2021		
16	**April (05-10)**	Non-solvability of the alternating group An
		Roots of unity cyclotomic polynomials and their irreducibility over Q
		Radical extension
		Galois radical extension
		Cyclic extension
		Solvability of polynomials by radicals over Q
SUNDAY -11.04.2021		
17	**April (12-13) (15)**	Construction with ruler and compass only
		Problem discussion
		Revision

I.B. (PG) COLLEGE, PANIPAT

SESSION 2020-2021

Weekly Lesson Plan (Odd Semester) **(1st Semester)**

NAME OF PAPER- REAL ANALYSIS-I **Class: M.Sc. (Mathematics) Previous**

Name of the Teacher : KOMAL

WEEK	DATE	TOPICS
1	December (22-24) , (26)	Definition and existence of riemann integral function
		Definition and existence of RIEMANN STIELJES INTEGRAL,and some examples
		theorem based on upper sum
		theorem based on lower sum
HOIDAY - 25.12.2020 (CHRISTMAS)		
SUNDAY - 27.12.2020		
2	December (28-31) January (1-2)	theorem based on refinement and common refinement
		theorem based on integration
		thorem based on differentiation
		cauchy criteria for integrability
		theorem based on differentiation continued.
		doubt session
SUNDAY - 03.01.2021		
3	January (4-9)	first mean value theorem
		Change of variable
		fundamental theorem of integral calculus
		integration by parts
		theorem based on integration by parts
		doubt session
SUNDAY - 10.01.2021		
4	January (11-16)	integration by vector valued function
		examples based on integration by vector valued function
		unit step function(introduction)
		rectifiable curves general introduction
		theorem based on rectifiable curves
		doubt session
SUNDAY - 17.01.2021		
5	January (18-19) (21-23)	general introduction to sequence and series
		convergence of a sequence
		convergence of a series
		pointwise convergence and examples
		uniform convergence and example based on uniform convergence
HOLIDAY - 20.01.2021 (Guru Gobind Singh Jayanti)		
SUNDAY - 24.01.2021		

6	January (25) (27-30)	Cauchy criterion for uniform convergence
		weirstrass M-TEST
		Abel's test for uniform convergence
		Dirichlet's test for uniform convergence
		doubt session
HOLIDAY - 26.01.2021 (Republic Day)		
SUNDAY - 31.01.2021		
7	February (1-6)	Uniform continuity
		examples based on uniform continuity
		RIEMANN STIELTJES INTEGRATION
		UNIFORM CONVERGENCE AND DIFFERENTIATION
		EXISTENCE OF REAL CONTINUOUS NOWHERE DIFFERENTIABLE FUNCTION
		doubt session
07.02.2021		
8	February (8-13)	Introduction to equicontinuous families of fuctions
		theorem based of equicontinuous functions
		weierstrass approximation theorem
		doubt session
		general introduction to variables
		intro about functions of several variables
14.02.2021		
9	February(14-20)	LINEAR TRANSFORMATION
		THEOREMS BASED ON LINEAR TRANSFORMATION
		derivative in an open subset of R^n
		definitions of fixed point contration mapping
		examples of contartion mapping
HOIDAY - 16.02.2021 (Basant Panchami) / (Sir Chotu Ram Jayanti)		
SUNDAY - 21.02.2021		
10	February (22-26)	banach fixed point theoprem(CONTRATION PRINCIPAL)
		CHAIN RULE
		DEFINITION OF CONVEX SET and some theorems based on it
		partial derivative
		Differential derivatives
HOIDAY - 27.02.2021 (Guru Ravidas Jayanti)		
SUNDAY - 28.02.2021		
11	March (01-06)	INVERSE FUNCTION THEOREM
		IMPLICIT FUNCTION THEOREM
		JACOBIANS
		EXTREME PROBLEMS WITH CONSTRAINTS
		LAGRANGE'S MULTIPLIER METHOD
		doubt session
SUNDAY - 07.03.2021		

12	**March (08-10) (12-13)**	test of section 1
		derivative of hiogher order
		mean value theorem for real functions of two variables
		interchange of the order of differentiation
		doubt session
HOLIDAY - 11.03.2021 (Maha Shivratri)		
SUNDAY - 14.03.2021		
13	**March (15-20)**	test of section 2
		differentiation of integrals
		introduction to power series
		examples of power series
		uniqueness theorem for power series
		ABEL'S AND TAUBER'S THEOREM
SUNDAY - 21.03.2021		
14	**March (22) (24-26)**	TAYLOR'S THEOREM
		Exponential &logarithm fuctions
		functions
		trigonomertic functions
HOLIDAYS - 27.03.2021 to 31.03.2021 (Holi break)		
15	**April (01-03)**	fourier series
		gamma function
		doubt session
SUNDAY -04.04.2021		
16	**April (05-10)**	test (half section 3)
		test(remaining half section-3)
		integration of differtial forms
		partitions of unity
		differential forms
		STOKES THEOREM
SUNDAY -11.04.2021		
17	**April (12-13) (15)**	Doubt session
		test of section -4(first half portion)
		test of section -4(second half portion)

I.B. (PG) COLLEGE, PANIPAT

SESSION 2020-2021

Weekly Lesson Plan (Odd Semester) **(1st Semester)**

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

Name of the Teacher : Mansi Bansal

WEEK	DATE	TOPICS
1	December (22-24) , (26)	Definition of topological space
		Examples of topological space
		Examples of topological space
		Neighbourhood system of a point and its properties
HOIDAY - 25.12.2020 (CHRISTMAS)		
SUNDAY - 27.12.2020		
2	December (28-31) January (1-2)	Neighbourhoods
		Interior point and interior of a point
		Interior of various topologies
		Theorems on interior point
		Theorems on interior point
		Interior as an operator and its properties
SUNDAY - 03.01.2021		
3	January (4-9)	Problem discussion
		Closed set as a complement of open set
		Limit point of a set
		Derived set of a set
		Definition of closure of a set as a union of the set and its derived points
		Theorems on limit point
SUNDAY - 10.01.2021		
4	January (11-16)	Adherent point of a set
		Closure of a set as set of adherent points
		Properties of closure
		Closure as an operator and its properties
		Boundary of a set
		Theorems on boundary of a set
SUNDAY - 17.01.2021		
5	January (18-19) (21-23)	Dense set
		Base for topology and its characterization
		Base for neighbourhood system
		Theorems on base for topology and neighbourhood system
		Sub-base for topology
HOLIDAY - 20.01.2021 (Guru Gobind Singh Jayanti)		
SUNDAY - 24.01.2021		

6	January (25) (27-30)	Induced topology and subspace of a topological space
		Alternate methods of defining a topology
		Kuratowski closure operator
		First countable space
		Second countable space
HOLIDAY - 26.01.2021 (Republic Day)		
SUNDAY - 31.01.2021		
7	February (1-6)	Seperable space
		Complete lattice
		Problem discussion
		Continuous function
		Composition of continuous functions
		Open and closed functions
SUNDAY - 07.02.2021		
8	February (8-13)	Homeomorphism
		Embedding
		Tychonoff product topology in terms of standard subbase
		Projection maps
		Characterisation of product topology as the smallest topology with projections
		Continuity of a function from a space into product of spaces
SUNDAY - 14.02.2021		
9	February (15) (17-20)	T0 ,T1 SPACE
		T2,T3 Space
		Hereditary property
		Quotent topology w.r.t. a map
		About Hausdorffness of quotent space
HOIDAY - 16.02.2021 (Basant Panchami) / (Sir Chotu Ram Jayanti)		
SUNDAY - 21.02.2021		
10	February (22-26)	Problem discussion
		Completely regular and tychonoff space
		Hereditary properties
		Productive properties
		Embedding lemma
HOIDAY - 27.02.2021 (Guru Ravidas Jayanti)		
SUNDAY - 28.02.2021		

11	March (01-06)	Embedding theorem
		Normal and T4 spaces
		Examples
		Urysohn's lemma
		Complete regularity of a regular normal space
		T4 implies tychonoff space , TIETZE'S EXTENSION THEOREM
SUNDAY - 07.03.2021		
12	March (08-10) (12-13)	Filters on a set
		Collection of all filters on a set as a p.o. set
		Finer filter
		Ultra filter and its characterization
		Ultra filter principle
HOLIDAY - 11.03.2021 (Maha Shivratri)		
SUNDAY - 14.03.2021		
13	March (15-20)	Image of filter under a function
		Convergence of filters
		Limit point and limit of a filter
		Continuity in terms of convergence of filters
		Hausdrorffness anf filter convergence
		Problem discussion
SUNDAY - 21.03.2021		
14	March (22) (24-26)	Compactness
		Definition of a compact subset oa a compact subspace
		Relation of open cover of a subset of a topological space in the sub-space with that
		Compactness in terms of finite intersection property
HOLIDAY - 23.03.2021 (Shaheedi Diwas/Martyrdum Day of Bhagat Singh, Rajguru & Sukhdev)		
HOLIDAYS - 27.03.2021 to 31.03.2021 (Holi break)		
15	April (01-03)	Continuity and compact sets
		Closedness of compact subset
		Hausdorff space and its consequence
SUNDAY -04.04.2021		
16	April (05-10)	Regularity and normality of a comact hausdorff space
		Compactness and filter convergence
		Convergence of filters in a product space
		Tychonoff product theorem using filters
		Hausdroff Compactification
		Stone-cech compactification
SUNDAY -11.04.2021		
17	April (12-13) (15)	Problem discussion
		Revision
		Revision

I.B. (PG) COLLEGE, PANIPAT

SESSION 2020-2021

Weekly Lesson Plan (Odd Semester) **(1st Semester)**

Name of the Paper:- **AMCV** **CLASS : M.Sc.(Mathematics) Previous**

Name of the Teacher : SOURAV

WEEK	DATE	TOPICS
1	December (22-24) , (26)	POWER SET INTRO
		SAME
		CONVERGENCE OF POWER SERIES
		RADIUS OF CONVERGENCE
HOIDAY - 25.12.2020 (CHRISTMAS)		
SUNDAY - 27.12.2020		
2	December (28-31) January (1-2)	example based on above
		problem discion
		sum product of differentibility
		sum function on power series
		do
		do
SUNDAY - 03.01.2021		
3	January (4-9)	property of function with derivetive
		exp. And log function
		power of complex number
		branch with analyticity
		path in region
		smooth path
SUNDAY - 10.01.2021		
4	January (11-16)	simple connected region
		multiple connected region
		bounded variation
		total variation
		complex integration
		problem discion
SUNDAY - 17.01.2021		
5	January (18-19) (21-23)	class test
		cauchy goursat theorem
		CAUCHY THEOREM FOR multiplre connected region'
		do
		problem discion
HOLIDAY - 20.01.2021 (Guru Gobind Singh Jayanti)		
SUNDAY - 24.01.2021		

6	January (25) (27-30)	index of winding number
		closed curve with simple property
		cauchy intergral formula
		extension of above
		propertites
HOLIDAY - 26.01.2021 (Republic Day)		
SUNDAY - 31.01.2021		
7	February (1-6)	higher order derivative
		gauss mean value theroem
		do
		problem discion
		morera's theorem
		test
SUNDAY - 07.02.2021		
8	February (8-13)	cauchy's inequality
		zero of analytics function
		entire function
		radious of convergence
		liouvalle's theorem
		problem discion
SUNDAY - 14.02.2021		
9	February (15) (17-20)	fundamental theorem of algebra
		taylor's thoerem
		extension of above
		problem discion
		class test
HOIDAY - 16.02.2021 (Basant Panchami) / (Sir Chotu Ram Jayanti)		
SUNDAY - 21.02.2021		
10	February (22-26)	maximum modulus princple
		minimum miodulus principle
		schwartz lemma
		properties
		problem discion
HOIDAY - 27.02.2021 (Guru Ravidas Jayanti)		
SUNDAY - 28.02.2021		
11	March (01-06)	singularity
		classification
		pole of ordr
		function of order
		laurent series
		problem discion
SUNDAY - 07.03.2021		

12	**March (08-10) (12-13)**	class test
		cassorati theorem
		meromorphic function
		poles
		zero of meromorphic
HOLIDAY - 11.03.2021 (Maha Shivratri)		
SUNDAY - 14.03.2021		
13	**March (15-20)**	the argument princple
		rouche's theorem
		inverse of function
		problem discion
		class test
		residue
SUNDAY - 21.03.2021		
14	**March (22) (24-26)**	residue of singularity
		residue at simple pole
		residue at infinty
		cauchy residue
HOLIDAY - 23.03.2021 (Shaheedi Diwas/Martyrdum Day of Bhagat Singh, Rajguru & Sukhdev)		
HOLIDAYS - 27.03.2021 to 31.03.2021 (Holi break)		
15	**April (01-03)**	definte integral
		integral of different type
		do
SUNDAY -04.04.2021		
16	**April (05-10)**	integral on trignometry fun.
		do
		problem discion
		ple on real number
		do
		do
17	**April (12-13) (15)**	complete revision
		test
		problem desion

I.B. (PG) COLLEGE, PANIPAT

SESSION 2020-2021

Weekly Lesson Plan (Odd Semester) **(1st Semester)**

Name of the Paper:-DIFFERENTIAL EQUATION **CLASS : M.Sc (Mathematics) Previous**

Name of the Teacher : MANISH KUMAR

WEEK	DATE	TOPICS
1	December (22-24) , (26)	Basic about differential equation
		degree and order,type of differential equation
		Related examples
HOIDAY - 25.12.2020 (CHRISTMAS)		
SUNDAY - 27.12.2020		
2	December (28-31) January (1-2)	Initial value problem
		approximation solution
		equicontinuous set of function
		Related examples
SUNDAY - 03.01.2021		
3	January (4-9)	Cauchy euler theorem
		Ascoli arzela theorem
		cauchy peano existence theorem and its corollary
		Lipschtiz condition
		Related examples
SUNDAY - 10.01.2021		
4	January (11-16)	Differential inequalties and uniquness
		gronwell inequality
		succesive approximation
		Related examples
SUNDAY - 17.01.2021		
5	January (18-19) (21-23)	Picard lindelof theorem
		continuation of solution
		maximal interval of existence
HOLIDAY - 20.01.2021 (Guru Gobind Singh Jayanti)		
SUNDAY - 24.01.2021		

6	January (25) (27-30)	Kneser theorem
		extension theorem
		theorems
		Related examples
		doubts
HOLIDAY - 26.01.2021 (Republic Day)		
SUNDAY - 31.01.2021		
7	February (1-6)	linear differential system
		linear homogenous system
		fundamental matrix
		Related examples
		Adjoint system
SUNDAY - 07.02.2021		
8	February (8-13)	Reduction to smaller homogrnous system
		non homogenous linear system
		variation of constant
		Related examples
		theorems
SUNDAY - 14.02.2021		
9	February (15) (17-20)	linear system with constant coefficient
		linear system with periodic coefficients
		Related examples
		theorems
HOIDAY - 16.02.2021 (Basant Panchami) / (Sir Chotu Ram Jayanti)		
SUNDAY - 21.02.2021		
10	February (22-26)	Floquet theory
		Related examples
		theorems
		doubts
		class test
HOIDAY - 27.02.2021 (Guru Ravidas Jayanti)		
SUNDAY - 28.02.2021		
11	March (01-06)	Higher order equations
		linear differential equation of order n
		linear combinations
		linear depandence,independence of solution
		wronskian theory
SUNDAY - 07.03.2021		

12	**March (08-10) (12-13)**	necessary and sufficient condition of solution
		Abels identity
		Related examples
		fundamental set
HOLIDAY - 11.03.2021 (Maha Shivratri)		
SUNDAY - 14.03.2021		
13	**March (15-20)**	more wronksian theory
		reduction of order
		theorems
		Related examples
		variation of parameters
		Adjoint equation
SUNDAY - 21.03.2021		
14	**March (22) (24-26)**	Lagranges identity
		green formula
		linear equation of order n with constant coefficients
		Related examples
HOLIDAY - 23.03.2021 (Shaheedi Diwas/Martyrdum Day of Bhagat Singh, Rajguru & Sukhdev)		
HOLIDAYS - 27.03.2021 to 31.03.2021 (Holi break)		
15	**April (01-03)**	system of differential equation
		dependance of solution on initial conditions
		continuity and differentiability
SUNDAY -04.04.2021		
16	**April (05-10)**	maximal and minimal solution
		differential inequalities
		wintner theorem
		kamke theorem
		nagumo theorem
SUNDAY -11.04.2021		
17	**April (12-13) (15)**	Osgood theorem
		Related examples
		class test