

<b>Name of Faculty</b>	:	Faculty of Science
<b>Name of Program</b>	:	Bachelor of Science
<b>Course Code</b>	:	2BSL02
<b>Course Title</b>	:	Immunology and Serology
<b>Type of Course</b>	:	Professional Core
<b>Year of Introduction</b>	:	2023-24

<b>Prerequisite</b>	:	Recall the basics of immunology and serology
<b>Course Objective</b>	:	Students will gain competence in recognizing and assessing immune responses, conducting blood typing and crossmatching for transfusions, and applying serological testing for infectious diseases and autoimmune disorders. Additionally, they will learn to analyze case studies, apply immunological assays in clinical settings, and stay informed about emerging trends in the field, preparing them for effective and informed practice as Medical Laboratory Technicians in the realm of immunology and serology.
<b>Course Outcomes</b>	:	At the end of this course students will be able to:
	CO1	Understand about awareness of laboratory safety protocols and quality control measures specific to immunology and serology.
	CO2	Apply enzyme-linked immunosorbent assay (ELISA) techniques and interpret results.
	CO3	Evaluate serological tests for infectious diseases such as HIV, hepatitis, and syphilis.
	CO4	Recall an immunological assays for monitoring autoimmune diseases and evaluating treatment efficacy

### Teaching and Examination Scheme

Teaching Scheme (Contact Hours)			Credits	Examination Marks				
				Theory Marks		Practical Marks		Total Marks
L	T	P	C	SEE	CIA	SEE	CIA	
3	0	2	4	50	25	50	25	150

Legends: **L**-Lecture; **T**-Tutorial/Teacher Guided Theory Practice; **P** - Practical, **C** - Credit, **SEE** - Semester End Examination, **CIA** - Continuous Internal Assessment (It consists of Assignments/Seminars/Presentations/MCQ Tests, etc.)

**Course Content**

Unit No.	Topics	Teaching Hours	Weightage	Mapping With COs
1	<b>Introduction to Immunology and Serology</b> Introduction to immunology and serology Historical perspectives on immunology Immune system components: cells and tissues Innate vs. adaptive immunity Antigens and antibodies Laboratory safety and quality control in immunology and serology	11	24.44%	CO1
2	<b>Immune Response and Antigen-Antibody Reactions</b> Cellular and humoral immune responses Major histocompatibility complex (MHC) Immunoglobulins (Ig): structure and function Antigen-antibody reactions: agglutination, precipitation, complement fixation Enzyme-linked immunosorbent assay (ELISA) and its applications Fluorescent antibody techniques Western blotting and immunofluorescence assays	11	24.44%	CO2
3	<b>Serological Testing and Diagnostic Techniques</b> Blood banking and transfusion medicine ABO and Rh blood group systems Crossmatching and compatibility testing Serological tests for infectious diseases (e.g., HIV, hepatitis, syphilis) Autoimmune diseases and serological markers Serological tests in autoimmune disease diagnosis Titer determination and seroconversion Serological screening in epidemiology and public health	10	22.22%	CO3
4	<b>Clinical Applications and Case Studies</b> Serological testing in diagnosing viral, bacterial, and parasitic infections Immunological disorders and diagnostic tests Monitoring autoimmune diseases and treatment efficacy Allergy testing and immunotherapy	13	28.89%	CO4

Transplantation immunology Case studies and practical applications Emerging trends in immunology and serology, Physiological needs & variation, regulation of BP			
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Suggested Distribution of Theory Marks Using Bloom's Taxonomy						
Level	Remembrance	Understanding	Application	Analyse	Evaluate	Create
<b>Weightage</b>	<b>25</b>	<b>25</b>	<b>25</b>	<b>-</b>	<b>25</b>	<b>-</b>

NOTE: This specification table shall be treated as a general guideline for the students and the teachers. The actual distribution of marks in the question paper may vary slightly from above table.

#### Suggested List of Experiments

Sr. No.	Name of Experiment	Teaching Hours
1	Demonstrate proper laboratory safety measures and execute quality control procedures for immunological tests	02
2	Observe and analyze the results of lymphocyte proliferation assays.	02
3	Perform a complement fixation assay to diagnose specific infections.	02
4	Perform a Western blot assay to detect specific proteins in a given sample.	02
5	Observe and analyze the results of lymphocyte proliferation assays.	02
6	Perform an ELISA test to detect the presence of a specific antigen or antibody.	02
7	Conduct blood typing tests to determine ABO and Rh blood groups.	02
8	Execute serological tests to diagnose syphilis using the VDRL or RPR tests.	02
9	Analyze serum samples for evidence of seroconversion in infectious diseases.	02
10	Detect specific antibodies associated with autoimmune diseases using serological assays.	02
11	Detect parasitic infections using serological tests.	02
12	Apply serological tests to diagnose bacterial infections (e.g., streptococcal infections).	02
13	Diagnose autoimmune diseases through the detection of specific autoantibodies.	02

### Major Equipment /Instruments

Sr. No.	Name of Major Equipment/ Instruments and Software
1	Analytical Balance
2	Various organ models of human body
3	Micropipettes
4	Stains
5	ABO Blood grouping kit
6	Neubauer haemocytometry
7	Haemoglobinometer
8	ELISA kit
9	VDRL/RPR kit

### Suggested Learning Websites

Sr. No.	Name of Website
1	<a href="https://jcp.bmj.com/">https://jcp.bmj.com/</a>
2	<a href="https://archive.nptel.ac.in/courses/102/105/102105083/">https://archive.nptel.ac.in/courses/102/105/102105083/</a>

### Reference Books

Sr. No.	Name of Reference Books
1	Immunology and Serology in Laboratory Medicine by Mary Louise Turgeon
2	Clinical Immunology and Serology: A Laboratory Perspective by Christine Dorresteyn Stevens and Linda E. Miller
3	Clinical Immunology: Principles and Practice by Robert R. Rich, Thomas A. Fleisher, and William T. Shearer
4	Basic and Clinical Immunology by Mark Peakman and Diego Vergani Basic and Clinical Immunology by Mark Peakman and Diego Vergani
5	Clinical Laboratory Immunology by Hugh D. Riordan and Jennifer M. Guerra-Lewis
6	Immunology for Medical Students by Matthew Helbert
7	Medical Laboratory Technology: Methods and Interpretations by Ramnik Sood
8	Clinical Immunology and Serology: A Laboratory Perspective by Christine Dorresteyn Stevens and Linda E. Miller