

Maharaja Ranjit Singh College of Professional Sciences, Indore		
Department of Biosciences		
Lesson Plan - B. Sc. Year I Life Science (July 2020 -June 2021)		
Micro+Chem+LS, BT+Chem+LS		
Paper I- Introduction to Biochemistry, Cell Biology, Plant & Animal Diversity		
Teacher - Prof. Manisha Malik		
Day/Lecture	Unit	Topic
1	1	Carbohydrate Introduction and Properties
2		Classification of Carbohydrates
3		Classification of Carbohydrates and Functions
4		Lipids: Introduction
5		Classification, Structure and Function
6		Classification, Structure and Function
7		Vitamins: Introduction and Occurrence
8		Functions of Vitamins
9		Functions of Vitamins
10	2	Introduction to Amino Acids
11		Introduction to Proteins
12		Structure of Proteins
13		Functions of Proteins
14		Enzymes: Introduction & Classification
15		Factors affecting enzymatic activity
16		Mechanism of enzyme action
17		Kinetics of enzyme catalyzed reactions
18		Introduction to Nucleic Acids
19		Structure & Function of DNA
20	Structure & Function of RNA	
21	3	Structure of Prokaryotic Cells
22		Structure of Eukaryotic Cells
23		Structure & Function of Plasma Membrane
24		Structure & Function of Plasma Membrane
25		Structure & Function of Endoplasmic Reticulum
26		Structure & Function of Golgi Apparatus
27		Structure & Function of Lysosomes & Ribosomes
28		Structure & Function of Mitochondria
29		Structure & Function of Chloroplast
30		Structure & Function of Nucleus
31		Cell division (Mitosis)
32		Cell division (Meiosis)
33	4	General Characteristics of Algae & its Economical Importance
34		General Characteristics of Fungi & its Economical Importance
35		General Characteristics of Lichens & its Economical Importance
36		General Characteristics & Adaptations of Bryophytes
37		General Characteristics & Adaptations of Pteridophytes
38		General Characteristics & Adaptations of Gymnosperms
39		General Characteristics of Monocot & Dicot Plants

40		Differences in Monocot & Dicot Plants
41		Anatomical Features of woody Plants
42		Economical Importance of Angiospermic Plants
43		General Characteristics of Annelids & Arthropods
44		General Characteristics of Mollusca & Pisces
45		General Characteristics of Amphibians & Reptiles
46	5	General Characteristics of Aves & Mammals
47		Osmoregulation in Fishes
48		Parental Care in Amphibians
49		Salient features of Poisonous & Non- Poisonous Snakes
50		Flight Adaptation in Birds

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Lesson Plan - B. Sc. Year I Life Science (July 2020 -June 2021)		
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Paper II- Environmental Biology, Genetics & Evolution		
Teacher - Prof. Sakina Indorewala		
Day/Lecture	Unit	Topic
1	1	Structure & Function of Ecosystem
2		Factors of Ecosystem & Ecological Pyramids
3		Energy Flow in Ecosystem & Food chain
4		Food Web & Trophics Levels
5		Ecological factors - Ecological Adaptations in Plants & Animals
6		Aquatic & Dessert Adaptation
7		Ecological Succession - Hydrosphere & Xerosphere
8	2	Environmental Pollution : Air Pollution
9		Sources, Nature & Effect of Water Pollution
10		Sources, Nature & Effect of Soil Pollution
11		Sources, Nature & Effect of Noise Pollution
12		Sources, Nature & Effect of Nuclear & Radioactive Pollution
13		Ozone Layer Depletion & Acid Rain
14		Global Warming
15		Nitrogen Cycle
16		Carbon Cycle
17		Sulphur & Phosphorus Cycle
18	Biofertilizers & Biopesticides	
19	3	Mendelian Laws of Inheritance
20		Incomplete Dominance & Codominance
21		Epistatsis, Complementary Ratio & Supplementary ratio
22		Cytoplamic Inheritance, Plastid & Kappa particles
23		Linkage & Crossing Over (Coupling & Repulsion Hypothesis)
24		Mechanism of Sex Determination
25		Sex linked Inheritance
26	4	Structure of Chromosomes
27		Polytene & Lampbrush Chromosomes
28		Chromosome related disorders - Klienfilter's Syndrome
29		Turner's Syndrome, Down Syndrome & Cri du chat Syndrome
30		Spontaneous & Induced Mutations
31		Chemical & Physical Mutagens
32		Molecular basis of Mutation
33	5	Theories of Organic Evolution - Lamarckism & Neo- Lamarckism
34		Darwinism & Neo- Darwinism
35		Germplasm Theory & Mutation Theory
36		Gene Pool & Random genetic Drift
37		Hardy Weinberg Law
38		Isolation & Types of Isolating Mechanisms

Maharaja Ranjit Singh College of Professional Sciences, Indore		
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Lesson Plan - B. Sc. Year II Life Science (July 2020 -June 2021)		
Micro+Chem+LS, BT+Chem+LS		
Paper I- Morphology, Developmental Biology & Physiology of Angiosperms		
Teacher - Dr. Monica Jain		
Day/Lecture	Unit	Topic
1	1	The Root System : Organization of Root Apex
2		Anatomy of Root in Monocotyledons & Dicotyledons
3		The Shoot System: Organization of Shoot Apex
4		Anatomy of Shoot in Monocotyledons & Dicotyledons
5		Anatomy of Leaf in Monocotyledons & Dicotyledons
6		Stomata: Mechanism of Stomatal movement
7		Secondary growth in Dicotyledons
8		Morphology of Flower
9	2	Microsporogenesis
10		Megasporogenesis
11		Pollination & Fertilization
12		Endosperm & Development of embryo in Monocotyledons & Dicotyledons
13	3	Plant Water Relations: Absorption of Water
14		Transpiration & Ascent of Sap
15		Photosynthesis: Photosynthetic Apparatus
16		Pigments of Photosynthesis
17		Factors of Photosynthesis
18	4	Respiration: Glycolysis
19		TCA Cycle
20		Electron Transport in Mitochondria
21		Pentose Phosphate Pathway
22		Nitrogen Metabolism: Biological Nitrogen Fixation
23		Nitrate reduction & its regulation
24		Ammonia Assimilation
25	5	Structure & Function of Auxins
26		Structure & Function of Gibberlins
27		Structure & Function of Cytokinins
28		Structure & Function of Ethylene & Abscisic Acid
29		Photoperiodism & Vernalization
30		Phytochrome
31		Plant Movements: Autonomic or Spontaneous Movements
32		Paratonic or Induced Movements

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Paper II- Morphology, Developmental Biology & Physiology of Mammals		
Teacher - Prof. Sakina Indorewala		
Day/Lecture	Unit	Topic
1	1	Digestive system of Mammals: Structure & Function
2		Digestion & Absorption of Carbohydrates
3		Digestion & Absorption of Lipids
4		Digestion & Absorption of Proteins
5		Secretory Function of Alimentary canal
6		Excretory System of Mammals: Structure & Function
7		Structure of Nephron
8		Formation of Urea
9		Formation of Urine
10	2	Respiratory System of Mammals: Morphology of Respiratory Organs
11		Mechanism of Respiration
12		Transport of Oxygen & Carbon dioxide by Blood
13		Circulatory System of Mammals: Morphology of Heart
14		Course of Blood Circulation
15		Composition of Blood & its functions
16		Mechanism of Blood Clotting
17	3	Muscular System of Mammals: Types of Muscles
18		Structure & Function of Muscles
19		Mechanism of Muscle Contraction
20		Nervous System of Mammals: Structure of Nervous Tissue
21		Neurons, Nerve fibers & Neuroglia
22		Mechanism of Nerve Impulse transmission
23		Reflex Action
24		Neuromuscular Junctions
25	4	Endocrine System of Mammals: Structure & Function of Pituitary gland
26		Structure & Function of Hypothalamus gland
27		Structure & Function of Thyroid gland
28		Structure & Function of Parathyroid gland
29		Structure & Function of Pancreas
30		Structure & Function of Adrenal gland
31		Disorders of Endocrine Glands
32		Disorders of Endocrine Glands
33	5	Reproductive system of Mammals: Structure of Male Reproductive Organs
34		Reproductive system of Mammals: Structure of Female Reproductive Organs
35		Female Reproductive Cycles (Menstrual & Oestrus Cycle)
36		Spermatogenesis
37		Oogenesis
38		Fertilization & its mechanism
39		Significance of Fertilization
40		Types and Patterns of Cleavage
41		Process of Blastulation
42		Formation of Germinal Layers

43	Extraembryonic Membranes
44	Placentation in mammals

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Department of Biosciences		
Lesson Plan - B. Sc. Year III Life Science (July 2020 -June 2021)		
Micro+Chem+LS, BT+Chem+LS		
Paper I- Microbiology, Immunology and Animal Cell Culture		
Teacher - Prof. Zahabiya Saifee & Dr. Fatema Matkawala		
Day/Lecture	Unit	Topic
1	1	Microbial Classification
2		Bacterial Classification (3 kingdom, 5 kingdom, 3 domain)
3		Bergey's Classification
4		Nutritional Classes of Bacteria
5		Microbiological Media & its Types
6		Pure Culture Isolation Techniques
7		Culture Maintenance
8		Staining Techniques: Simple & Gram's Staining
9		Differential & Acid Fast Staining
10		Bacterial Growth - Stages of Growth Cycle
11		Factors affecting Growth
12		Batch & Continuous Culture
13		Measurement of Bacterial Growth
14	2	Plasmids: Definition & Types
15		Identification & Classification of Plasmids
16		Bacterial Conjugation
17		F- mediated & Merozygotes
18		Transformation
19		Transduction (General & Specialized)
20		Viruses: General Characteristics
21		Classification & Replication of Bacteriophages
22		Principle type of Fermentation processes
23		Batch & Continuous Fermentations
24	3	Cells of Immune System
25		Organs of Immune System
26		Innate Immunity
27		Acquired Immunity
28		Primary & Secondary Immune Response
29		Humoral & Cell mediated Immunity
30		Humoral & Cell mediated Immunity
31	4	Antigens
32		Haptens & Epitopes
33		Antibody: Structure & types
34		Properties & Functions of Immunoglobulins
35		Antigen-Antibody reactions
36		Quantitative precipitin Titration
37		Immunological Techniques: Haemagglutination
38		ELISA
39		ODD & RID

40		Vaccines & Immunization
41	5	Animal Cell Culture: Culture Media
42		Primary & Secondary Culture
43		Cell lines
44		Growth Curve of Animal Cells in Culture
45		Transfection of Animal Cell Lines
46		HAT Selection & Selectable Markers
47		Antibiotic Resistance
48		Expression of Clone Proteins in Animal Cells & its uses
49		Stem cell Culture & its Applications

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Lesson Plan - B. Sc. Year III Life Science (July 2020 -June 2021)			
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Paper II- Molecular Biology, Genetic Engineering & Plant Tissue Culture			
Teacher - Dr. Monica Jain & Dr. Fatema Matkawala			
Day/Lecture	Unit	Topic	
1	1	DNA Replication in Prokaryotes	
2		DNA Replication in Eukaryotes	
3		Semi Conservative Nature of DNA Replication	
4		Transcription in Prokaryotes	
5		Transcription in Eukaryotes	
6		RNA Processing - 5' Cap formation	
7		3' End Processing	
8		Polyadenylation & Splicing	
9		Transposable elements: Definition	
10		Types of Bacterial transposons	
11		Applications of Transposons	
12		Genetic Code- Important Characteristics	
13		Prokaryotic Translation	
14		Eukaryotic Translation	
15	2	Regulation of Gene Expression in Prokaryotes	
16		Operon Concept- Lac Operon	
17		Operon Concept- Trp Operon	
18		Gene Regulation in Eukaryotic System	
19		Promoters, Enhancers elements & Gene Amplification	
20		Isolation of Genomic & Plasmid DNA from Bacteria	
21		Isolation of Genomic DNA from Plant & Animal cells	
22		Cloning Vectors (pUC 19, Phage 2, Cosmid & M13)	
23		Restriction Enzymes	
24		Other enzymes in Ligation Technology	
25		Introduction of DNA into living cells	
26		3	Methods of Gene Transfer
27			Expression & Detection of Clones
28			Introduction to Blotting Technique
29	Western Blotting		
30	Southern Blotting		
31	Northern Blotting		
32	Introduction to PCR, RAPD & RFLP		
33	Terms & Definition of Plant Tissue Culture		
34	Media Ingredients		
35	Various Media & Sterilizing Agents		
36	4	Cell Culture : Initiation of callus & Isolation of Single cells	
37		Suspension Cultures & Batch Cultures	
38		Protoplast Culture & Cybrids	
39		Applications of PTC in Horticulture, Agriculture & Pharmaceutical Industry	
40		Clonal Propagation: General Techniques	
41		5	Factors affecting Clonal Propagation
42			Applications of Clonal Propagation
43			Production of Haploid Plants
44			Factors affecting Androgenesis
45			Limitations & Applications of Androgenesis
46	Plant Transformation: Methods of Gene Transfer		

47	<i>Agrobacterium tumefaciens</i> mediated Transformation
48	Direct Gene Transfer methods
49	Selection & Identification of transformed cells

Chandigarh Rajit Singh College of Professional Sciences, Indore

Department of Biosciences

Lesson Plan for B. Sc. I Year Life Science (July 2020- June 2021)

BT+Chem+LS, Micro+Chem+LS

Subject: Practicals

Teacher - Prof. Sakina Indorewala

Day/Lecture	Topic
1	Qualitative analysis of Carbohydrates
2	Qualitative analysis of Carbohydrates
3	Qualitative analysis of Proteins
4	Qualitative analysis of Proteins
5	Qualitative analysis of Lipids
6	Study of different stages of Mitosis & Meiosis using permanent slides.
7	Study of different stages of Mitosis by Onion root tip squash method
8	Study of different stages of Mitosis by Onion root tip squash method
9	Separation of Amino acids by Paper chromatography
10	Separation of Amino acids by Paper chromatography
11	Preparation of Herbarium
12	Preparation of Animal Album
13	Study of floral organs by dissection of flower & representing it by floral diagram & floral formula
14	To determine the frequency, density & abundance of vegetation by Quadrant method.
15	Study of ecological adaptations in Hydrophytes & Xerophytes.
16	Study of ecological adaptations in Hydrophytes & Xerophytes.
17	Soil Analysis
18	Soil Analysis
19	Water Analysis
20	Water Analysis
21	Working out the Laws of Inheritance
22	Study of Biogeochemical Cycles using Charts: Nitrogen Cycle
23	Study of Biogeochemical Cycles using Charts: Carbon Cycle
24	Study of Biogeochemical Cycles using Charts: Sulphur Cycle
25	Study of Biogeochemical Cycles using Charts: Phosphorus Cycle

Haraja Ranjit Singh College of Professional Sciences, Ind

Department of Biosciences

Lesson Plan for B. Sc. II Year Life Science (July 2020- June 2021)

BT+Chem+LS, Micro+Chem+LS

Subject: Practicals

Teacher - Prof. Sakina Indorewala

Day/Lecture	Topic
1	Perform histological study of root, stem & leaf for identification of monocotyledons & dicotyledons Plant System.
2	Perform histological study of root, stem & leaf for identification of monocotyledons & dicotyledons Plant System.
3	Study of floral organs by dissection of flower & representing it by floral diagram & floral formula
4	Separation & identification of leaf pigments by Paper chromatography
5	Separation & identification of leaf pigments by Paper chromatography
6	Study of Plasmolysis & Deplasmolysis using Tradescantia peel.
7	Study of Plasmolysis & Deplasmolysis using Tradescantia peel.
8	Effect of Auxin on Plant growth.
9	Effect of Cytokinin on Plant growth.
10	Estimation of Hemoglobin
11	RBC counting by Haemocytometer
12	WBC counting by Differential cell count
13	Blood Group test
14	Clotting time Estimation
15	Bleeding time Estimation
16	Study of different Developmental Stages of Chick Embryo
17	Study & Comment on the histological slides and charts related to: Digestive system, Excretory system, Respiratory system, Circulatory system, Muscular system, Nervous system, Endocrine system, Reproductive system, & Developmental

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Lesson Plan for B. Sc. III Year Life Science (July 2020 - June 2021)	
BT+Chem+LS, Micro+Chem+LS	
Subject: Practicals	
Teacher - Fatema Matkawala & Zahabiya Saifee	
Day/Lecture	Topic
1	Monochrome staining
2	Gram's Staining
3	Negative Staining
4	Endospore Staining
5	Media Preparation: Nutrient Agar & Nutrient Media
6	Cultivation Technique: Streak Plate & Pour Plate method
7	Cultivation Technique: Streak Plate & Pour Plate method
8	Isolation and enumeration of microorganisms from air
9	Isolation and enumeration of microorganisms from air
10	Isolation and enumeration of microorganisms from water
11	Isolation and enumeration of microorganisms from water
12	Isolation and enumeration of microorganisms from soil
13	Isolation and enumeration of microorganisms from soil
14	Isolation of Amylase producers from Soil.
15	Isolation of Amylase producers from Soil.
16	Isolation of Protease producers from Soil.
17	Isolation of Protease producers from Soil.
18	Isolation of Antibiotic Producing microorganisms from Soil
19	Effect of UV radiation on Microorganisms.
20	Use of Ethyl Alcohol as Sterilizing Agent.
21	Blood group analysis
22	Differential WBC count
23	To examine Flocculation reaction using VDRL test
24	To observe the Agglutination reaction using WIDAL test
25	Enumeration of RBC
26	DOT ELISA
27	Ouchterlony Double Diffusion Method
28	Ouchterlony Double Diffusion Method
29	Determine the concentration of unknown antigen using Radial Immuno Diffusion technique
30	Determine the concentration of unknown antigen using Radial Immuno Diffusion technique
31	Chromosomal DNA isolation from Plant cells
32	Chromosomal DNA isolation from Plant cells
33	Genomic DNA isolation from Microorganisms
34	Genomic DNA isolation from Microorganisms
35	Chromosomal DNA isolation from Animal cells
36	Chromosomal DNA isolation from Animal cells
37	Germination of Seed in <i>in vitro</i> for Axenic cultures
38	Primary Establishment of culture from leaf & stem explants
39	Clonal Propagation
40	Anther & Pollen culture & check the Viability of Pollens