

Maharaja

Lesson

Paper I- Intro

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Ranjit Singh College of Professional Sciences, Indore

Department of Biosciences

1 Plan - B. Sc. Year I Life Science (July 2018-June 2019)

Micro+Chem+LS, BT+Chem+LS

Introduction to Biochemistry, Cell Biology, Plant & Animal Diversity

Teacher - Prof. Baishali Roy

Topic

Carbohydrate Introduction and Properties

Classification of Carbohydrates

Classification of Carbohydrates and Functions

Lipids: Introduction

Classification, Structure and Function

Classification, Structure and Function

Vitamins: Introduction and Occurrence

Functions of Vitamins

Functions of Vitamins

Introduction to Amino Acids

Introduction to Proteins

Structure of Proteins

Functions of Proteins

Enzymes: Introduction & Classification

Factors affecting enzymatic activity

Mechanism of enzyme action

Kinetics of enzyme catalyzed reactions

Introduction to Nucleic Acids

Structure & Function of DNA

Structure & Function of RNA

Structure of Prokaryotic Cells

Structure of Eukaryotic Cells

Structure & Function of Plasma Membrane

Structure & Function of Plasma Membrane

Structure & Function of Endoplasmic Reticulum

Structure & Function of Golgi Apparatus

Structure & Function of Lysosomes & Ribosomes

Structure & Function of Mitochondria

Structure & Function of Chloroplast

Structure & Function of Nucleus

Cell division (Mitosis)

Cell division (Meiosis)

General Characteristics of Algae & its Economical Importance

General Characteristics of Fungi & its Economical Importance

General Characteristics of Lichens & its Economical Importance

General Characteristics & Adaptations of Bryophytes

General Characteristics & Adaptations of Pteridophytes

General Characteristics & Adaptations of Gymnosperms

General Characteristics of Monocot & Dicot Plants
Differences in Monocot & Dicot Plants
Anatomical Features of woody Plants
Economical Importance of Angiospermic Plants
General Characteristics of Annelids & Arthropods
General Characteristics of Mollusca & Pisces
General Characteristics of Amphibians & Reptiles
General Characteristics of Aves & Mammals
Osmoregulation in Fishes
Parental Care in Amphibians
Salient features of Poisonous & Non- Poisonous Snakes
Flight Adaptation in Birds

Maharaja

Lesson

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Ranjit Singh College of Professional Sciences, Indore

Department of Biosciences

Plan - B. Sc. Year I Life Science (July 2018 -June 2019)

Micro+Chem+LS, BT+Chem+LS

Semester II- Environmental Biology, Genetics & Evolution

Teacher - Dr. Monica Jain & Prof. Baishali Roy**Topic**

Structure & Function of Ecosystem

Factors of Ecosystem & Ecological Pyramids

Energy Flow in Ecosystem & Food chain

Food Web & Trophics Levels

Ecological factors - Ecological Adaptations in Plants & Animals

Aquatic & Desert Adaptation

Ecological Succession - Hydrosphere & Xerosphere

Environmental Pollution : Air Pollution

Sources, Nature & Effect of Water Pollution

Sources, Nature & Effect of Soil Pollution

Sources, Nature & Effect of Noise Pollution

Sources, Nature & Effect of Nuclear & Radioactive Pollution

Ozone Layer Depletion & Acid Rain

Global Warming

Nitrogen Cycle

Carbon Cycle

Sulphur & Phosphorus Cycle

Biofertilizers & Biopesticides

Mendelian Laws of Inheritance

Incomplete Dominance & Codominance

Epistasis, Complementary Ratio & Supplementary ratio

Cytoplasmic Inheritance, Plastid & Kappa particles

Linkage & Crossing Over (Coupling & Repulsion Hypothesis)

Mechanism of Sex Determination

Sex linked Inheritance

Structure of Chromosomes

Polytene & Lampbrush Chromosomes

Chromosome related disorders - Klinefelter's Syndrome

Turner's Syndrome, Down Syndrome & Cri du chat Syndrome

Spontaneous & Induced Mutations

Chemical & Physical Mutagens

Molecular basis of Mutation

Theories of Organic Evolution - Lamarckism & Neo- Lamarckism

Darwinism & Neo- Darwinism

Germplasm Theory & Mutation Theory

Gene Pool & Random genetic Drift

Hardy Weinberg Law

Isolation & Types of Isolating Mechanisms

Instantaneous and Gradual Speciation

Maharaja Ranjit Singh College of Professional Sciences, Indore		
Department of Biosciences		
Lesson Plan - B. Sc. Year II Life Science (July 2018 -June 2019)		
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

Maharaja Ranjit Singh College of Professional Sciences, Indore		
Department of Biosciences		
Lesson Plan - B. Sc. Year II Life Science (July 2018 -June 2019)		
Micro+Chem+LS, BT+Chem+LS		
Paper II- Morphology, Developmental Biology & Physiology of Mammals		
Teacher - Prof. Baishali Roy		
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

Maharaja Ranjit Singh College of Professional Sciences, Indore		
Department of Biosciences		
Lesson Plan - B. Sc. Semester V Life Science (July 2018 -June 2019)		
Micro+Chem+LS, BT+Chem+LS		
Paper- Microbiology, Immunology and Animal Cell Culture		
Teacher - Prof. Zahabiya Saifee & Dr. Fatema Matkawala		
Day/Lecture	Unit	Topic
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	1	Factors affecting Growth
12		Batch & Continuous Culture
13		Measurement of Bacterial Growth
14		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		Design of Typical Fermentor
23		Control of Fermentation parameters
24	2	Batch & Continuous Fermentations
25		Down-Stream processing of Fermentation product
26		Production of Solvent - Ethyl Alcohol
27		Production of Antibiotic - Penicillin
28		Cells of Immune System
29		Organs of Immune System
30		Innate Immunity
31	3	Acquired Immunity
32		Primary & Secondary Immune Response
33		Humoral & Cell mediated Immunity
34		Humoral & Cell mediated Immunity
35		Antigens
36		Haptens & Epitopes
37		Antibody: Structure & types
38		Properties & Functions of Immunoglobulins
39	4	Antigen-Antibody reactions
40		Quantitative precipitin Titration
41		Immunological Techniques: Haemagglutination
42		ELISA
43		ODD & RID
44		Vaccines & Immunization
45		Animal Cell Culture: Culture Media
46		Primary & Secondary Culture
47		Cell lines
48		Growth Curve of Animal Cells in Culture
49	5	Transfection of Animal Cell Lines

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HAT Selection & Selectable Markers
Antibiotic Resistance
Expression of Clone Proteins in Animal Cells & its uses
Stem cell Culture & its Applications

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Ranjit Singh College of Professional Sciences, Indore

Department of Biosciences

n - B. Sc. Semester VI Life Science (July 2018 -June 2019)

Micro+Chem+LS, BT+Chem+LS

Molecular Biology, Genetic Engineering & Plant Tissue Culture

Instructor - Dr. Monica Jain & Dr. Fatema Matkawala

Topic
DNA Replication in Prokaryotes
DNA Replication in Eukaryotes
Semi Conservative Nature of DNA Replication
Transcription in Prokaryotes
Transcription in Eukaryotes
RNA Processing - 5' Cap formation
3' End Processing
Polyadenylation & Splicing
Transposable elements: Definition
Types of Bacterial transposons
Applications of Transposons
Genetic Code- Important Characteristics
Prokaryotic Translation
Eukaryotic Translation
Regulation of Gene Expression in Prokaryotes
Operon Concept- Lac Operon
Operon Concept- Trp Operon
Gene Regulation in Eukaryotic System
Promoters, Enhancers elements & Gene Amplification
Isolation of Genomic & Plasmid DNA from Bacteria
Isolation of Genomic DNA from Plant & Animal cells
Cloning Vectors (pUC 19, Phage 2, Cosmid & M13)
Restriction Enzymes
Other enzymes in Ligation Technology
Introduction of DNA into living cells
Methods of Gene Transfer
Expression & Detection of Clones
Introduction to Blotting Technique
Western Blotting
Southern Blotting
Northern Blotting
Introduction to PCR, RAPD & RFLP
Terms & Definition of Plant Tissue Culture
Media Ingredients
Various Media & Sterilizing Agents
Cell Culture : Initiation of callus & Isolation of Single cells
Suspension Cultures & Batch Cultures
Protoplast Culture & Cybrids
Applications of PTC in Horticulture, Agriculture & Pharmaceutical Industry
Clonal Propagation: General Techniques
Factors affecting Clonal Propagation
Applications of Clonal Propagation

Production of Haploid Plants
Factors affecting Androgenesis
Limitations & Applications of Androgenesis
Plant Transformation: Methods of Gene Transfer
<i>Agrobacterium tumefaciens</i> mediated Transformation
Direct Gene Transfer methods
Selection & Identification of transformed cells

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Department of Biosciences
son Plan for B. Sc. I Year Life Science (July 2018- June 2019)
BT+Chem+LS, Micro+Chem+LS
Subject: Practicals
Teacher - Prof. Baishali Roy
Topic
Qualitative analysis of Carbohydrates
Qualitative analysis of Carbohydrates
Qualitative analysis of Proteins
Qualitative analysis of Proteins
Qualitative analysis of Lipids
Study of different stages of Mitosis & Meosis using permanent slides.
Study of different stages of Mitosis by Onion root tip squash method
Study of different stages of Mitosis by Onion root tip squash method
Separation of Amino acids by Paper chromatography
Separation of Amino acids by Paper chromatography
Preparation of Herbarium
Preparation of Animal Album
Study of floral organs by dissection of flower & representing it by floral diagram & floral formula
To determine the frequency, density & abundance of vegetation by Quadrate method.
Study of ecological adaptations in Hydrophytes & Xerophytes.
Study of ecological adaptations in Hydrophytes & Xerophytes.
Soil Analysis
Soil Analysis
Water Analysis
Water Analysis
Working out the Laws of Inheritance
Study of Biogeochemical Cycles using Charts: Nitrogen Cycle
Study of Biogeochemical Cycles using Charts: Carbon Cycle
Study of Biogeochemical Cycles using Charts: Sulphur Cycle
Study of Biogeochemical Cycles using Charts: Phosphorus Cycle

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Araraja Ranjit Singh College of Professional Sciences, Indore
Department of Biosciences
Lesson Plan for B. Sc. II Year Life Science (July 2018- June 2019)
BT+Chem+LS, Micro+Chem+LS
Subject: Practicals
Teacher - Prof. Baishali Roy
Topic
Perform histological study of root, stem & leaf for identification of monocotyledons & dicotyledons Plant System.
Perform histological study of root, stem & leaf for identification of monocotyledons & dicotyledons Plant System.
Study of floral organs by dissection of flower & representing it by floral diagram & floral formula
Separation & identification of leaf pigments by Paper chromatography
Separation & identification of leaf pigments by Paper chromatography
Study of Plasmolysis & Deplasmolysis using Tradescantia peel.
Study of Plasmolysis & Deplasmolysis using Tradescantia peel.
Effect of Auxin on Plant growth.
Effect of Cytokinin on Plant growth.
Estimation of Hemoglobin
RBC counting by Haemocytometer
WBC counting by Differential cell count
Blood Group test
Clotting time Estimation
Bleeding time Estimation
Study of different Developmental Stages of Chick Embryo
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 Biology.

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raja Ranjit Singh College of Professional Sciences, Indore

Department of Biosciences

n Plan for B. Sc. Semester V Life Science (July 2018 - June 2019)

BT+Chem+LS, Micro+Chem+LS

Subject: Practicals

Teacher - Prof. Baishali Roy**Topic**

Monochrome staining

Gram's Staining

Negative Staining

Endospore Staining

Media Preparation: Nutrient Agar & Nutrient Media

Cultivation Technique: Streak Plate & Pour Plate method

Cultivation Technique: Streak Plate & Pour Plate method

Isolation and enumeration of microorganisms from air

Isolation and enumeration of microorganisms from air

Isolation and enumeration of microorganisms from water

Isolation and enumeration of microorganisms from water

Isolation and enumeration of microorganisms from soil

Isolation and enumeration of microorganisms from soil

Isolation of Amylase producers from Soil.

Isolation of Amylase producers from Soil.

Isolation of Protease producers from Soil.

Isolation of Protease producers from Soil.

Isolation of Antibiotic Producing microorganisms from Soil

Effect of UV radiation on Microorganisms.

Use of Ethyl Alcohol as Sterilizing Agent.

Blood group analysis

Differential WBC count

To examine Flocculation reaction using VDRL test

To observe the Agglutination reaction using WIDAL test

Enumration of RBC

DOT ELISA

Oucterlony Double Diffusion Method

Oucterlony Double Diffusion Method

Determine the concentration of unknown antigen using Radial Immuo Diffusion technique

Determine the concentration of unknown antigen using Radial Immuo Diffusion technique

Maharaja Ranjit Singh College of Professional Sciences, Indore	
Department of Biosciences	
Lesson Plan for B. Sc. Semester VI Life Science (July 2018 - June 2019)	
BT+Chem+LS, Micro+Chem+LS	
Subject: Practicals	
Teacher - Dr. Monica Jain & Prof. Baishali Roy	
Day/Lecture	Topic
1	Chromosomal DNA isolation from Plant cells
2	Chromosomal DNA isolation from Plant cells
3	Genomic DNA isolation from Microorganisms
4	Genomic DNA isolation from Microorganisms
5	Chromosomal DNA isolation from Animal cells
6	Chromosomal DNA isolation from Animal cells
7	Germination of Seed in <i>in vitro</i> for Axenic cultures
8	Primary Establishment of culture from leaf & stem explants
9	Clonal Propagation
10	Anther & Pollen culture & check the Viability of Pollens