



**Gyanmanjari**  
Innovative University

Course Syllabus  
Gyanmanjari Science College  
Semester-I(M.Sc.)

**Subject:** Immunology and Serology - MSCMT11502

**Type of course:** Major

**Prerequisite:** Students should have basic knowledge of biology, microbiology, and human physiology, usually gained through a BSc in Medical Laboratory Technology or a related field.

**Rationale:** This subject helps student understand how the immune system works and how to detect antibodies and antigens in the lab. It is important for diagnosing infections, autoimmune diseases, and monitoring immunity in patients.

**Teaching and Examination Scheme:**

Teaching Scheme			Credits	Examination Marks					Total Marks
CI	T	P	C	Theory Marks		Practical Marks		CA	
				ESE	MSE	V	P	ALA	
4	0	0	4	60	30	10	00	50	150

*Legends: CI-Class Room Instructions; T – Tutorial; P - Practical; C – Credit; ESE - End Semester Examination; MSE- Mid Semester Examination; V – Viva; CA - Continuous Assessment; ALA- Active Learning Activities.*

**Continuous Assessment:**

Sr. No.	Activity Learning Activity	Marks
1	<b>Ag-Ab Simulation:</b> Simulate antigen-antibody reactions and upload observations. (Activity: Reaction Simulation) Upload it into GMIU web portal.	10
2	<b>Role-Play:</b> Participate in vaccine roleplay and upload report/video. (Activity: Vaccine Debate) Upload it into GMIU web portal.	10
3	<b>Disease or Disorder analysis:</b> Analyze immune disorder cases and upload diagnosis. (Activity: Disorder Analysis) Upload it into GMIU web portal.	10
4	<b>ELISA Set-up:</b> Set up ELISA assays and upload results. (Activity: ELISA Setup) Upload it into GMIU web portal.	10
5	<b>Lab Instrument Report:</b> Rotate flow cytometry stations and upload report. (Activity: Flow Cytometry) Upload it into GMIU web portal.	10
<b>Total</b>		<b>50</b>



**Course Content:**

Unit No.	Course content	Hrs	% Weightage
1	<b>Basics of the Immune System and Antigen-Antibody Reactions</b> <ul style="list-style-type: none"> <li>• Introduction to the Immune System: Innate and Adaptive Immunity</li> <li>• Structure and Function of Immunoglobulins</li> <li>• Antigen-Antibody Interactions: Types, properties, and clinical relevance</li> <li>• Agglutination and Precipitation Reactions: Principles and diagnostic uses</li> <li>• Complement System: Components, activation pathways, and clinical significance</li> <li>• Quality Control in Serological Testing: Accuracy, reproducibility, and validation</li> </ul>	15	25
2	<b>Immune Disorders and Hypersensitivities</b> <ul style="list-style-type: none"> <li>• Hypersensitivity Reactions: Types I-IV with mechanisms and examples</li> <li>• Autoimmune Diseases: Mechanisms, examples, and serological markers</li> <li>• Immunodeficiency Disorders: Primary and secondary, with clinical features</li> <li>• Transplant Immunology: Graft types, rejection, and immunosuppressive strategies</li> <li>• Immunopathology: Overview of immune-related diseases and diagnosis</li> </ul>	15	25
3	<b>Vaccines, Monoclonal Antibodies, and Therapeutics</b> <ul style="list-style-type: none"> <li>• Vaccines: Types (live, attenuated, recombinant), development, and immunization schedules</li> <li>• Monoclonal Antibodies: Production (hybridoma technology) and therapeutic uses</li> <li>• Immunotherapy and Immunomodulation: Principles and applications</li> <li>• Flow Cytometry and Immunophenotyping: Principles and clinical applications</li> <li>• Laboratory Applications of Immune Modulators and Biologics</li> </ul>	15	25





4	<b>Immunological and Serological Techniques in Diagnostics</b> <ul style="list-style-type: none"> <li>Immunological Techniques: ELISA, RIA, and Western Blot</li> <li>Serological Tests: VDRL, Widal, ASO, CRP, RF—principles and interpretation</li> <li>Automation in Serology: Platforms, benefits, and challenges</li> <li>Quality Assurance in Immunological Testing: Standards, QC, and result validation</li> <li>Case-based Interpretation of Immunological Tests</li> </ul>	15	25
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**Suggested Specification table with Marks (Theory):60**

Distribution of Theory Marks (Revised Bloom's Taxonomy)						
Level	Remembrance (R)	Understanding (U)	Application (A)	Analyze (N)	Evaluate (E)	Create (C)
Weightage (%)	20%	20%	30%	30%		-

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

**Course Outcome:**

After learning the course, the students should be able to:	
CO1	Expound the structure and function of immune components and evaluate antigen-antibody interactions in clinical contexts.
CO2	Differentiate immune-related disorders and interpret their clinical and serological features.
CO3	Depict vaccine types, monoclonal antibody technology, and their role in disease prevention and therapy.
CO4	Apply immunological and serological techniques for disease diagnosis and interpret test results accurately.

**Instructional Method:**

The course delivery method will depend upon the requirement of content and the needs of students. The teacher, in addition to conventional teaching methods by black board, may also use any tools such as demonstration, role play, Quiz, brainstorming, MOOCs etc.

From the content 10% topics are suggested for flipped mode instruction.

Students will use supplementary resources such as online videos, NPTEL/SWAYAM videos, e-courses, Virtual Laboratory

The internal evaluation will be done on the basis of Active Learning Assignment

Practical/Viva examination will be conducted at the end of semester for evaluation of performance of students in the laboratory.

**Reference Books:**

- [1] Textbook of Clinical Pathology for MLT Students – 2025 by Sathya Publications Editorial Board, Sathya Publishers.
- [2] Clinical Pathology (A Practical Manual) by Harsh Mohan & Sugandha Mohan, Jaypee Brothers Medical Publishers.
- [3] Textbook of Pathology for MLT by Harsh Mohan (Adapted by Dr. Ramadas Nayak), Jaypee Brothers Medical Publishers.
- [4] Practical Manual of Clinical Pathology and Microbiology by Suvarna Jathar & Ranjana S. Waghmare, Nirali Prakashan.
- [5] Clinical Pathology and Diagnostic Methods by P. Ramadas, CBS Publishers & Distributors.

