INTEGRAL UNIVERSITY, LUCKNOW

INTEGRAL INSTITUTE OF ALLIED HEALTH SCIENCES & RESEARCH

DEPARTMENT OF BASIC MEDICAL SCIENCES

BACHELOR OF SCIENCE IN MEDICAL MICROBIOLOGY
(B. Sc. MM)

SYLLABUS

YEAR/ SEMESTER: III/V

Integral University, Lucknow
Department of Basic Medical Sciences
Study and Evaluation Scheme

Program: BSc. MM Semester-V

S. N.	Course code	Course Title	Type of Paper	Period Per hr/week/sem			Evaluation Scheme				Sub. Total	Credit	Total Credits
				L	T	P	CT	TA	Total	ESE			
THEORIES													
1	MM301	Medical Mycology	Core	2	1	0	40	20	60	40	100	2:1:0	3
2	MM302	Research Methodology	Core	2	1	0	40	20	60	40	100	2:1:0	3
3	MM303	Clinical virology	Core	2	1	0	40	20	60	40	100	2:1:0	3
4	MM304	Recombinant DNA Technology	Core	3	1	0	40	20	60	40	100	3:1:0	4
5	MM305	Biosafety and Bioethics	Core	3	1	0	40	20	60	40	100	3:1:0	4
PRACTICAL													
1	MM306	Medical Mycology-Lab	Core	0	0	2	40	20	60	40	100	0:0:1	2
2	MM307	Recombinant DNA Technology-Lab	Core	0	0	2	40	20	60	40	100	0:0:1	2
3	MM308	Clinical Posting	Core	0	0	2	40	20	60	40	100	0:0:1	2
Total				**12**	**05**	**06**	**320**	**160**	**480**	**320**	**800**	**23**	**23**

S. N.	Course code	Course Title	Type of Paper	Attributes							United Nation Sustainable Development Goal (SDGs)
				Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	
THEORIES											
1	MM301	Medical Mycology	Core	√	√	√			√	√	3,4
2	MM302	Research Methodology	Core	√	√	√			√	√	3,4
3	MM303	Clinical virology	Core	√	√	√			√	√	3,4
4	MM304	Recombinant DNA Technology	Core	√	√	√			√	√	3,4
5	MM305	Biosafety and Bioethics	Core	√	√	√			√	√	3,4
PRACTICAL											
1	MM306	Medical Mycology-Lab	Core	√	√	√			√	√	3,4
2	MM307	Recombinant DNA Technology-Lab	Core	√	√	√			√	√	3,4
3	MM308	Clinical Posting	Core	√	√	√			√	√	3,4

L: Lecture **T:** Tutorials **P:** Practical **CT:** Class Test **TA:** Teacher Assessment **ESE:** End Semester Examination,
AE= Ability Enhancement, DSE- Discipline Specific Elective, **Sessional Total:** Class Test + Teacher Assessment **Subject Total:** Sessional Total + End Semester Examination (ESE)

Integral University, Lucknow

Effective from Session: 2024-25							
Course Code	**MM301**	**Title of the Course**	**MEDICAL MYCOLOGY**	**L**	**T**	**P**	**C**
Year	**III**	**Semester**	**V**	**2**	**1**	**0**	**3**
Pre-Requisite	**Nil**	**Co-requisite**	**Nil**				
Course Objectives	• Learning about the structure and classification of fungi, the fungal diagnosis of fungal infection, and the techniques used to identify fungi in clinical samples.						

Course Outcomes	
CO1	Explain the fundamental concepts of medical mycology and its clinical significance.
CO2	Classify different types of fungal infections, including superficial, deep, and opportunistic mycoses.
CO3	Compare the characteristics of superficial, deep, and opportunistic fungal infections.
CO4	Identify common fungal pathogens associated with human infections.
CO5	Discuss the pathogenesis and clinical manifestations of major fungal infections.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	**INTRODUCTION TO MEDICAL MYCOLOGY**	• Introduction About Medical Mycology and Relevant Terms Related to Medical Mycology • Basic Concepts About Superficial and Deep Mycoses and Opportunistic Mycoses	6	CO1
2	**TAXONOMY AND CLASSIFICATION**	• Classification And General Characteristics of Clinically Important Fungus • Normal Fungal Flora of The Body • About Mycotoxins produced by fungal species	6	CO2
3	**MORPHOLOGICAL IDENTIFICATION METHODS**	• Morphological And Cultural Characteristics of Common Fungal Contaminants in Laboratory Settings and Culture Media Used in Mycology Laboratory. • Microscopic And Macroscopic Identification Methods	6	CO3
4	**FUNGAL DISEASE**	• Morphology, Disease and Lab Diagnosis Of: Candida, Dermatophytes, Dimorphic fungus, Mycetoma, Cryptococcus, Histoplasma, Blastomyces, Coccidioides.	6	CO4
5	**LABORATORY DIAGNOSIS**	• Sample Collection Methods, Processing of Skin, Nails, Pus, Sputum, CSF And Other Body Fluids.	6	CO5

Reference Books:

1. **Apurva s shastri 2nd and 3rd edition JP publication press**
2. **Textbook of Medical Mycology Chander.**
3. **Practical Medical Microbiology by MacCie and MacCartney Volume 1st and 2nd**

e-Learning Source:

1. https://www.youtube.com/watch?v=MnVgGTv6EW0
2. https://www.youtube.com/watch?v=sBoRKzc7pdY
3. https://ecgsolutions.com/
4. https://www.youtube.com/watch?v=S1kdYd4JGbg

	Course Articulation Matrix: (Mapping of COs with POs and PSOs)																
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	-	3	-	2	-	-	1	2	-	1	**3**	-	**1**	**1**	-
CO2	3	3	-	2	-	2	-	-	2	3	-	1	**3**	-	**1**	**1**	-
CO3	3	3	-	3	-	2	-	-	1	2	-	1	**3**	-	**2**	**2**	-
CO4	3	3	-	3	-	2	-	-	1	2	-	1	**3**	-	**1**	**1**	-
CO5	3	3	-	2	-	2	-	-	1	3	-	1	**3**	-	**1**	**1**	-

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Attributes & SDGs

Course Code	Course Title	Attributes							SDGs No.
MM301	**MEDICAL MYCOLOGY**	Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	
		√	√	√			√	√	**3,4**

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Effective from Session: 2024-25							
Course Code	**MM302**	**Title of the Course**	**Research Methodology**	**L**	**T**	**P**	**C**
Year	**III**	**Semester**	**V**	**3**	**1**	**0**	**4**
Pre-Requisite	**Nil**	**Co-requisite**	**Nil**				
Course Objectives							

Course Outcomes	
CO1	Understand the basics of research, types of research, and their significance.
CO2	Formulate research questions, hypotheses, and study designs.
CO3	learning how to gather and analyze data and creating effective graphs, charts, and tables to visually communicate data insights.
CO4	Course aims to equip students with the skills to critically analyze existing research within their field and writing a comprehensive literature review
CO5	Course typically aims to equip students with the ability to develop a well-structured research proposal, including a thorough literature review, appropriate methodology, and a compelling presentation to effectively communicate

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1.	**INTRODUCTION OF RESEARCH METHODOLOGY**	• Meaning, objectives, characteristics & significance. • Types of research: qualitative & quantitative. • Basic elements of research: variables – types- independent, dependent, active, attribute, continuous and categorical, characteristic and relationships	6	CO1
2.	**RESEARCH DESIGN AND SAMPLING METHODS**	• Research design: meaning, features, types: Observational vs. Experimental research • Types of sampling: Probability and Non-probability sampling • Sample size calculation and statistical power • Sample test**:** use of distribution, test for single mean, equality of mean paired- t test, test for equality of variance, chi- square test	6	CO2
3.	**DATA COLLECTION AND ANALYSIS**	• Data collection: classification, tabulation and methods of collecting data. • Types of data: Primary vs. Secondary data • Methods of data collection: Surveys, Questionnaires, Interviews, and Observations. • Statistics: definition, aim, scope, importance and limitation of statistics	6	CO3
4.	**SCIENTIFIC WRITING AND LITERATURE REVIEW**	• Review of related literature: Importance of literature review and referencing. • Identification of the related literature. • Organizing the related literature.	6	CO4
5.	**RESEARCH PROPOSAL AND PRESENTATION SKILLS**	• Preparing a research proposal – Title, Objectives, Methodology, Budgeting • Research proposal: research proposal or synopsis, introduction, procedure for collecting and treating data, bibliography, time and budget schedule. • Writing a thesis/dissertation – Structure and formatting guidelines • How to prepare poster and oral presentations for conferences	6	CO5

Reference Books:

1. **Research Methodology Method and Techniques** – CR Kothari
2. **Research Fundamentals in Home Economics -** Joseph, William D Joseph
3. **WHO (2001) Health Research Methodology** – A Guide for Training in Research Methods.

e-Learning Source:

https://paperpal.com/blog/academic-writing-guides/what-is-research-methodology
https://euacademic.org/bookupload/9.pdf
https://www.intechopen.com/chapters/68505
https://www.grammarly.com/blog/academic-writing/research-paper-introduction/

	Course Articulation Matrix: (Mapping of COs with POs and PSOs)																
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	-	1	-	1	-	-	1	1	-	1	2	-	1	1	-
CO2	2	3	-	2	-	2	-	-	-	1	-	2	3	-	2	2	-
CO3	3	3	-	1	-	1	-	-	1	1	-	1	2	-	1	1	-
CO4	2	3	-	1	-	2	-	-	-	1	-	2	2	-	1	1	-
CO5	2	3	-	1	-	2	-	-	-	1	-	2	3	-	1	1	-

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1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation Attributes & SDGs

Course Code	Course Title	Attributes							SDGs No.
		Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	
MM302	RESEARCH METHODOLOGY	√	√	√			√	√	3,4

Integral University, Lucknow

Effective from Session: 2024-25							
Course Code	**MM303**	**Title of the Course**	**CLINICAL VIROLOGY**	**L**	**T**	**P**	**C**
Year	**III**	**Semester**	**V**	**3**	**1**	**0**	**4**
Pre-Requisite	**Nil**	**Co-requisite**	**Nil**				
Course Objectives	The students will be taught about introduction, general characteristics, life cycle and laboratory diagnosis of various medically important viruses						

Course Outcomes: After the successful course completion, learners will develop following attributes:	
CO1	Explain the fundamental concepts of virology, including viral structure, classification, and replication.
CO2	Describe the epidemiology, pathogenesis, and clinical features of major viral infections.
CO3	Identify the laboratory diagnostic techniques used for detecting viral infections.
CO4	Analyze the mechanisms of viral transmission and host immune response to viral infections.
CO5	Evaluate antiviral therapies, vaccines, and preventive measures for viral diseases.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	**INTRODUCTION TO MEDICAL VIROLOGY**	• Introduction about clinical virology, general characteristics and classification of medically important viruses.	6	CO1
2	**MORPHOLOGICAL FEATURES OF VIRUES**	• Detailed structure of medically important virus and their general characteristics, multiplication strategy of these viruses.	6	CO2
3	**BASIC CONCEPTS ABOUT MEDIACLLY IMPORTANT VIRUSES**	• DNA virus, RNA virus, Arbo virus, Immunodeficiency virus, blood borne virus, Corona and oncogenic virus	6	CO3
4	**SAMPLE COLLECTION AND PROCESSING**	• Collection of various medically relevant samples (Blood, Serum, pus and body fluids). • Sample processing Methods and Transport Methods	6	CO4
5	**STAINING AND PROCESSING**	• Processing of samples for viral cultures (Egg inoculation and Tissue culture)	6	CO5

Reference Books:

1. Text of Medical Microbiology by Ananthanarayanan
2. Practical Medical Microbiology by Panikar & Satish gupte.
3. Essenials of Medical Microbiology and Immunology Lange 14th edition
4. Practical Medical Microbiology by Mackie & MacCartney Volume 1st and 2nd

e-Learning Source:

1. https://www.youtube.com/watch?v=-tvDLg-5Qy8
2. https://www.youtube.com/watch?v=XfVqnlkU3ZY
3. https://www.youtube.com/watch?v=vGh7VVk9Oeg
4. https://www.youtube.com/watch?v=Wu18mpI_62s

	Course Articulation Matrix: (Mapping of COs with POs and PSOs)																
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	1	3	2	2	-	-	-	1	2	1	-	2	2	1	-	1	-
CO2	1	3	1	3	-	-	-	2	3	-	-	3	3	2	-	2	-
CO3	1	3	1	2	-	-	-	1	2	2	-	2	3	1	-	1	-
CO4	1	3	1	2	-	-	-	1	3	-	-	3	2	1	-	1	-
CO5	1	3	1	2	-	-	-	1	2	1	-	2	2	1	-	1	-

1-Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation Attributes & SDGs

Course Code	Course Title	Attributes							SDGs No.
MM303	**CLINICAL VIROLOGY**	Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	
		√	√	√	√		√	√	**3,4**

Integral University, Lucknow

Effective from Session: 2024-25							
Course Code	**MM304**	**Title of the Course**	**RECOMBINANT DNA TECHNOLOGY**	**L**	**T**	**P**	**C**
Year	**III**	**Semester**	**V**	**3**	**1**	**0**	**4**
Pre-Requisite	**Nil**	**Co-requisite**	**Nil**				
Course Objectives	To understand about the basic concept of RDNA technology in medical sector.						

Course Outcomes: After the successful course completion, learners will develop following attributes:	
CO1	Explain the fundamental concepts of recombinant DNA technology, including gene cloning and vector systems.
CO2	Describe the techniques involved in gene manipulation, such as restriction digestion, PCR, and ligation.
CO3	Apply recombinant DNA techniques for genetic modification and biotechnology applications.
CO4	Analyze the role of rDNA technology in medicine,
CO5	Evaluate ethical, biosafety, and regulatory aspects of recombinant DNA research.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	**INTRODUCTION ABOUT RDNA TECHNOLOGY**	• Introduction to gene cloning and its uses, Requirement of Recombinant molecules in medical sector. • Contribution of Arber and smith, Boyer and Temin and Baltimore, southern and Mullis	6	CO1
2	**TOOLS AND TECHNIQUES**	• Restriction enzymes and other enzymes used in cloning. • Vectors (Plasmid, vector based on Bacteriophages, Cosmids, YAC vectors, BAC vectors)	6	CO2
3	**MAKING RECOMBINANT DNA**	• Purification of cDNA from cells, manipulation of purified DNA, DNA library • Introduction of recombinant DNA in host cells.	6	CO3
4	**EXPRESSION OF GENE**	• Expression of genes in prokaryotes. • Identification of recombinant.	6	CO4
5	**METHODS OF DETECTION**	• PCR, DNA probes, Hybridization techniques Blotting techniques, DNA sequencing (sanger method) • Production of hepatitis B vaccines and monoclonal antibodies	6	CO5

Reference Books:

1. **Molecular Cloning: A Laboratory Manual"** – Michael R. Green & Joseph Sambrook
2. **"Recombinant DNA"** – James D. Watson, Richard M. Myers, Amy A. Caudy, Jan A. Witkowski
3. **Principles of Gene Manipulation and Genomics"** – Sandy B. Primrose, Richard Twyman
4. **Molecular Biology of the Gene"** – James D. Watson, Tania A. Baker, Stephen P. Bell
5. **Gene Cloning and DNA Analysis: An Introduction"** – T.A. Brown

e-Learning Source:

1. https://www.youtube.com/watch?v=aXt1DbdeBXk
2. https://www.youtube.com/watch?v=esxafXkG6zk
3. https://www.youtube.com/watch?v=GDcoeWBxOjc
4. https://www.youtube.com/watch?v=vAL8H3idU6k

	Course Articulation Matrix: (Mapping of COs with POs and PSOs)																
PO-PSO CO	PO1	PO2	PO3	PO 4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	2	3	-	-	-	-	-	-	-	-	-	1	3	-	1	-	2
CO2	3	3	-	-	-	2	-	-	-	-	-	-	3	3	2	3	3
CO3	2	3	-	-	-	2	-	-	-	-	-	1	3	2	1	3	2
CO4	3	3	-	-	-	-	-	-	-	-	-	-	2	3	2	2	3
CO5	3	3	-	-	-	3	-	1	-	-	-	-	3	3	2	3	3

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation Attributes & SDGs

Course Code	Course Title	Attributes							SDGs No.
		Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	
MM304	RECOMBINANT DNA TECHNOLOGY	√	√	√			√	√	**3,4**

Integral University, Lucknow

Effective from Session: 2024-25							
Course Code	**MM305**	**Title of the Course**	**BIOSAFETY AND BIOETHICS**	**L**	**T**	**P**	**C**
Year	**III**	**Semester**	**V**	**2**	**1**	**0**	**3**
Pre-Requisite	**Nil**	**Co-requisite**	**Nil**				
Course Objectives	• **To introduce the fundamental principles of bioethics** and its importance in scientific research and healthcare. • **To explore risk assessment and management strategies** in laboratories handling biological materials and hazardous agents.						

Course Outcomes	
CO1	To understand the fundamental principles of medical bioethics and their role in clinical decision-making.
CO2	To analyze ethical dilemmas in medical research related to human experimentation, clinical trials, and genetic engineering.
CO3	To comprehend biosafety levels, risk assessment, and biocontainment in medical laboratories and healthcare settings.
CO4	To evaluate national and international guidelines on medical biosafety, patient rights, and informed consent.
CO5	To understand the legal and ethical implications of organ transplantation, stem cell research, and personalized medicine.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	**INTRODUCTION**	• Biosafety of transgenic and genetically engineered products. • International biosafety protocol	6	CO1
2	**BIOETHICAL ISSUES**	• Bioethical issues in transgenics, bioethics and consumer acceptance, bioethics guidelines, • International biosafety committee.	6	CO2
3	**BIOSAFETY GUIDELINES**	• Biosafety and rDNA guidelines in India, Review committee on genetic manipulation at genetic engineering approval committee	6	CO3
4	**PATENT ISSUES**	• Patents on biological inventions, licensing revenue, selection of partners, negotiations on terms and conditions.	6	CO4
5	**PRODUCT ISSUES**	• Product selection, Product development R & D	6	CO5

Reference Books:

1. **Principles of Biomedical Ethics" – Tom L. Beauchamp & James F. Childress**
2. **Bioethics: An Introduction for the Biosciences"** – Ben Mepham

e-Learning Source:

1. https://www.youtube.com/watch?v=MnVgGTv6EW0
2. https://www.youtube.com/watch?v=sBoRKzc7pdY
3. https://www.youtube.com/watch?v=AuTlwFreqlc
4. https://www.youtube.com/watch?v=kJ3VsW4gnO0

Course Articulation Matrix: (Mapping of COs with POs and PSOs)

PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	-	1	-	1	-	-	1	1	-	1	2	-	1	1	-	3
CO2	2	3	-	2	-	2	-	-	-	1	-	2	3	-	2	2	-	2
CO3	3	3	-	1	-	1	-	-	1	1	-	1	2	-	1	1	-	3
CO4	2	3	-	1	-	2	-	-	-	1	-	2	2	-	1	1	-	2
CO5	2	3	-	1	-	2	-	-	-	1	-	2	3	-	1	1	-	2

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation Attributes & SDGs

Course Code	Course Title	Attributes							SDGs No.
		Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	
MM305	**BIOSAFETY AND BIOETHICS**	√	√	√	√		√	√	**3,4**

Integral University, Lucknow

Effective from Session: 2024-25							
Course Code	**MM306**	**Title of the Course**	**MEDICAL MYCOLOGY -LAB**	**L**	**T**	**P**	**C**
Year	**III**	**Semester**	**V**	**0**	**0**	**2**	**1**
Pre-Requisite	**Nil**	**Co-requisite**	**Nil**				
Course Objectives	• **To introduce fundamental laboratory techniques** for isolating and identifying fungal pathogens. • **To familiarize students with microscopic and macroscopic identification** of medically important fungi.						

Course Outcomes	
CO1	To introduce fundamental laboratory techniques for isolating and identifying fungal pathogens.
CO2	To familiarise students with microscopic and macroscopic identification of medically important fungi.
CO3	To understand the role of culture media, staining techniques, and biochemical tests in fungal identification.
CO4	To develop skills in handling clinical specimens for diagnosing superficial, subcutaneous, systemic, and opportunistic mycoses.
CO5	To apply biosafety measures and aseptic techniques in working with fungal cultures.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	**STRUCTURE OF FUNGUS**	• To demonstrate structure of Fungus and their multiplication from charts etc.	**6**	CO1-5
2	**STAINING PROCEDURES**	• Grams stain, Acid fast stain, LPCB mount, Teased mount, To perform KOH preparation, Gram stain, Potassium Hydroxide - CalcofluorWhite method, India Ink preparation, Modified Kinyoun Acid Fast Stain for Nocardia, LCB preparation	6	CO1-5
3	**CULTURE MEDIA**	• To prepare culture media used routinely in mycology.	6	CO1-5
4	**IDENTIFICATION OF FUNGUS**	• To identify given yeast culture by performing various identification techniques studied in theory.	6	CO1-5
5	**IDENTIFICATION OF MOLD AND LABORATORY CONTAMINANTS**	• To identify given mould culture by performing various identification techniques studied in theory	6	CO1-5

Reference Books:

APOORVA S SHASTRI PRACTICAL MICROBIOLOGY

ANANTNARAYAN AND PANIKAR MEDICAL MICROBIOLOGY PRACTICAL ASPECTS

e-Learning Source:

1. https://www.youtube.com/watch?v=MnVgGTv6EW0
2. https://www.youtube.com/watch?v=sBoRKzc7pdY
3. https://ecgsolutions.com/
4. https://www.youtube.com/watch?v=S1kdYd4JGbg

	Course Articulation Matrix: (Mapping of COs with POs and PSOs)																
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	1	3	1	2	-	-	-	1	2	-	-	2	-	1	-	1	-
CO2	1	3	1	3	-	-	-	1	3	-	-	3	-	2	-	2	-
CO3	1	3	1	2	-	-	-	1	2	-	-	2	-	1	-	1	-
CO4	1	3	1	2	-	-	-	1	3	-	-	3	-	1	-	1	-
CO5	1	3	1	2	-	-	-	1	2	-	-	2	-	1	-	1	-

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation Attributes & SDGs

Course Code	Course Title	Attributes							SDGs No.
		Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	
MM306	**Medical Mycology-Lab**	√	√	√			√	√	**3,4**

Integral University, Lucknow

Effective from Session: 2024-25							
Course Code	**MM307**	**Title of the Course**	**Recombinant DNA Technology (RDT)-Lab**	**L**	**T**	**P**	**C**
Year	**III**	**Semester**	**V**	**0**	**0**	**4**	**2**
Pre-Requisite	**Nil**	**Co-requisite**	**Nil**				
Course Objectives	The objective of this course is to introduce students to the principles and applications of recombinant DNA technology, including gene cloning, DNA manipulation, molecular biology techniques, and their applications in medicine and biotechnology.						

Course Outcomes	
CO1	Students will be able to receive process and preserve the design and construct recombinant vectors for gene transfer.
CO2	Students will be able to Understand gene cloning and expression in prokaryotic and eukaryotic systems.
CO3	Students will be able to understand gene library and various screening method
CO4	Students will be able to receive process and preserve the Apply PCR for DNA amplification and use gel electrophoresis for analysis.
CO5	Students will be able to Evaluate the ethical, social, and environmental issues in recombinant DNA technology

Unit No.	**Title of the Unit**	**Content of Unit**	**Contact Hrs.**	**Mapped CO**
	Introduction to Recombinant DNA Technology	• Isolation of plasmid DNA from E. coli cells. • Digestion of plasmid DNA with restriction enzymes and size estimation of fragments by gel electrophoresis. • Preparation of competent cells, transformation and estimation of transformation efficiency.	**06**	CO1-CO5

Reference Books:

James D. Watson, Amy A. Caudy, Richard M. Myers, Jan A. Witkowski

Sandy B. Primrose & Richard Twyman

Joseph Sambrook & David W. Russell

Genomes (3rd Edition) – by T.A. Brown

Molecular Biotechnology: Principles and Applications of Recombinant DNA

e-Learning Source:

5. https://www.youtube.com/watch?v=aXt1DbdeBXk
6. https://www.youtube.com/watch?v=esxafXkG6zk
7. https://www.youtube.com/watch?v=GDcoeWBxOjc
8. https://www.youtube.com/watch?v=vAL8H3idU6k

	Course Articulation Matrix: (Mapping of COs with POs and PSOs)																
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	1	3	2	2	-	-	-	1	2	1	-	2	-	2	2	1	-
CO2	1	3	1	3	-	-	-	2	3	-	-	3	-	1	1	1	-
CO3	1	3	1	2	-	-	-	1	2	2	-	2	-	1	1	1	-
CO4	1	3	1	2	-	-	-	1	3	-	-	3	-	1	2	1	-
CO5	1	3	1	2	-	-	-	1	2	1	-	2	-	1	1	1	-

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation Attributes & SDGs

Course Code	**Course Title**	**Attributes**							**SDGs No.**
		Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	
MM307	**Recombinant DNA Technology**	√	√	√			√	√	**3,4**

Integral University, Lucknow

Effective from Session: 2024-25							
Course Code	**MM308**	**Title of the Course**	**Clinical POSTING**	**L**	**T**	**P**	**C**
Year	**III**	**Semester**	**V**	0	0	10	5
Pre-Requisite	Nil	**Co-requisite**	Nil				
Course Objectives	The primary objective of the Mycology Laboratory course is to provide students with **practical knowledge and hands-on skills** in the study of fungi.						

Course Outcomes	
CO1	To learn the punctuality and interaction with colleague and supporting staff during clinical training.
CO2	To develop assessment skills.
CO3	To develop appropriate treatment protocol.
CO4	To understand the importance of documentation of the case record and case presentation.
CO5	To develop discipline and improve overall quality of clinical work.

CLINICAL POSTING ASSESSMENT FORM

Name of Student:		**Session:**	**2025-26**
Enrolment Number:		**Date:**	
Name of Subject:	**CLINICAL POSTING**	**Subject code:**	**MM308**
Topics:			

S. No.	Point to be Considered	Max. Marks	Marks Obtained
1.	Punctuality	4	
2.	Interaction with colleagues and supporting staff	2	
3.	Maintenance of case records	3	
4.	Presentation of case during rounds	2	
5.	Maintained Lab records	2	
6.	lab Manners	2	
7.	Rapport with patients	2	
8.	Assistance during operative procedures	3	
9.	Discipline	2	
10.	Overall quality of clinical work	3	
	TOTAL SCORE	**25**	

(Name and signature of In-charge) **(Head, Paramedical)**

GUIDELINES FOR CLINICAL TRAINING PROGRAM

The students of Post Graduate BSc.MM program must spend above mentioned allotted time period in the hospital based clinical training for specified clinical experiences to meet the objectives of the training program. This period of practical and theoretical experience will enable the students to acquire competency and experience to perform as an independent practice and will enable to adjust to the real practical life in different units in the hospital settings.

S.No.	Program Name	Year/Semester	Duration of Training
1.	BSc.MM	II Year/ V Semester	4 Months
2.		II Year/ V Semester	4 Months
3.		III Year/ V Semester	4 Months
4.		IIIYear/ V Semester	4 Months

By the successful completion of this clinical training period, the student is expected to fulfil the objectives of the program and will be examination as given below:

S.No.	Program Name	Year/Semester	Case file	Practical on Case	Voice/Viva	Attendance
1.	BSc.MM	II Year/ V Semester	10 Marks	10 Marks (1 Long Case and 2 Short Case)	25 Marks	5 Marks
2.		II Year/ V Semester				
3.		III Year/ V Semester				
4.		III Year/ V Semester				

EVALUATION OF CLINICAL POSTING

Bsc.MM- Students has to prepare 1 long case and 2 short cases during their clinical posting. The evaluation for internal clinical examination of 50 marks will be distributed:

Cases during clinical posting=**25 marks**. Viva voce =**20 marks** Attendance=**5 marks**

	Course Articulation Matrix: (Mapping of COs with POs and PSOs)																
PO-PSO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	2	3	3	2	3	2	3	1	2	1	-	-	3	2	3	3	2
CO2	3	3	3	3	2	2	3	2	1	3	-	-	2	2	3	2	3
CO3	3	3	3	3	2	2	3	2	1	3	-	-	3	2	2	2	3
CO4	3	3	3	3	2	2	3	2	1	3	-	-	2	3	2	2	3
CO5	3	3	3	3	2	2	3	2	1	3	-	-	3	2	3	3	2

1-Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation **Attributes & SDGs**

Course Code	Course Title	Attributes							SDGs No.
		Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	
MM308	CLINICAL POSTING	√	√	√			√	√	**3,4,11**