

**Maharaja Ranjit Singh College of Professional Sciences, Indore**

Department of Chemical Sciences

Lesson Plan - M.Sc. I Sem Pharmaceutical chemistry (July 2020 - Dec 2020)

Subject - Principle of Physical Pharmacy

**Teacher - Dr. Mukesh Gupta**

Day/Lecture	Unit	Topic
1	Unit 1	Introduction of thermodynamics, First law of thermodynamics
2		thermochemistry
3		Second law of thermodynamics
4		Third law of thermodynamics
5		Free energy functions and applications
6		Thermodynamics of phase equilibria
7		Thermal analysis of crystals and liquid crystals
8		Supra molecules
9		inclusion compounds
10		Thermodynamics treatment of stability constants
11	Unit 2	Introduction of kinetics, rate of reactions
12		Order of simple and complex reactions
13		Influence of temperature and other factors on reaction rates
14		Theories of rates
15		Effect of solvent on ion strength
16		Acid base catalysis
17		Enzyme catalysis
18		Decomposition and stabilization of medicinal agents
19		Photodegradation
20		Kinetics in solid states
21		Solid dosage forms
22		Accelerated stability analysis
23	Unit 3	Introduction of diffusion and dissolution
24		Steady-state diffusion
25		Procedures and apparatus
26		Dissolution and drug release
27		Drugs in polymer matrices
28		Release from granular matrices
29		multilayer diffusion
30		Membrane control and diffusion layer control
31		Diffusion principles in biologic systems
32		Thermodynamics of diffusion
33		Fick's second law
34		Diffusion and ecology

35	Unit 4	Introduction of interfacial phenomena
36		Liquid interfaces
37		Adsorption of liquid interfaces
38		Adsorption of solid interfaces
39		Application of surface active agents
40		Electric properties of interfaces
41		Introduction of colloids and colloidal solution
42		types of colloidal system
43		Optical properties of colloids
44		Kinetic properties of colloids
45		Electric properties of collods
46		Solubilization, Addendum
47		Thermodynamics of micellization
48	Unit 5	Introduction of Micromeritics
49		Particle size and size distribution
50		Methods for determining particle size
51		Methods for determining particle size
52		Particle shape and surface area
53		Particle shape and surface area
54		Methods for determining surface area
55		Methods for determining surface area
56		Pore size, derived properties of powders
58		

**Maharaja Ranjit Singh College of Professional Sciences, Indore**  
 Department of Chemical Sciences  
 Lesson Plan - M.Sc. I Sem Pharmaceutical chemistry ((July 2020 - Dec 2020)  
 Subject - Pharmaceutical Analysis  
**Teacher - Dr. Lal Kumar**

Day/Lecture	Unit	Topic
1	Unit 1	Infrared Spectroscopy, Review of Linear Harmonic Oscillator
2		Vibrational energies of diatomic molecules
3		Zero point energy, Force constant and bond Strength
4		Anharmonicity, Morse potential energy diagram
5		Vibration -Rotation spectroscopy
6		P.Q.R. Branches
7		Break down of Born Oppenheimer Approximation
8		Vibration of polyatomic molecules
9		Selection Rules, Normal modes of Vibration
10		Group Frequencies, Overtones. Hot Bands, Factor affecting Bands Positions
11		Application of IR spectroscopy in Pharmaceutical analysis
12		Interpretation of IR spectra of following compounds: Aspirin and Quinoline
13	Unit 2	NMR: Nuclear Spin, Nuclear resonance, Saturation
14		Shielding of Magnetic Nuclei, Chemical shift and its measurements
15		Factors Influencing chemical shift, Deshielding
16		Spin-Spin Interactions, Factors influencing the coupling constant J- Classification
17		Spin decoupling, basic ideas about instrument
18	Unit 3	Raman Spectroscopy
19		Classical and quantum theories of Raman effect
20		Pure rotational, vibrational and vibrational rotational Raman spectra
21		Selection rules, Mutual Exclusion Principle
22		Resonance Raman Spectroscopy
23		Coherent Anti-Stokes Raman Spectroscopy (CARS)
24	Unit 4	Electron Spin Resonance Spectroscopy
25		Basic Principle, Zero field Splitting and Kramer's Degeneracy
26		Factors affecting the g Values
27		Isotropic and Anisotropic Hyperfine Coupling Constants
28		Spin Hamiltonian
29		Spin Densities and McConnell Relationship
30		Measurement Techniques and Applications
31	Unit 5	Atomic Absorption Spectroscopy
32		Theory of Atomic Absorption Spectroscopy
33		Instrumentation of Atomic Absorption Spectroscopy
34		Aspects of Atomic Absorption Spectroscopy
35		Application of Atomic Absorption Spectroscopy in Pharmaceutical Analysis

**Maharaja Ranjit Singh College of Professional Sciences, Indore**  
 Department of Chemical Sciences  
 Lesson Plan - M.Sc. I Sem Pharmaceutical Chemistry ((July 2020 - Dec 2020)  
 Subject - Principle of Inorganic Pharmaceutical Chemistry  
**Teacher - Prof. Seema Shintre**

Day/Lecture	Unit	Topic
1	Unit 1	Weak Chemical Forces
2		Hydrogen Bonding
3		Hydrates on Dipole
4		Clathrates on Dipole
5		Dipole Dipole Interaction
6		VSEPR Theory
7		Molecular Orbital Theory
8		Theories of Bonding in Metals
9		Theories for Conductors
10		Theories for Insulators
11		Theories for Semi-conductors
12	Unit 2	Crystal Field Theory
13		Bent Theory
14		Energetics of Hybridization
15		Limitations of Crystal Field Theory
16		Molecular Orbital Theory
17		Octahedral Complexes
18		Tetrahedral Complexes
19		Square Planer Complexes
20		Pi-bonding and Molecular Orbital theory
21	Unit 3	Reactivity of Metal Complexes
22		Inert and Labile Complexes
23		Acid Hydrolysis
24		Factors affecting Acid Hydrolysis
25		Base Hydrolysis
26		Substitution Reactions in Square Planer Complexes
27		Trans effect
28		Redox Reactions
29		Electron Transfer Reactions
30		Mechanism of One Electron Transfer Reaction
31		Outer Sphere Type Reactions
32		Cross Reactions
33		Marcus -Hush Theory
34		Inner Sphere Type Reactions
35	Unit 4	Cationic Components of Inorganic Drugs useful for Systemic effect
36		Anionic Components of Inorganic Drugs useful for Systemic effect
37		Complexing Agents used in Therapy
38		Chilating Agents used in Therapy
39		Oxygen Anesthetic Stimulants
40		Respiratory Stimulants
41		Dentifrices
42		Anti-Caries Agents

43	Unit 5	Metal Porphiren
44		Biochemistry of Iron-Heme Iron
45		Biochemistry of Non Heme Protein
46		Haemoglobin
47		Myoglobin
48		Nitrogen Fixation in Bacterial Nitrogenase System
49		Essential Elements in Biological Systems
50		Trace Elements in Biological Systems

**Maharaja Ranjit Singh College of Professional Sciences, Indore**

Department of Chemical Sciences

Lesson Plan - M.Sc. I Sem Pharmaceutical Chemistry (July 2020 - Dec 2020)

Subject - Principle of Organic Pharmaceutical Chemistry

**Teacher - Dr. Dipak Sharma**

Day/Lecture	Unit	Topic
1	Unit I	organic pharmaceutical chemistry
2		Concept of chirality
3		Recognition of symmetry elements and chiral structure
4		R S Nomenclature
5		Stereoisomerism in acyclic and cyclic system
6		Optical activity without asymmetric carbon atom
7		Geometrical isomerism of olefene and oximes
8		E Z Nomenclature
9		Backman transformation
10		Analysis of simple cyclic and acyclic system
11		Effect of conformation of reactivity in acyclic compounds and cyclohexane
12		Interconversion of Fischer
13		Newman and Sawhars projection
14		Stereoselective synthesis and asymmetric synthesis
15	Unit II	Mechanism of organic reactions
16		Types of mechanics
17		Methods of determining reaction mechanism
18		Aliphatic nucleophilic substitution reaction SN1 and SN2
19		Neighbouring group mechanism
20		Types of reaction
21		Thermodynamics and kinetic requirements
22		Potential energy diagram
23		Hydrolysis of Ester
24		E1 and E2 mechanism
25		Haffmann and saytzeff elimination
26		Reaction intermediates structures
27		Formation and example of participation in chemical reactions of following carbanion carbonium
28	Unit III	Aromaticity Concept, Huckel's Rules and Its Limitations
29		Benzenoid and nonbenzenoid compounds
30		cyclopentadienyl anion
31		tropylium cation
32		azulenes
33		Annulenes
34		Heteroannulenes
35		Fullerenes
36		non aromaticity and antiaromaticity
37	Unit IV	
38		Synthetic applications Mechanism and stereochemistry and organic reaction, molecular rearrangements pinacol-pinnacolone rearrangements
39		Synthetic applications Mechanism and stereochemistry and organic reaction, molecular rearrangements benzylic acid rearrangements
40		Synthetic applications Mechanism and stereochemistry and organic reaction, molecular rearrangements Backmann rearrangements
41		Synthetic applications Mechanism and stereochemistry and organic reaction, molecular rearrangements Hoffmann-curtius rearrangements
42		Synthetic applications Mechanism and stereochemistry and organic reaction, molecular rearrangements Lossen-schmidt rearrangements
43		Synthetic applications Mechanism and stereochemistry and organic reaction, molecular rearrangements claisen rearrangements
44	Unit V	Synthetic applications Mechanism and stereochemistry of following name reaction Birch reduction
45		Synthetic applications Mechanism and stereochemistry of following name reaction Mannich reaction
46		Synthetic applications Mechanism and stereochemistry of following name reaction Meerwein Ponderf Verley
47		Synthetic applications Mechanism and stereochemistry of following name reaction Oppeneur Oxidation
48		Synthetic applications Mechanism and stereochemistry of following name reaction Ozonolysis
49		Synthetic applications Mechanism and stereochemistry of following name reaction Hydrogenation
50		Synthetic applications Mechanism and stereochemistry of following name reaction Diels Alder reaction
51		Synthetic applications Mechanism and stereochemistry of following name reaction Wittig reaction
52		Synthetic applications Mechanism and stereochemistry of following name reaction Reformatski reaction

<b>Maharaja Ranjit Singh College of Professional Sciences, Indore</b>		
<b>Department of Chemical Sciences</b>		
<b>Lesson Plan - M. Sc. I Sem Pharmaceutical Chemistry (July 2020 -Dec 2020)</b>		
<b>Subject - Mathematic for Pharmaceutical Chemistry</b>		
<b>Teacher - Dr. Manoj Joshi</b>		
<b>Day/Lecture</b>	<b>Unit</b>	<b>Topic</b>
1	1	Vectors: dot
2	1	Cross
3	1	Triple products
4	1	Gradient
5	1	Divergence
6	1	Curl
7	1	Vector calculus
8	1	Matrix algebra: Addition
9	1	Multiplication
10	1	Inverse
11	1	Adjoint
12	1	Transpose
13	2	Differential calculus
14	2	Functions
15	2	Continuity
16	2	Differentiability
17	2	Rules for differentiation
18	2	Applications of differential calculus including maxima and minima
19	2	Maximally populated rotational energy levels
20	2	Maximally populated rotational energy levels
21	2	Bohrs radius
22	2	Bohrs radius
23	2	Most probable velocity from Maxwells distribution
24	2	Most probable velocity from Maxwells distribution
25	3	Integral calculus
26	3	Basic rules for integration
27	3	Basic rules for integration
28	3	Integration by parts
29	3	Partial fractions and substitution
30	3	Partial fractions and substitution
31	3	Reduction formulae
32	3	Applications of integral calculus
33	3	Functions of several variables
34	3	Partial differentiation
35	3	Co-ordinate transformations
36	3	Example: Cartesian to spherical polar

37	4	Elementary differential equations
38	4	First order and first degree differential equations
39	4	First order and first degree differential equations
40	4	Homogenous
41	4	Exact and linear equations
42	4	Applications to chemical kinetics
43	4	Secular equilibria
44	4	Quantum chemistry
45	4	Second order differential equation and their solutions
46	4	Second order differential equation and their solutions
47	5	Permutation and probability
48	5	Permutations and combinations
49	5	Permutations and combinations
50	5	Permutations and combinations
51	5	Probability and probability theorems average
52	5	Probability and probability theorems average
53	5	Probability and probability theorems average
54	5	Variance
55	5	Root means square deviation
56	5	Examples from the kinetic theory of gases etc
57	5	Examples from the kinetic theory of gases etc
58	5	Fitting
59	5	Least squares fit etc with a general polynomial fit
60	5	Least squares fit etc with a general polynomial fit



**Maharaja Ranjit Singh College of Professional Sciences, Indore**

Department of Chemical Sciences

Lesson Plan - M.Sc. I Sem Pharmaceutical Chemistry (July 2020- Dec 2020)

Subject - Biology for Pharmaceutical Chemistry

**Teacher - Prof. Shashwat Nigam**

Day/Lecture	Unit	Topic
1	Unit 1	Cell structure and functions, structure prokaryotic and eukaryotic
2		Intracellular organelles and their functions
3		Comparison of plant and animal cells
4		Overview and function
5		Comparison of plant and animal cells
6		Overview of metabolic processes-catabolism and anabolism
7		ATP-the biology energy currency
8		Origin of life-unique properties of carbon chemical evolution and rise of living systems
9		Origin of life-unique properties of carbon chemical evolution and rise of living systems
10		Introduction to bio-molecules
11		Building blocks of bio-macromolecules
12	Unit 2	Carbohydrate-conformation of monosaccharides
13		Structure and function of important derivatives of monosaccharides like glycosides
14		Structure and function of important derivatives of monosaccharides like deoxy sugars
15		Structure and function of important derivatives of monosaccharides like myoinositol
16		Structure and function of important derivatives of monosaccharides like amino sugars
17		Structure and function of important derivatives of monosaccharides like N-acetylmuramic acid
18		Structure and function of important derivatives of monosaccharides like sialic acid
19		Structure and function of important derivatives of monosaccharides like disaccharides
20		Structural polysaccharides cellulose and chitin
21		Storage of polysaccharides- starch and glycogen
22		Storage of polysaccharides- starch and glycogen
23		Structural and biological function of glucosaminoglycans of mucopolysaccharides
24		Structural and biological function of glucosaminoglycans of mucopolysaccharides
25		Carbohydrate of glycoproteins and glycolipids
26		Role of sugar in biological recognition
27		Blood sugar substances
28		Ascorbic acid
29	Unit 3	Lipid- fatty acids, essential fatty acids
30		Structure and function of triacylglycerols
31		Structure and function of glycerophospholipids
32		Structure and function of sphingolipids
33		Structure and function of cholesterol
34		Structure and function of bile acids
35		Structure and function of prostaglandins
36		Lipoproteins-composition and function role in atherosclerosis
37		Properties of lipid aggregates-micelles, bilayers, liposomes and their possible biological function
38		Properties of lipid aggregates-micelles, bilayers, liposomes and their possible biological function
39		Properties of lipid aggregates-micelles, bilayers, liposomes and their possible biological function
40		Biological membranes
41		Fluid mosaic model of membrane structure
42		Lipid metabolism beta-oxidation of fatty acids

43	Unit 4	Amino-acid, properties and proteins
44		Chemical and enzymatic hydrolysis of proteins to peptides,amino acid sequencing
45		Chemical and enzymatic hydrolysis of proteins to peptides,amino acid sequencing
46		Chemical and enzymatic hydrolysis of proteins to peptides,amino acid sequencing
47		Secondary structure of proteins
48		Forces responsible for holding of secondary structure
49		alpha-helix,beta-sheets
50		super secondary structure,triple helix structure of collagen
51		Tertiary structure of protein-folding and domain structure
52		Quaternary structure
53		Amino acid metabolism -degradation and biosynthesis of amino acid
54		Sequence determination:chemical
55		Sequence determination:enzymatic
56		Sequence determination:mass spectral
57		Sequence determination:recemization
58		Sequence determination:detection
59		Chemistry of oxytoin and tryptophan releasing hormone (TRH)
60	Unit 5	Nucleic acids, purine and pyrimidine bases of nucleic acid
61		Base pairing via H-bonding
62		Structure of ribonucleic acids(RNA) and deoxyribonucleic acid(DNA)
63		Structure of ribonucleic acids(RNA) and deoxyribonucleic acid(DNA)
64		Double helix model of DNA and forces responsible for holding it
65		Chemical and enzymatic hydrolysis of nucleic acid
66		The chemical basis for heredity
67		An overviewof replication of DNA, transcription,translationand genetic code
68		An overviewof replication of DNA, transcription,translationand genetic code
69		Chemical synthesis of mono and tri nucleoside

**Maharaja Ranjit Singh College of Professional Sciences, Indore**  
 Department of Chemical Sciences  
 Lesson Plan - M.Sc. I Sem Pharmaceutical Chemistry (July 2020 - Dec 2020)  
 Subject - Practical Lab-Course - I  
 Teacher - Dr Mukesh Gupta

Day/Lecture	Unit	Topic
1		To prepare Anthraquinone from Anthracene
2		To prepare p-Amino Phenol from Phenyl Hydroxylamine
3		To prepare 2,4-Di nitrophenyl hydrazine from 2,4-Di nitrochlorobenzene
4		To prepare Phenyl Urea from Aniline
5		To prepare Picric acid from Phenol
6		To prepare P-Bromo acetanilide
7		To prepare Dibenzalacetone from Benzaldehyde
8		To prepare Aluminium Acetate Drop.
9		To prepare ammoniated Camphor ointment
10		To prepare Electrolyte maintenance IV fluid ( for paediatric use)
11		To prepare Salicylic acid compound dusting powder
12		To prepare compound sodium chloride and Dextrose oral powder
13		To prepare Strong Iodine solution
14		To prepare Zinc sulphate Eye/Ear drop
15		To prepare Effervescent granules
16		To Isolate Caffine from tea leaves
17		To Isolate Casein and Lactose from Milk
18		To Isolate Glucose from Cane sugar
19		To Isolate Cystine from tea leaves
20		Separation ortho and para nitroaniline by TLC
21		Separation of Dyes by TLC
22		

**Maharaja Ranjit Singh College of Professional Sciences, Indore**  
 Department of Chemical Sciences  
 Lesson Plan - M.Sc. I Sem Pharmaceutical Chemistry (July 2020 - Dec 2020)  
 Subject - Practical Lab-Course - II  
**Teacher - Dr Mukesh Gupta**

Day/Lecture	Unit	Topic
1		Limit test for chloride
2		Limit test for Sulphate
3		Limit test for Lead
4		Limit test for Arsenic
5		Limit test for Heavy metals
6		Identification test of drug Paracetamol
7		Identification test of drug Ibuprofen
8		Identification test of drug Metranidazole
9		Identification test of drug Pyrazinamide
10		Identification test of drug Aspirin
11		Identification test of drug Chloroquin Phosphate
12		Identification test of drug Ascorbic acid
13		Assay of Sodium bicarbonate
14		Assay of Benzoic acid
15		Assay of Citric acid
16		Assay of Borax
17		Assay of Zinc sulphate

Maharaja Ranjit Singh College of Professional Sciences, Indore  
 Department of Chemical Sciences  
 Lesson Plan M. Sc. II Sem. Pharmaceutical Chemistry (Jan 2021 - June 2021)  
 Subject - Principle of Organic Pharmaceutical Chemistry

**Teacher - Dr. Dipak Sharma**

Day/Lecture	Unit	
1	Unit 1	Classification of drugs on the basis of Chemical structure
2		Classification of drugs on the basis of Therapeutic action
3		Classification of drugs on the basis of Therapeutic action
4		Classification of drug receptors
5		Structure and nature of drug receptors
6		Receptors theories
7		Receptors theories
8		Mechanism of Receptors
9		Mechanism of Receptors
10	Unit 2	Physico-chemical properties in relation to biological action
11		Factors affecting drug Absorption, Distribution
12		Factors affecting drug Metabolism and Elimination
13		Study of properties like- Ionization
14		Study of properties like-Partition coefficient
15		Study of properties like- Acid base properties
16		Study of properties like- Hydrogen bonding
17		Study of properties like-Stereochemistry
18		Drug metabolism-Metabolic changes of drug in the body
19		Factors affecting the Metabolism, Pathway of Metabolism
20	Unit 3	Preparation and uses of Complex Metal hydride- Aluminium Hydride
21		Preparation and uses of Complex Metal hydride- Gilman's reagents
22		Preparation and uses of Complex Metal hydride- Lithium diisopropylamide
23		Preparation and uses of Complex Metal hydride- Osmium tetra Oxide
24		Preparation and uses of Complex Metal hydride- Dicyclohexylcarbodiisomide
25		Preparation and uses of Complex Metal hydride- 1,3-Dithian
26		Preparation and uses of Complex Metal hydride- Phase transfer catalysis
27		Preparation and uses of Complex Metal hydride- Wilkinson's Catalysis
28		Preparation and uses of Complex Metal hydride- Raney Nickel
29		Preparation and uses of Complex Metal hydride- Lead tetra acetate periodic acid
30		Preparation and uses of Complex Metal hydride- Diazomethane
31		Preparation and uses of Complex Metal hydride- Ozone

32	Unit 4	Heterocyclic Compounds Synthesis,Reactivity
33		Heterocyclic Compounds Chemical Properties, Applications
34		Applications and Biological Significance of following heterocyclic Compounds- Mono heteroatom system: Indole
35		Applications and Biological Significance of following heterocyclic Compounds- Mono heteroatom system: Quiniline
36		Applications and Biological Significance of following heterocyclic Compounds- Mono heteroatom system: Isoquinoline
37		Applications and Biological Significance of following heterocyclic Compounds- Multi heteroatom system: Diazole
38		Applications and Biological Significance of following heterocyclic Compounds- Multi heteroatom system: Pyrazole
39		Applications and Biological Significance of following heterocyclic Compounds- Multi heteroatom system: Imidazole
40		Applications and Biological Significance of following heterocyclic Compounds- Multi heteroatom system: Oxazole
41	Unit 5	Addition to carbon-hetero multiple bonds
42		Mechanism of metal hydride reduction of saturated and unsaturated carbonyl compounds, acid esters and nitriles
43		Mechanism of metal hydride reduction of saturated and unsaturated carbonyl compounds, acid esters and nitriles
44		Mechanism of metal hydride reduction of saturated and unsaturated carbonyl compounds, acid esters and nitriles
45		Addition of Grignard reagents, organozinc and organolithium reagents to carbonyl compounds
46		Addition of Grignard reagents, organozinc and organolithium reagents to carbonyl compounds
47		Addition of Grignard reagents, organozinc and organolithium reagents to carbonyl compounds
48		Mechanism of condensation reactions involving enolates-Aldol
49		Mechanism of condensation reactions involving Knoevenagel, Claisen
50		Mechanism of condensation reactions involving Mannich, Benzoin
51		Mechanism of condensation reactions involving Perkin and Stobbe Reaction
52		Mechanism of condensation reactions involving Hydrolysis of ester and amides
53		Mechanism of condensation reactions involving Ammonolysis of Ester

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 Department of Chemical Sciences  
 Lesson Plan - M.Sc. II Sem Pharmaceutical Chemistry (Jan 2021 - June 2021)  
 Subject - Inorganic Pharmaceutical Chemistry  
 Teacher - Prof. Seema Shintre

Day/Lecture	Unit	Topic
1	Unit 1	Sources of Impurities in Pharmaceutical Chemicals
2		Effects of Impurities
3		Permissible Impurities in Pharmaceutical Substances
4		Method Used to Purify Inorganic Substances
5		Tests of Purity
6		Limit Test of Chloride
7		Limit Test of Sulphate
8		Limit Test of Arsenic
9		Limit Test of Iron
10		Limit Test of Lead
11	Unit 2	Introduction to Topical, Gastro-Intestinal, Respiratory drugs
12		Dusting Powders
13		Lubricants
14		Astringents
15		Antacid
16		Digestants
17		Emetics
18		Adsorbents
19		Expectorants
20		Antitussives
21	Unit 3	Basic Properties
22		Production
23		Quality Control
24		Stability
25		Clinical and Medicinal Applications of Radio Isotopes used in Pharmacy
26		Medicinal Preparations of Diagnostic Agents
27		Medicinal Preparations of Therapeutic Agents
28	Unit 4	Role of Calcium in Body
29		Deficiency Disorder of Calcium
30		Preparation, Properties and Uses of Calcium Acetate
31		Preparation, Properties and Uses of Calcium Carbonate
32		Preparation, Properties and Uses of Calcium Chloride
33		Preparation, Properties and Uses of Calcium Gluconate
34		Preparation, Properties and Uses of Calcium Hydroxide
35		Preparation, Properties and Uses of Calcium Lactate
36		Importance of Iron in Human Body
37		Deficiency Disorder of Iron
38		Preparation Properties and Uses of Ferric Ammonium Citrate
39		Preparation Properties and Uses of Ferrous Fumarate
40		Preparation Properties and Uses of Ferrous Gluconate
41		Preparation Properties and Uses of Ferrous Succinate
42		Preparation Properties and Uses of Ferrous Sulphate

43	Unit 5	Absorbents
44		Adsorbents
45		Antioxidant
46		Preservatives
47		Excipients
48		Suspending Agents
49		Filter Aids
50		Colourants
51		Tonicity Adjusting Agent
52		Colouring Agent
53		Flavouring Agent
54		Sweetening Agent
55		Ointment
56		Suppository Bases
57		Diluents Agent
58		Binders Agent
59		Disintegrating Agent
60		Lubricants



<p align="center"><b>Maharaja Ranjit Singh College of Professional Sciences, Indore</b>            Department of Chemical Sciences            Lesson Plan - M.Sc. II Sem Pharmaceutical Chemistry (Jan 2021 - June 2021)            Subject - Principle of Physical Pharmacy            Teacher - Dr. Mukesh Gupta</p>		
Day/Lecture	Unit	Topic
1	Unit 1	Introduction
2		Newtonian Systems
3		Non-Newtonian Systems
4		Thixotropy
5		Determination of Rheological Properties
6		Viscoelasticity
7		Psychorheology
8		Application of Pharmacy
9	Unit 2	Suspensions
10		Interfacial Properties of Suspended Particles
11		Formulation of Suspensions
12		Emulsions
13		Theories of Emulsification
14		Theories of Emulsification
15		Semisolids
16		Drug Kinetics in Coarse Disperse System
17		Drug Diffusion in Coarse Disperse System
18	Unit 3	Prodrug Liposomes
19		Morphology
20		Reservoir Devices - Microcapsules
21		Nano Capsules
22		Nanoparticles
23		Ocular Administration
24		Nasal Administration
25		Buccal Administration
26		Pulmonary Administration
27		Gastrointestinal Administration
28		Rectal Administration
29		Transdermal Administration
30		Preparation, Properties and Uses of Calcium Chloride

31	Unit 4	Historical Background
32		Pharmaceutical Application of Polymers
33		Definitions
34		Molecular Weight Determination from Solution Viscosity
35		Conformation of Dissolved Linear Micromolecules
36		Polymers as Thickening Agents
37		Polymer Solution-Overview
38		Solvent Selection
39		Preparing Polymer Solutions
40		Preparation, Properties and Uses of Ferrous Sulphate
41	Unit 5	Thermodynamics of Polymer Solutions
42		Phase Separation
43		Gel Formation
44		Coacervation
45		Microencapsulation
46		Polymers in the Solid State- Overview
47		Mechanical Properties
48		Interchain Cohesive Forces
49		Crystallinity
50		Tacticity
51		Morphology
52		Orientation
53		Thermodynamics of Fusion
54		Thermodynamics of Crystallization
55		Glass Rubber Transition
56		Plasticization
57		Elastomers
58		Fabrication Technology
59		Future Trends in Pharmaceutical
60		Biological uses of Polymers

**Maharaja Ranjit Singh College of Professional Sciences, Indore**  
 Department of Chemical Sciences  
 Lesson Plan - M.Sc. II Sem Pharmaceutical chemistry (Jan 2021 - June 2021)  
 Subject - Pharmaceutical Analysis  
**Teacher - Dr Lal Kumar**

Day/Lecture	Unit	Topic
1	Unit 1	Introduction of Chromatography and chromatographic methods
2		Principles of Chromatography
3		Techniques and application of thin layer chromatography (TLC)
4		Techniques and application of thin layer chromatography (TLC)
5		Column Chromatography
6		Column Chromatography
7		Gas-liquid Chromatography in pharmaceutical analysis
8		Gas-liquid Chromatography in pharmaceutical analysis
9	Unit 2	High performance liquid chromatography (HPLC)
10		High performance liquid chromatography (HPLC)
11		Ion Exchange Chromatography
12		Ion Exchange Chromatography
13		Ion Exchange Chromatography
14		Size Exclusion or Gel Chromatography
15		Size Exclusion or Gel Chromatography
16	Unit 3	Introduction of solvent extraction
17		Principle of liquid-liquid extraction
18		Principle of Solid-liquid extraction
19		Distribution law
20		Factor favouring solvent extraction
21		Factor favouring solvent extraction
22		Sequence of extraction process
23		Extraction technique-Batch extraction
24		Extraction technique-Batch extraction
25		Extraction technique-Batch extraction
26		Stripping extraction
27		Continue extraction and soxhelt ectraction
28		Continue extraction and soxhelt ectraction
29		Important applications of liquid-liquid extraction

30	Unit 4	Introduction of trimetry and gravimetry analysis
31		Determination of dissolve oxygen (DO)
32		Determination of dissolve oxygen (DO)
33		Determination of dissolve oxygen (DO)
34		Determination of Biological oxygen demand (BOD)
35		Determination of Biological oxygen demand (BOD)
36		Determination of Biological oxygen demand (BOD)
37		Determination of Chemical oxygen demand (COD)
38		Determination of Chemical oxygen demand (COD)
39		Determination of Chemical oxygen demand (COD)
40		Determination of Arsenic by trimetric and gravimetric method
41		Determination of Cadmium by trimetric and gravimetric method
42		Determination of Lead by trimetric and gravimetric method
43		Determination of Mercury by trimetric and gravimetric method
44		Determination of Calcium by trimetric and gravimetric method
45		Determination of Magnesium by trimetric and gravimetric method
46	Unit 5	Introduction of Naphelometry and Turbidimetry
47		Theory and principle of Turbidimetry
48		Theory and principle of Nephelometry
49		Instrumentation- single beam and double beam
50		Instrumentation- single beam and double beam
51		Instrumentation- single beam and double beam
52		Factors affectinf the measurements
53		Application of Nephelometry
54		Application of Turbidimetry
55		

Maharaja Ranjit Singh College of Professional Sciences, Indore  
 Department of Chemical Sciences  
 Lesson Plan - M.Sc. - II Sem Pharmaceutical Chemistry (Jan 2021 - June 2021)  
 Subject - Computer for Pharmaceutical Chemistry  
 Teacher - Prof. Pravin Kumar Sharma

Day/Lecture	Unit	Topic
1	I	Introduction of computer and its components with the help of block diagram and characteristics
2	I	Classification of computer with hierarchical diagram: Purpose, Data Handling and Functionality
3	I	Generation of Computers on the basis: Period, Technology, Languages, Memory, Important computers, Merits and Demerits
4	I	Input and Output devices and their functions
5	I	Memory and its Classification: Primary(RAM, ROM and its types)
6	I	Secondary Memory: Sequential Access and Direct Access(Magnetic Tape, Magnetic disk, Optical disk)
7	I	What is Program, software and types of software,
8	I	Programming language and its types: High level, Middle level and Low level
9	I	Introduction of Operating system and its logical architecture
10	I	Types and functions of operating system
11	I	Difference between CLI/GUI operating system(DOS, Windows and UNIX)
12	II	Tools of Programming Languages: Algorithm, its keyword and advantage and disadvantages, Flowchart, its notations
13	II	Introduction of C Language and its historical development, types of C
14	II	Keywords, Identifiers, Literals, Constant and Variables
15	II	What is Instruction?, types of Instructions used in C: Arithmetic, Control, I/O and type declaration
16	II	Data types used in C language: Primary, Pointer, Derived, Void, User defined
17	II	Statements in C Language: Expression, Compound and Control
18	II	Decision control statement: if, if-else and conditional, nested-if-else
19	II	Operator and its types: Arithmetic, Relational, Logical, Increment and Decrement, Condition, bitwise and Special
20	II	Hierarchy of operators, Loop control structures: for, while, do-while and Odd
21	II	Jumping Statements: goto, break and continue,
22	II	Case control structures: switch() and exit()
23	II	Difference between for, while and do-while loop control structures
24	II	Function and its types: Library and User-defined
25	III	Program to print addition, subtraction, multiplication and division
26	III	Program to calculate factorial of given number
27	III	Program to print table of given number
28	III	Program for Vander wall equation
29	III	Program to calculate Normality, Molarity and Molality of solutions
30	III	Program for radioactive decay(half life and full life)
31	IV	Standard software packages: MS-word its features, mail-merge, macros, formatting & table handling, header and footer
32	IV	MS-Excel: spread sheet, workbook and its contents, cell
33	IV	working with formulas, sorting, freeze panes and filters
34	IV	Insert charts in MS-Excel: Pie, Bar, column
35	IV	Introduction of MS-Power point and its features,
36	IV	components of power point: slide, Handouts, Speakers note and outline view
37	IV	Custom animation, setup show and its options, slide transition
38	IV	Different views of power point presentation
39	V	Introduction of Internet, its advantages and disadvantages
40	V	Search engines and its types and list of different search engines for chemist
41	V	Types of files: PDF, JPG, JPEG, Bitmap, DOCX, XLSX

**Maharaja Ranjit Singh College of Professional Sciences, Indore**

Department of Chemical Sciences

Lesson Plan - M.Sc. II Sem Pharmaceutical Chemistry (Jan 2021 - June 2021)

Subject - Pharmaceutical practical Lab-course-I

**Teacher - Dr. Mukesh Gupta**

<b>Day/Lecture</b>	<b>Unit</b>	<b>Topic</b>
1		Volumetric Assay of Ampicilline
2		Volumetric Assay of Aspirin
3		Volumetric Assay of Aluminium hydroxide
4		Volumetric Assay of Magnesium sulphate
5		Volumetric Assay of Lithium Carbonate
6		Gravimetric Assay of Sodium Sulphate (ppt. BaSO <sub>4</sub> )
7		Separation of Paracetamol and Ibuprofen by TLC
8		Separation of Vitamins by TLC
9		Separation of Alpha amino acid by paper chromatography

**Maharaja Ranjit Singh College of Professional Sciences, Indore**

Department of Chemical Sciences

Lesson Plan - M.Sc. II Sem Pharmaceutical Chemistry (Jan 2021 - June 2021)

Subject - Pharmaceutical practical Lab-course-II

**Teacher - Dr. Mukesh Gupta**

<b>Day/Lecture</b>	<b>Unit</b>	<b>Topic</b>
1		Potentiometric Analysis of Sulphanilamide by titration with $\text{NaNO}_2$
2		Conductometric Analysis of Chlorides in drugs
3		Determination of COD ( chemical oxygen demand) of water sample
4		Estimation of Phenols using bromate bromide solution or Acetylation method
5		Determination of Heat of Ionization of Acetic acid
6		Investigate the auto catalytic reaction between $\text{KMnO}_4$ and Oxalic acid
7		Inv. Ads. of Oxalic acid by activated charcoal and test validity of Freundlich & Langmuir isotherm
8		To construct phase diagram for three component system (Chloroform-Acetic acid-Water)
9		To study the physical parameters of tablets Hardness
10		To study the physical parameters of tablets Friability
11		Disintegration test of coated and uncoated tablets and capsules
12		Dissolution test of coated and uncoated tablets and capsules