



Hindi Vidya Prachar Samiti's

Ramniranjan Jhunjhunwala College

of Arts, Science & Commerce

(Empowered Autonomous College)

Affiliated to

UNIVERSITY OF MUMBAI

Syllabus for the B.Sc.

Program: B.Sc. Medical Laboratory Technology

National Education Policy (NEP 2020)

Level 5.5

SEMESTER	:	VI
TITLE	:	Discipline specific CORE I
TITLE OF THE SUBJECT/COURSE	:	IMMUNOLOGY 2
COURSE CODE	:	RJDSCMLT361
CREDITS	:	04
DURATION	:	60 hrs

LEARNING OBJECTIVES	
1	Understand the structure, organs, and components of the immune system.
2	Explain the mechanisms of innate and adaptive immunity.
3	Describe antigen–antibody interactions and immune responses.
4	Identify hypersensitivity reactions and autoimmune disorder

Course Outcome No.	On completing the course, the student will be able to:	PSO Addressed	Bloom's Levels
CO1	Demonstrate an understanding of immune system components and their functions.	1, 3	BT level 1 & 2
CO2	Explain antigen processing, presentation, and antibody formation.	1, 3	BT level 1 & 2
CO3	Describe hypersensitivity, autoimmunity, and immunodeficiency conditions.	1, 3	BT level 1 & 2

SEMESTER VI			
Course Code : RJDSCMLT361		Title: IMMUNOLOGY 2	Credits
Unit	Unit Name	Topics	4
I	Basics of Immunology & Immune System Components	Introduction to the immune system, Innate and adaptive immunity, Immune organs: thymus, bone marrow, spleen, lymph nodes, Antigens and antibodies, Immunoglobulin structure and classes, Antigen-antibody reactions, Complement system pathways, Cytokines and their role in immunity, Major Histocompatibility Complex (MHC I & II), T-cell and B-cell activation and differentiation.	2
II	Applied Immunology and Immune disorders	Hypersensitivity reactions (Type I-IV), Autoimmune diseases and mechanism, Immunodeficiency disorders, Transplantation immunology, Tumor immunology basics, Vaccines: types and mechanisms, Immunological diagnostic tests (ELISA, RIA, immunofluorescence), Monoclonal antibodies, Immunotherapy: basics and applications, Biosafety and infection control in immunology labs.	2
References: <ul style="list-style-type: none"> • Kuby Immunology – Kindt, Goldsby & Osborne • Roitt's Essential Immunology – Ivan M. Roitt 			

SEMESTER	:	VI
TITLE	:	DISCIPLINE SPECIFIC CORE 2
TITLE OF THE SUBJECT/COURSE	:	Endocrinology 2 and Molecular Biology 2
COURSE CODE	:	RJDSCMLT362
CREDITS	:	04
DURATION	:	60 hrs

LEARNING OBJECTIVES	
1	Describe endocrine dysfunctions and their biochemical basis. Interpret laboratory investigations related to endocrine disorders.
2	Explain molecular techniques used in diagnostics and research.
3	Perform PCR, blotting, and sequencing-based methods conceptually.
4	Understand genome organization, mutation, and repair mechanisms.

Course Outcome No.	On completing the course, the student will be able to:	PSO Addressed	Bloom's Levels
CO1	Demonstrate understanding of gene regulation and molecular mechanisms. Describe and conceptually perform molecular diagnostic methods.	1, 2	BT level 1 & 2
CO2	Explain advanced hormonal mechanisms and endocrine pathways. Identify and describe complex endocrine disorders.	1, 2	BT level 1, 2 & 3
CO3	Explain recombinant DNA technology and cloning principles.	1, 2	BT level 1, 2 & 3

SEMESTER VI			
Course Code : RJDSCMLT362		Title:Endocrinology 2 and Molecular Biology 2	Credits
Unit	Unit Name	Topics	4
I	Advanced Endocrine Physiology and Metabolism	Hormonal regulation of metabolism, Growth hormone and growth disorders, Cortisol physiology and metabolism, Adrenal cortex and medulla functions, Stress hormones and adaptation, Calcium and phosphate regulation, Parathyroid and calcitonin physiology, Role of vitamin D in endocrine balance	1
II	Endocrine Disorders and Diagnostic Evaluation	Thyroid disorders: hypo/hyperthyroidism, thyroiditis, Adrenal disorders: Cushing's, Addison's, Pancreatic endocrine disorders and diabetes complications, Reproductive endocrine disorders: PCOD, infertility, hypogonadism, Endocrine tumors and neoplasms, Endocrine emergencies: thyroid storm, adrenal crisis, Laboratory tests for endocrine diseases, Hormone assays and interpretation	1
III	Gene Regulation and genome organization	Prokaryotic and eukaryotic gene regulation, Operon models (lac, trp), Chromatin structure and epigenetics, Transcription factors and enhancers, DNA replication and repair pathways, Mutation types and mutagenesis, Genome structure and organization, RNA processing and post-transcriptional regulation	1
IV	Molecular Techniques and Applications	Recombinant DNA technology, PCR and its advanced variants, DNA sequencing methods, Blotting techniques (Southern, Northern, Western), Cloning vectors and gene cloning, Genetically modified organisms basics, Molecular diagnostics (RT-PCR, DNA probes), Applications in forensics, medicine, and biotechnology	1

References:

- **Williams Textbook of Endocrinology** – Melmed
- **Textbook of Medical Physiology (Endocrine sections)** – Guyton & Hall
- **Molecular Biology of the Gene** – Watson
- **Molecular Biology** – David Freifelder