



Course Syllabus
Gyanmanjari Science Colleges
Semester-2 (M.Sc.)

Subject: Immunology and Radiation Biology- MSCMB12509

Type of course: Major

Prerequisite: These courses provide the knowledge about different types of radiation and their effects on cells and tissues as well as learn about immune system and immunity of humans.

Rationale: To teach students about the radiation effects and immunity on living cells.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks					Total Marks
CI	T	P		C	Theory Marks		Practical Marks		
			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.

Course Content:

Unit No	Course content	Hrs	% Weightage
1	<p>Chapter:1 Fundamentals of Radiation</p> <ul style="list-style-type: none"> • Introduction: <ol style="list-style-type: none"> 1. Discovery of radiations 2. radioactive materials and their Biological effects 3. The atom, nuclides, radio nuclides. 4. Characteristics and source of alpha, beta, X and gamma rays and their interaction with matter. • Radiation detection and uses: <ol style="list-style-type: none"> 1. Units, measurements of radiation, utility in different fields of biological sciences. 	15	25%



2	Chapter:2 Biological effects of Radiation <ul style="list-style-type: none"> • Radiation effects on biomolecules • Chromosomes, microorganisms, plants, mammals, blood and hematopoietic tissues, digestive system, reproductive system, skin and hair, bones. • Hazards of radiation. 	15	25%
3	Chapter:3 Principle of Immunology <ul style="list-style-type: none"> • Immune development system: <ol style="list-style-type: none"> 1. Antigens: Definition, types and properties. 2. Antibodies: definition, classes. 3. Definition and different types of immunity. 4. Antigen –antibody reactions. 5. Complement system, properties and mode of action. • Monoclonal antibodies: <ol style="list-style-type: none"> 1. Definitions, productions, uses. 	15	25%
4	Chapter:4 Immune Responses <ul style="list-style-type: none"> • Hypersensitivity: <ol style="list-style-type: none"> 1. Types of hypersensitivity reactions, vaccines. • Vaccines: <ol style="list-style-type: none"> 1. Types, DNA vaccines, malaria vaccines, edible vaccines. • Interferons: <ol style="list-style-type: none"> 1. Types, properties and mode of action. 	15	25%

Continuous Assessment:

Sr. No	Active Learning Activities	Marks
1	Research paper writing Faculty will Assign topic for research paper writing and group of students will write and upload on GMIU web Portal.	10
2	Effect of radiation on microbes Faculty will provide different organisms and students will study effect of radiation microorganisms and results will be upload on GMIU web portal.	10
3	Quiz Faculty will conduct quiz sessions on the GMIU web Portal from their respective subject. (10 MCQ)	10



4	Paper Review Faculty will provide a particular portion of the research paper and a group of students will review it and prepare a conclusion in 100 words and upload it to GMIU web Portal.	10
5	Scientific structure preparation Faculty will assign the specific topic and students will prepare scientific structure and upload on GMIU web Portal.	10
Total		50

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%	40%	30%	10%	-	-

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	Aware about various radiation and it detection and usage techniques.
CO2	Justify about the effects of various radiation on living beings.
CO3	Comprehend about the antigen, antibody, immunity and various antigen- antibody reactions.
CO4	Become proficient about hypersensitivity, vaccines and interferon.

Instructional Method:

The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by black board, may also use any of 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 laboratory.

Reference Books:

- 1) Immunology by Anant Narayan & Paniker
- 2) Immunology by Gordsby, Kindt, Osborne & Kuby.
- 3) Immunodiagnosics : Principles and Practice by S. C. Rastogi.
- 4) Radiation biology by A. P. Casarett, Prentice Hall.
- 5) Essential Immunology-Ivan. M. Roitt.

