



INTEGRAL UNIVERSITY, LUCKNOW

**INTEGRAL INSTITUTE OF ALLIED HEALTH SCIENCES &
RESEARCH**

DEPARTMENT OF PARAMEDICAL SCIENCES

**BACHELOR OF SCIENCE IN MEDICAL LABORATORY TECHNOLOGY
(B.Sc. MLT)**

SYLLABUS

YEAR/ SEMESTER: III/V



Integral University, Lucknow Department of
Paramedical Sciences Study and Evaluation Scheme

Program: B.Sc. MLT

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	LT301	General & Clinical Pathology	Core	3	1	0	40	20	60	40	100	3:1:0	4
2	LT302	Blood Banking & Genetics	Core	2	1	0	40	20	60	40	100	2:1:0	3
3	LT303	Analytical Biochemistry	Core	2	1	0	40	20	60	40	100	2:1:0	3
4	LT310	Seminar	Core	2	1	0	40	20	60	40	100	2:1:0	3
5	LT305	Medical Parasitology	Core	2	1	0	40	20	60	40	100	2:1:0	3
PRACTICAL													
L													
1	LT306	Blood Banking & Genetics- Lab	Core	0	0	2	40	20	60	40	100	0:0:1	1
2	LT307	Analytical Biochemistry- Lab	Core	0	0	2	40	20	60	40	100	0:0:1	1
3	LT308	Medical Parasitology - Lab	Core	0	0	2	40	20	60	40	100	0:0:1	1
4	LT309	Hospital Posting - Lab	Core	0	0	12	40	20	60	40	100	0:0:6	6
Total				11	05	18	360	180	540	360	900	25	25

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	LT301	General & Clinical Pathology	Core	√	√	√			√	√	3,4
2	LT302	Blood Banking & Genetics	Core	√	√	√	√		√	√	3,4
3	LT303	Analytical Biochemistry	Core	√	√	√	√		√	√	3,4
4	LT310	Seminar	Core	√	√	√	√		√	√	3,4
5	LT305	Medical Parasitology	Core	√	√	√	√		√	√	3,4
PRACTICAL											
1	LT306	Blood Banking & Genetics- Lab	Core	√	√	√	√		√	√	3,4
2	LT307	Analytical Biochemistry- Lab	Core	√	√	√	√		√	√	3,4
3	LT308	Medical Parasitology - Lab	Core	√	√	√	√		√	√	3,4
4	LT309	Hospital Posting - Lab	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

Integral University, Lucknow							
Effective from Session: 2023-24							
Course Code	LT301	Title of the Course	GENERAL & CLINICAL PATHOLOGY	L	T	P	C
Year	III	Semester	V	3	1	0	4
Pre-Requisite	Nil	Co-requisite	Nil				
Course Objectives	The students will be made aware of the General Pathology. In addition, they will understand Mechanism of disease, its Nature, processes, pathogenesis and accountability.						

Course Outcomes	
CO1	Students are able to identify the different condition like cell injury, cell adaptations.
CO2	Students are able to identify the different condition like cell injury, cell adaptations,
CO3	Students are able to identify the different condition like cell adaptations, Inflammation, liver cirrhosis
CO4	Students are able to identify the different condition like Hepato-Biliary Pathology.
CO5	Students are able to identify the different condition like Fluid Analysis

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	CELL INJURY	Cell injuries –Introduction and Types. Reversible cell injury: Types, Sequential changes. Irreversible cell injury: Types of Necrosis & Gangrene, Autolysis. Amyloidosis - Classification, Pathogenesis, Pathology including special stains.	8	CO1
2	CELL ADAPTATIONS	Growth Disturbances and Neoplasia Atrophy, Hypertrophy, Hyperplasia, Aplasia, Hypoplasia, Metaplasia, Malformation, agenesis, dysplasia. Precancerous lesions. Neoplasia: Definition, classification, biological behaviour: Benign and Malignant, Carcinoma and Sarcoma. Malignant Teratoma.	8	CO2
3	INFLAMMATION	Infections- Definition, Components, Types, Pathogenesis. Inflammation-Introduction, Definition, Sign, Types. Acute inflammation, Chronic inflammation, mechanism, sign, inflammatory cells, symptoms.	8	CO3
4	HEPATO-BILIARY PATHOLOGY	Hepato – biliary pathology. Jaundice: Types, aetio-pathogenesis and diagnosis. Hepatitis: Acute, Chronic, neonatal. Alcoholic liver disease. Cirrhosis: Post necrotic, Alcoholic, Metabolic and Portal hypertension Liver abscesses; Pyogenic, parasitic and Amoebic. Tumours of Liver, Endocrine Pathology-Diabetes Mellitus: Types, Pathogenesis, Pathology, Laboratory diagnosis.	8	CO4
5	FLUID ANALYSIS	Seminal fluid analysis: Normal semen, production, composition, specimen handling and disposal of sample, physical examination, chemical and microscopic examination, sperm concentration techniques. CSF and other body fluids: Normal composition, production, normal values, physiological alteration, sample collection, preservation, storage, handling, processing and disposal of CSF, Ascetics fluid, Plural fluid, pericardial fluid, Synovial fluid.	8	CO5

Reference Books:

1. Textbook of Medical Laboratory Technology by Praful B. Godkar.
2. Medical Laboratory Technology by K L Mukherjee Volume-I.
3. Practical Hematology by J.B.Dacie.
4. Clinical Diagnosis & Management by Laboratory methods (20th edition) by John Bernard Henry
5. Atlas of Hematology by G.A.McDonald

e-Learning Source:

1. <https://www.slideshare.net/appyakshay/cell-injury-75140470>
2. <https://www.webmd.com/arthritis/about-inflammation>
3. <https://slideplayer.com/slide/7094661/>

PO-PSO CO	Course Articulation Matrix: (Mapping of COs with POs and PSOs)																	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO4	PSO5	PSO6	PSO7
CO1	1	3	1	2	-	-	-	1	2	-	-	2	2	1	-	1	-	1
CO2	1	3	1	3	-	-	-	1	3	-	-	3	3	2	-	2	-	1
CO3	1	3	1	2	-	-	-	1	2	-	-	2	3	1	-	1	-	1
CO4	1	3	1	2	-	-	-	1	3	-	-	3	2	1	-	1	-	1
CO5	1	3	1	2	-	-	-	1	2	-	-	2	2	1	-	1	-	1

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

Attributes & SDGs

Course Code	Course Title	Attributes							SDGs No.
LT301	GENERAL & CLINICAL PATHOLOGY	Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	3,4
		√	√	√			√	√	



Integral University, Lucknow

Effective from Session: 2023-24

Effective from Session: 2023-24							
Course Code	LT302	Title of the Course	BLOOD BANKING & GENETICS	L	T	P	C
Year	III	Semester	V	2	1	0	3
Pre-Requisite	Nil	Co-requisite	Nil				
Course Objectives	Blood banking will make students learn about blood grouping & blood, Transfusion. The students will learn about the concept of blood grouping, compatibility testing in blood transfusion & screening of donated blood for various Infection Diseases. Genetics will make students learn about Fundamentals of Heredity. The students will learn about the concept of inheritance in various genetic diseases.						

Course Outcomes

CO1	Students are able to perform blood grouping, cross matching, compatibility test, blood collection, preservation, separation and storage.
CO2	Students are able to perform Blood Component, cross matching, compatibility test, blood collection, preservation, separation and storage.
CO3	Students are able to perform Transfusion reactions, compatibility test, blood collection, preservation, separation and storage.
CO4	Students are able to perform about the Genetics.
CO5	Students are able to perform blood genetic materials.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	BLOOD GROUP & CROSS MATCHING	History and discovery of blood group system, ABO and Rhesus blood group system, Cell and serum grouping, various methods, interpretation of results. Discrepancies in blood grouping and resolving problems, Variants of D antigen and weak D typing. Compatibility testing: - definition, indication methods. Coombs test: - Direct, indirect, principle, procedure, interpretation, applications.	6	CO1
2	BLOOD COMPONENT	Blood component: Preparation, labeling, storage, cell separator, Preparation of packed cells and various fractions of blood for transfusion purposes. Total quality management, documentation record keeping.	6	CO2
3	TRANSFUSION REACTION	Transfusion reactions- Laboratory investigation of transfusion reactions and mismatched, transfusion reactions. Compatibility tests in blood transfusion, complications and hazard of blood transfusion. Transfusion transmissible diseases, screening methods (Sample collection, processing, handling and disposal).	6	CO3
4	GENETICS	Genetics- Continuity of life-heredity, variation, Mendel's laws of inheritance, Chromosomal basis of inheritance; other patterns of inheritance- incomplete dominance, multi parallelism, quantitative inheritance.	6	CO4
5	GENETIC MATERIAL	Chromosomes-Bacterial cell and eukaryotic cell; parallelism between genes and chromosomes; genome, linkage and crossing over; gene mapping; recombination. Molecular genetics: DNA as a genetic material- its structure and replication; structure of RNA and its role in protein synthesis, Vectors, plasmids, Human Genetics, Microbial genetics.	6	CO5

Reference Books:

1. Practical Hematology by J.B. Dacie.
2. Transfusion Science by Overfield, Hame.
3. Medical Laboratory Technology by K.L. Mukherjee Volume-I.
4. Mollison's Blood Transfusion in Clinical Medicine, 12th Edition by Harvey G. Klein.
5. Genes by Benjamin Lewin.
6. Genetics by B. D. Singh.

e-Learning Source:

1. <https://www.healthline.com/health/blood-typing-and-crossmatching>
2. <https://www.slideshare.net/peddanasunilkumar/blood-transfusion-reactions-119314356>
3. <https://study.com/academy/lesson/genetic-material-definition-structure-function.html>

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	1	3	1	2	-	-	-	1	2	-	-	2	2	1	-	1	-	1
CO2	1	3	1	3	-	-	-	1	3	-	-	3	3	2	-	2	-	1
CO3	1	3	1	2	-	-	-	1	2	-	-	2	3	1	-	1	-	1
CO4	1	3	1	2	-	-	-	1	3	-	-	3	2	1	-	1	-	1
CO5	1	3	1	2	-	-	-	1	2	-	-	2	2	1	-	1	-	1

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

Attributes & SDGs

Course Code	Course Title	Attributes							SDG No.
LT302	BLOOD BANKING & GENETICS	Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	3,4
		√	√	√	√		√	√	



Integral University, Lucknow

Effective from Session: 2023-24							
Course Code	LT303	Title of the Course	ANALYTICAL CLINICAL BIOCHEMISTRY	L	T	P	C
Year	II	Semester	III	2	1	0	3
Pre-Requisite	Nil	Co-requisite	Nil				
Course Objectives	This course deals with fundamentals of metabolism, metabolic disorders, laboratory test and instruments of Clinical Biochemistry.						

Course Outcomes: After the successful course completion, learners will develop following attributes:	
CO1	Students are able to perform all the test on spectrophotometer & colorimeter
CO2	Students are able to handle the photometer.
CO3	Students are able to know the technique of chromatography-qualitative & quantitative both.
CO4	Students are understand the principle & technique of different kind of electrophoresis.
CO5	Students are able to know about many types of enzymatic reaction.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	SPECTRO PHOTOMETRY AND COLORIMETRY	Spectro photometry and colorimetry Introduction, Theory of spectrophotometry and colorimetry, Lambert's law and Beer's law, Applications of colorimetry and spectrophotometry.	6	CO1
2	PHOTOMETRY	Photometry: Introduction, General principles of flame photometry, Limitations of flame photometry, Instrumentation, Applications of flame photometry, Atomic absorption spectroscopy – Principle & applications.	6	CO2
3	CHROMATOGRAPHY	Chromatography: Introduction, Types of Chromatography. Paper Chromatography: Introduction, principle, types, details for qualitative and quantitative analysis, application. Thin layer chromatography: Introduction, experimental techniques, application of TLC, limitations, High performance thin layer chromatography. Column chromatography: Introduction, principle column efficiency, application of column chromatography. Gas chromatography: Introduction principle, instrumentation, application. Ion exchange chromatography: Introduction, Definition and principle, cation and anion exchangers, application. Gel Chromatography: Introduction Principle and method, application and advantages.	6	CO3
4	ELECTROPHORESIS	Electrophoresis: Introduction, Principle, Instrumentation, Applications, Types of electrophoresis, Paper electrophoresis, Gel electrophoresis.	6	CO4
5	ENZYME PRINCIPLES	Enzymes Principles, Clinical significance and Procedures for estimation: Acid phosphatase, Alkaline phosphatase, Lactate dehydrogenase, Aspartate transaminase, Alanine transaminase, Creatine phosphokinase.	6	CO5

Reference Books:

1. Practical Clinical Biochemistry by Harold Varley.
2. Medical Laboratory Technology by Mukherjee.
3. Text book of Medical Laboratory Technology by P. B. Godker
4. Principal of Biochemistry by M. A.Siddiqi.
5. Instrumental Analysis by ChatwalAnand.
6. Text book of Medical Biochemistry by Chatterjee,Shinde..
7. Biochemistry by Voet & Voet.
8. Principal of Biochemistry by Lehninger.
9. Biochemistry by Voet & Voet.

e-Learning Source:

1. https://www.spcmc.ac.in/wp-content/uploads/2021/04/UV-VIS_Part-1.pdf
2. <https://en.wikipedia.org/wiki/Chromatography>
3. <https://soe.unipune.ac.in/studymaterial/ashwiniWadegaonkarSelf/BSC%20821%20Ch%205.pdf>

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

Course Code	Course Title	Attributes							SDGs No.
LT303	ANALYTICAL CLINICAL BIOCHEMISTRY	Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	3,4
		√	√	√	√		√	√	



Integral University, Lucknow

Effective from Session: 2023-24							
Course Code	LT310	Title of the Course	SEMINAR	L	T	P	C
Year	III	Semester	V	2	1	0	3
Pre-Requisite	Nil	Co-requisite	Nil				
Course Objectives	This curriculum imparts the knowledge of various types of diseases and functioning of various programs.						

Course Outcomes	
CO1	Student will be able to present seminar under concern topic in places like conferences, workshops, meets etc.
CO2	Student will have the knowledge on Power point presentation.
CO3	Student will have the presentation skill.
CO4	Student will have the knowledge on how to prepare a presentation for any event.
CO5	Student will be able to organize a Seminar, Webinar & Workshop.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	SEMINAR	Each student will be assigned topics for presentations as seminars, will explore recent innovations in the department of Radiological Imaging Techniques for presenting topics during Seminar and shall be holding group discussions along with in the presence of faculty.	60	CO1-5

Reference Books:

1. Medical Laboratory Technology by Mukherjee.
2. Text book of Medical Laboratory Technology by P. B. Godker
3. Practical Hematology by J.B. Dacie.
4. Transfusion Science by Overfield, Hame.
5. Textbook of Medical Laboratory Technology by Praful B. Godkar.

e-Learning Source:

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

1-

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

Attributes & SDGs

Course Code	Course Title	Attribute s							SDGs No.	
LT310	SEMINAR	Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	3,4	
		√	√	√	√		√	√		



Integral University, Lucknow

Effective from Session: 2023-24

Course Code	LT305	Title of the Course	MEDICAL PARASITOLOGY	L	T	P	C
Year	III	Semester	V	2	1	0	3
Pre-Requisite	Nil	Co-requisite	Nil				
Course Objectives	The student will be taught about introduction, general characteristics, life cycle and laboratory diagnosis of various medically important parasites.						

Course Outcomes

CO1	Students are able known about characteristics, habitat, morphology & life cycle of different types of parasites.
CO2	Students are able to known about characteristics, habitat, morphology & life cycle of different types of Helminthes.
CO3	Students are study about stool examinations like- collection, preservation, physical chemical & microscopic examination.
CO4	Students are able to make a thin or thick smear for parasitic examination and also about various types of stains.
CO5	Students are able known about collection, handling, transport and preservation of samples for parasitological investigations.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	PARASITOLOGY	Introduction to Medical Parasitology with respect to terms used in Parasitology. Protozoology/ Protozoal parasites: General characteristics of protozoa classification, Geographical distribution, Habitat, Morphology, lifecycle, Mode of infection and laboratory diagnosis of Entamoeba sp. E. Histolytica, Free-living Entamoeba sp. Geographical distribution, Habitat, Morphology, life cycle, Mode of infection and laboratory diagnosis of Intestinal and vaginal flagellates i.e., Giardia, Trichomonas sp. Geographical distribution, Habitat, Morphology, life cycle, Mode of infection and laboratory diagnosis of blood and tissue flagellates i.e., Plasmodium, Leishmania and Toxoplasma sp.	6	CO1
2	HELMINTHOLOGICAL	Helminthology/ Helminthic parasites: General characteristics of Cestodes, Trematodes and Nematodes. Geographical distribution, Habitat, Morphology, life cycle, Mode of infection and laboratory diagnosis of -Taeniasolium and saginata, Echinococcusgranulos, Hymenolepis nana, Schistosoma haematobium and mansoni, Fasciola hepaticabuski, Trichuristrichura, Trichinellaspiales, Strongyloidesstercoralis, Ancylostomaduodenale Enterobiusvermicularis Ascaris lumbricoides, Wuchereriabancrofti, Dracunculusmedinensis	6	CO2
3	DIAGNOSTIC PROCEDURE	Diagnostic procedures: Collection of stool samples, Preparation of material for unstained and stained preparations Staining methods i.e., Iodine staining and permanent staining. Concentration techniques i.e., Flotation and sedimentation techniques, egg counting techniques. General rules for microscopic examination of stool samples, Examination of Stool for parasites for intestinal protozoal infections, For Helminthic infections. Examination of blood for parasite, preparation of thin and thick blood film, leishman staining, examination of thick and thin smear, field's stain, JSB stain.	6	CO3
4	SLIDE PREPARATION	Biomedical waste management in a medical microbiology laboratory, types of waste generated, segregation treatment, disposal.	6	CO4
5	SAMPLES	Clinical case studies of various protozoal and helminthic infections with special focus on identification strategies of above mentioned parasites.	6	CO5

Reference Books:

1. Parasitology in relation to Clinical Medicine by K D Chatterjee.
2. Medical Entomology by A.K. Hati, Pub. Allied Book Agency.
3. Medical Parasitology by D.R.Arora
4. Clinical Parasitology by Paul Chester Beaver.

e-Learning Source:

1. <https://www.ncbi.nlm.nih.gov/books/NBK8262/>
2. <https://en.wikipedia.org/wiki/Helminthology>
3. <https://onlinelibrary.wiley.com/doi/abs/10.1128/9781555817381.ch133>

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	-	-	2	3	1	2	3	-
CO2	1	3	1	3	-	-	-	2	3	-	-	3	3	-	1	2	-
CO3	1	3	1	2	-	-	-	1	2	-	-	2	2	2	1	2	2
CO4	1	3	1	2	-	-	-	1	3	1	-	3	2	3	1	3	2
CO5	1	3	1	2	-	-	-	1	2	2	-	2	3	1	2	2	2

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

Course Code	Course Title	Attributes							SDGs No.
LT305	MEDICAL PARASITOLOGY	Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	3,4
		√	√	√	√		√	√	



Integral University, Lucknow

Effective from Session: 2023-24							
Course Code	LT306	Title of the Course	BLOOD BANKING & GENETICS- LAB	L	T	P	C
Year	III	Semester	V	0	0	2	1
Pre-Requisite	Nil	Co-requisite	Nil				
Course Objectives	The student will be taught about introduction of Abo-Rh grouping Blood donor screening, component preparation, screening of blood. according to NACO & SBTC guidelines.						

Course Outcomes: After the successful course completion, learners will develop following attributes:	
CO1	Students are study about Screening of Blood donor
CO2	Students are study about ABO & Rh grouping
CO3	Students are study about Collection and preservation of blood for transfusion purpose
CO4	Students are study about Screening of Transfusion transmitted diseases
CO5	Students are study about Blood component preparation storage system.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	DONOR SCREENING	1. Screening of blood donor: physical examination including medical history of the donor.	30	CO1
2	BLOOD COLLECTION	2. Collection and preservation of blood for transfusion purpose.		CO1
3	BLOOD SCREENING	3. Screening of blood for Malaria, Microfilaria, HBs Ag, Syphilis and HIV.		CO2
4	ABO-RH GROUPING	4. To determine the ABO & Rh Grouping-Direct or preliminary grouping, Indirect or proof grouping.		CO3
5	DU-TESTING	5. Rh grouping and determination of Du in case of Rh negative.		CO3
6	DAT/IAT	6. To perform Direct and Indirect Coomb 's test.		CO4
7	COMPATIBILITY TESTING	7. To perform cross matching - Major cross matching, Minor cross matching.		CO4
8	COMPONENT PREPARATION	8. Preparation of various fractions of blood.		CO5

Reference Books:	
1. Practical Hematology by J.B. Dacie	
2. Mollison's Blood Transfusion in Clinical Medicine	
3. Medical Laboratory Technology by K.L. Mukherjee Volume-	
4. Transfusion Science by Over field, Hamer	
e-Learning Source:	
1. https://www.healthline.com/health/blood-typing-and-crossmatching	
2. https://www.slideshare.net/peddanasunilkumar/blood-transfusion-reactions-119314356	
3. https://study.com/academy/lesson/genetic-material-definition-structure-function.html	

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	-

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

Course Code	Course Title	Attributes							SDGs No.
LT306	BLOOD BANKING & GENETICS- LAB	Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	3,4
		√	√	√	√		√	√	



Integral University, Lucknow

Effective from Session: 2023-24

Course Code	LT307	Title of the Course	ANALYTICAL CLINICAL BIOCHEMISTRY- LAB	L	T	P	C
Year	III	Semester	V	0	0	2	1
Pre-Requisite	Nil	Co-requisite	Nil				
Course Objectives	The student will be taught about demonstration & working of different types of biochemistry lab Equipment.						

Course Outcomes

CO1	Students are study about principle, working & maintenance of colorimeter.
CO2	Students are study about principle, working & maintenance of flame photometer.
CO3	Students are study about e principle, procedure of paper chromatography.
CO4	Students are study about principle & demonstration of TLC.
CO5	Students are study about principle & procedure of Electrophoresis.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	SPECTROPHOTOMETER	1. To demonstrate the principle, working & maintenance of spectrophotometer.	30	CO1
2	COLORIMETER	2. To demonstrate the principle, working & maintenance of colorimeter.		CO1
3	FLAME PHOTOMETER	3. To demonstrate the principle, working & maintenance of flame photometer.		CO2
4	PAPER CHROMATOGRAPHY	4. To demonstrate the principle, procedure of paper chromatography.		CO3
5	GAS CHROMATOGRAPHY	5. To demonstrate the principle & procedure of gas chromatography		CO3
6	TLC	6. To demonstrate the principle & demonstration of TLC.		CO4
7	COLUMN CHROMATOGRAPHY	7. To demonstrate the principle & procedure of column chromatography.		CO5
8	ELECTROPHORESIS	8. To demonstrate the principle & procedure of Electrophoresis.		CO5

Reference Books:

1. Practical Clinical Biochemistry by Harold Varle.
2. Text book of Medical Laboratory Technology by P. B. Godker
3. Medical Laboratory Technology by Mukherjee.
4. Principal of Biochemistry by M. A. Siddiqi.
5. Instrumental Analysis by Chatwal Anand.
6. Text book of Medical Biochemistry by Chatterjee, Shinde.
7. Principal of Biochemistry by Lehninger.
8. Biochemistry by Voet & Voet.

e-Learning Source:

1. https://www.spcmc.ac.in/wp-content/uploads/2021/04/UV-VIS_Part-1.pdf
2. <https://en.wikipedia.org/wiki/Chromatography>
3. <https://soe.unipune.ac.in/studymaterial/ashwiniWadegaonkarSelf/BSC%20821%20Ch%205.pdf>

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	1	-	2	-	1	2	-	3
CO2	2	3	2	2	-	-	-	1	3	1	-	3	-	2	1	-	2
CO3	1	3	1	2	-	-	-	1	2	-	-	2	-	1	2	-	3
CO4	2	3	1	2	-	-	-	1	3	-	-	3	-	2	3	-	3
CO5	1	3	1	2	-	-	-	1	2	1	-	2	-	1	2	-	3

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

Attributes & SDGs

Course Code	Course Title	Attributes							SDGs No.
LT307	ANALYTICAL CLINICAL BIOCHEMISTRY- LAB	Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	3,4
		√	√	√	√		√	√	



Integral University, Lucknow

Effective from Session: 2023-24							
Course Code	LT308	Title of the Course	MEDICAL PARASITOLOGY - LAB	L	T	P	C
Year	III	Semester	V	0	0	2	1
Pre-Requisite	Nil	Co-requisite	Nil				
Course Objectives	The student will be taught about laboratory diagnosis of various medically important parasites & microscopy.						

Course Outcomes	
CO1	Students are study about medical Parasitology with respect to terms used in Parasitology.
CO2	Students are study about General character, mode of infection lab diagnosis of many parasites.
CO3	Students are study about sample collection & identification of different parasites.
CO4	Students are study about slide preparation & staining of different parasitic infection.
CO5	Students are study about Collection, Transport, processing and preservation of samples for routine parasitological investigations.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	PARASITOLOGY HELMINTHOLOGICAL DIAGNOSTIC PROCEDURE SLIDE PREPARATION SAMPLES	1. Routine stool examination for detection of intestinal parasites with concentration methods.	30	CO1
2		2. Saline preparation, Iodine preparation, Floatation method Centrifugation method, Formal ether method, Zinc sulphate method.		CO2
3		3. Identification of adult worms from models/slides.		CO3
4		4. Tapeworm, Tapeworm segments, Ascaris (Round worm), Hookworms, Pinworms.		CO3
5		5. Malarial parasite.		CO4
6		6. Preparation of thin and thick smears, Staining of smear, Examination of smears for malarial parasites (P. vivax and P. falciparum).		CO5

Reference Books:

1. Parasitology in relation to Clinical Medicine by K D Chatterjee.
2. Medical Entomology by A.K. Hati, Pub. Allied Book Agency.
3. Medical Parasitology by D.R. Arora.
4. Clinical Parasitology by Paul Chester Beaver.

e-Learning Source:

1. <https://www.ncbi.nlm.nih.gov/books/NBK8262/>
2. <https://en.wikipedia.org/wiki/Helminthology>
3. <https://onlinelibrary.wiley.com/doi/abs/10.1128/9781555817381.ch133>

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

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

Attributes & SDGs

Course Code	Course Title	Attributes							SDGs No.
LT308	MEDICAL PARASITOLOGY - LAB	Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	3,4
		√	√	√	√		√	√	



Integral University, Lucknow

Effective from Session: 2023-24

Effective from Session: 2023-24							
Course Code	LT309	Title of the Course	HOSPITAL POSTING- LAB	L	T	P	C
Year	III	Semester	V	0	0	12	06
Pre-Requisite	Nil	Co-requisite	Nil				
Course Objectives	The student will be taught about different type of medical laboratory work according to respective SOPs						

Course Outcomes

CO1	The students will study about clinical sample collection.
CO2	The students will study about Sample accountability
CO3	The students will study about Quality Management system
CO4	The students will study about Biomedical waste management
CO5	The students will study about Calibration and Validation of Clinical Laboratory instruments.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	HOSPITAL POSTING	1. Determination of hemoglobin by various methods.	150	CO1
2		2. Determination of Total RBC count.		CO1
3		3. Determination of PCV.		CO1
4		4. Determination of red cell indices.		CO2
5		5. Demonstration of hypochromic microcytic slide.		CO2
6		6. General blood picture.		CO2
7		7. Determination of G-6-PD.		CO3
8		8. Differential Leucocyte Count.		CO3
9		9. Absolute leucocyte count.		CO3
10		10. Demonstration of toxic granulation of neutrophil.		CO4
11		11. To perform PT and Calculate INR.		CO4
12		12. To perform APTT.		CO4
13		13. To perform sickling test.		CO5
14		14. Determination of Plasma Hemoglobin.		CO5
15		15. To perform reticulocyte count.		CO5

Reference Books:

1.	Textbook of Medical Laboratory Technology by Praful B. Godkar.
2.	Medical Laboratory Technology by K L Mukherjee Volume-I.
3.	Practical Hematology by J.B. Dacie.
4.	Clinical Diagnosis & Management by Laboratory methods (20th edition) by John Bernard Henry

e-Learning Source:

1.	https://docs.google.com/presentation/d/1wFllcX0tvZ_BUAB1nDhstmj9KLU0-3Fb/edit?usp=share_link&ouid=106521868798423984598&rtopof=true&sd=true
2.	https://en.wikipedia.org/wiki/Complete_blood_count
3.	https://www.hopkinsmedicine.org/health/conditions-and-diseases/g6pd-glucose6phosphate-dehydrogenase-deficiency#:~:text=G6PD%20deficiency%20is%20an%20inherited,enzyme%20can%20cause%20hemolytic%20anemia.

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.
LT206	HOSPITAL POSTING-LAB	Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	3,4
		√	√	√	√		√	√	



INTEGRAL UNIVERSITY, LUCKNOW
**INTEGRAL INSTITUTE OF ALLIED HEALTH SCIENCES &
RESEARCH**

DEPARTMENT OF PARAMEDICAL SCIENCES

**BACHELOR OF SCIENCE IN MEDICAL LABORATORY
TECHNOLOGY
(B.Sc. MLT)**

SYLLABUS

YEAR/ SEMESTER: III/VI



Integral University, Lucknow Department of
Paramedical Sciences Study and Evaluation Scheme

Program: B.Sc. MLT

Semester-VI

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	LT310	Cytopathology & Cytotechniques	Core	3	1	0	40	20	60	40	100	31:0	4
2	LT311	Clinical Endocrinology & Toxicology	Core	2	1	0	40	20	60	40	100	3:1:0	3
3	LT312	Clinical Virology	Core	2	1	0	40	20	60	40	100	3:1:0	3
4	LT313	Medical Mycology	Core	2	1	0	40	20	60	40	100	2:1:0	3
5	LT314	Research Methodology & Biostatistics	Core	2	1	0	40	20	60	40	100	2:1:0	3
PRACTICAL													
1	LT315	Cytopathology & Cytotechniques-Lab	Core	0	0	2	40	20	60	40	100	0:0:1	1
2	LT316	Clinical Endocrinology & Toxicology - Lab	Core	0	0	2	40	20	60	40	100	0:0:1	1
3	LT317	Clinical Virology & Medical Mycology -Lab	Core	0	0	2	40	20	60	40	100	0:0:1	1
4	LT318	Hospital Posting - Lab	Core	0	0	12	40	20	60	40	100	0:0:6	6
Total				11	05	18	360	180	540	400	900	25	25

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	LT310	Cytopathology & Cytotechniques	Core	√	√	√	√		√	√	3,4
2	LT311	Clinical Endocrinology & Toxicology	Core	√	√	√	√		√	√	3,4
3	LT312	Clinical Virology	Core	√	√	√	√		√	√	3,4
4	LT313	Medical Mycology	Core	√	√	√	√		√	√	3,4
5	LT314	Research Methodology & Biostatistics	Core	√		√		√	√	√	3,4, 11
PRACTICAL											
1	LT315	Cytopathology & Cytotechniques-Lab	Core	√	√	√	√		√	√	3,4
2	LT316	Clinical Endocrinology & Toxicology - Lab	Core	√	√	√	√		√	√	3,4
3	LT317	Clinical Virology & Medical Mycology -Lab	Core	√	√	√	√		√	√	3,4
4	LT318	Hospital Posting - Lab	Core								

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: 2023-24							
Course Code	LT310	Title of the Course	CYTOPATHOLOGY & CYTOTECHNIQUES	L	T	P	C
Year	III	Semester	VI	3	1	0	4
Pre-Requisite	Nil	Co-requisite	Nil				
Course Objectives	The students will learn about various staining procedures for demonstration of different substances & various cytological investigations. This will include special staining procedures & handling & testing of various cytological specimens.						

Course Outcomes	
CO1	The students will learn about various cytological staining procedures
CO2	The students will learn about various cytological investigations.
CO3	The students will learn about special staining procedures about cytology
CO4	The students will learn about Assessment of smearing and staining quality
CO5	The students will learn about identification of, normal, neoplastic and inflammatory cells.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	ASPIRATION & EXFOLIATIVE CYTOLOGY	Introduction, Definition, Branches of Cytopathology. Aspiration cytology - Principles, indications and utility of the technique with special emphasis on role of cytotechnician in FNAC clinics, Equipments used in FNAC clinics. Exfoliative Cytology - Principles, indications and utility of the technique, Sample collection, labelling, preparation, processing of cervical, endometrial, respiratory tract, gastro intestinal tract and urinary tract sample, Smear preparation.	8	CO1
2	FIXATIVES AND FIXATIONS	Fixatives and fixations : - types, uses, merits, demerits. Cell Block preparation. Routine staining with MGG : - Stains preparation, staining method, Mounting, Pap staining	8	CO2
3	CRYOSTAT SECTIONING	Cryostat sectioning, its applications in diagnostic cytopathology. Enzyme Cytochemistry: Diagnostic applications Demonstration of Phosphatases, Dehydrogenases, Oxidases & Peroxidases, Vital staining for Sex Chromatin.	8	CO3
4	CERVICAL CYTOLOGY	Cervical Cytology : - Identification of normal cells, malignant cells, inflammatory cells. Assessment of staining quality, problems and remedies.	8	CO4
5	FLUID CYTOLOGY	Fluid Cytology : - Assessment of smearing and staining quality, remedies. Special stains used in cytology : - PAS, Alcian Blue, Mucicarmin, Giemsa, Sudan.	8	CO5

Reference Books:

1. Medical Lab technology by Lynch.
2. An Introduction to Medical Lab Technology by F J Baker and Silverton
3. Bancroft's Theory and Practice of Histopathological Techniques by John D Bancroft.
4. Diagnostic Cytology by Koss Volume -II.
5. Handbook of Histopathological Techniques by C F A Culling.

e-Learning Source:

- 1 <https://www.sciencedirect.com/topics/medicine-and-dentistry/cytopathology>
- 2 <https://www.thieme-connect.com/products/ejournals/pdf/10.1055/s-0039-1693098.pdf>
- 3 <https://www.slideserve.com/tevy/cytology-of-body-fluid>

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

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

Attributes & SDGs

Course Code	Course Title	Attributes							SDGs No.
LT310	CYTOPATHOLOGY & CYTOTECHNIQUES	Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	3,4
		√	√	√	√		√	√	



Integral University, Lucknow

Effective from Session: 2023-24							
Course Code	LT311	Title of the Course	CLINICAL ENDOCRINOLOGY & TOXICOLOGY	L	T	P	C
Year	III	Semester	VI	2	1	0	3
Pre-Requisite	Nil	Co-requisite	Nil				
Course Objectives	The students will learn about various Hormones male & Females Classification, Mechanism of action, Secretionand reference ranges.						

Course Outcomes	
CO1	The student will study about hormones classification & mechanism.
CO2	The student will study about determination & disorders of T3, T4, TSH
CO3	The student will study about Infertility profile: LH, FSH, TSH
CO4	The student will study about estimation and clinical significance, reference range, hypo and hyper secretion. Of various hormones
CO5	The student will study about Toxicology,

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mappe d CO
1	HORMONES, ITS CLASSIFICATION & ACTION	Hormones, Classification of hormones, organs of endocrine system their secretion and function, regulation of hormone secretion, Mechanism of action.	6	CO1
2	THYROID FUNCTION TEST	Thyroid function test: Thyroid hormones, biological function, hypothyroidism, hyperthyroidism, Determination of T3, T4, TSH, FT3, FT4, TBG, Disorder associated with thyroid dysfunction.	6	CO2
3	INFERTILITY PROFILE	Infertility profile: LH, FSH, TSH, Estrogen, Progesterone, Total Testosterone, Free testosterone, DHEA-S, 17- Ketosteroids, Prolactin, their estimation and clinical significance, reference range, hypo and hyper secretion, Triple Test.	6	CO3
4	GROWTH HORMONE	Growth hormone, ACTH, Aldosterone, Cortisol their estimation and clinical significance, reference range, hypo and hyper secretion.	6	CO4
5	INTRODUCTION OF TOXICOLOGY	Introduction of Toxicology, Alcohol poisoning, Lead poisoning, Zinc poisoning, Mercury poisoning drugs abuse, screening procedure for drug screening, Spot tests, hair and urine test, Immunoassay for drugs.	6	CO5

Reference Books:

1. Teitz (2007), fundamental of clinical chemistry, 6th edition Elsevier Publications.
2. Bion (2013), Clinical chemistry, 7th edition, Wiley Publication.
3. Henry's clinical diagnosis and management by laboratory methods (2011), 22nd edition, Elsevier.
4. D M Vasudevan (2011), text book of medical biochemistry, 8th edition Jaypee Brothers.
5. M N Chatterjee & Rana Shinde (2012), textbook of medical biochemistry, 8th edition Jaypee Publications.
6. Singh & Sahni (2008), Introductory Practical Biochemistry, 2nd edition, alpha Science.

e-Learning Source:

1. <https://byjus.com/biology/hormones/>
2. https://docs.google.com/presentation/d/11DhZilsAs_nhte5NqSQ30TV1RnMQOk5/edit?usp=share_link&ouid=116700992000575491834&rtopof=true&sd=true
3. <https://www.slideshare.net/TSOLEMAN/1-introduction-15583147>

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	2	1	-	1	1
CO2	1	3	1	3	-	-	-	1	3	-	-	3	3	2	-	1	1
CO3	1	3	1	2	-	-	-	1	2	-	-	2	3	1	-	1	1
CO4	1	3	1	2	-	-	-	1	3	-	-	3	2	1	-	1	1
CO5	1	3	1	2	-	-	-	1	2	-	-	2	2	1	-	1	1

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

Course Code	Course Title	Attribute s							SDGs No.
LT311	CLINICAL ENDOCRINOLOGY & TOXICOLOGY	Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	3,4
		√	√	√	√		√	√	



Integral University, Lucknow

Effective from Session: 2023-24							
Course Code	LT312	Title of the Course	CLINICAL VIROLOGY	L	T	P	C
Year	III	Semester	VI	2	1	0	3
Pre-Requisite	Nil	Co-requisite	Nil				
Course Objectives	The student will be taught about introduction, general characteristics, life cycle and laboratory diagnosis of various Medically important Viruses.						

Course Outcomes	
CO1	The student will be taught about introduction to medically importance various viruses
CO2	The student will be taught about Collection, transportation and storage of sample for viral diagnosis
CO3	The student will be taught about Modes of viral transmission.
CO4	The student will be taught about Symptoms, prophylaxis and control of various medically importance viruses
CO5	The student will be taught about oncogenic viruses' prevention & control of medically importance viral diseases,

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	INTRODUCTION TO MEDICAL VIROLOGY	<ul style="list-style-type: none"> Introduction to medical virology. Introduction to medically important viruses. Structure and Classification of viruses. Multiplication of viruses. 	6	CO1
2	VIRAL DIAGNOSIS	<ul style="list-style-type: none"> Collection, transportation and storage of sample for viral diagnosis. Staining techniques used in Virology Processing of samples for viral culture (Egg inoculation and tissue culture), viral identification techniques commonly used in diagnostic lab. 	6	CO2
3	MODES OF VIRAL TRANSMISSION	Host virus interaction. Modes of viral transmission: Persistent, non-persistent, vertical and horizontal Viral multiplication and replication strategies: Interaction of viruses with cellular receptors and entry of viruses. Assembly, maturation and release of virions.	6	CO3
4	VIRUSES- PROPHYLAXIS AND CONTROL	Poxviruses, Herpesviruses, hepatitis viruses, retroviruses-HIV, Picorna viruses, rhabdoviruses, orthomyxoviruses and paramyxoviruses, TORCH profile, Symptoms, mode of transmission, prophylaxis and control of Polio, Herpes, Hepatitis, Rabies, Dengue, HIV, Influenza with brief description of swine flu, Ebola, Chikungunya, Japanese Encephalitis, COVID-19.	6	CO4
5	INTRODUCTION TO ONCOGENIC VIRUSES	Introduction to oncogenic viruses, Types of oncogenic DNA and RNA viruses, concepts of oncogenes and proto-oncogenes, prevention & control of viral diseases, antiviral compounds and their mode of action, interferon and their mode of action, General principles of viral vaccination.	6	CO5

Reference Books:

1. Medical Laboratory manual for tropical countries Vol. II Microbiology by Monica Cheesbrough
2. Medical laboratory Technology Vol. I, II, III by Mukherjee
3. Medical Microbiology by Panikar & Satish Gupte
4. Text book of Microbiology by Ananthanarayanan
5. Practical Medical Microbiology by Mackie & MacCartney Volume 1 and 2

e-Learning Source:

1. <https://www.ncbi.nlm.nih.gov/books/NBK8098/>
2. <https://www.nature.com/articles/s41579-021-00535-6>
- <https://www.sciencedirect.com/topics/agricultural-and-biological-sciences/oncogenic-viruses>

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

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

Attributes & SDGs

Course Code	Course Title	Attributes							SDGs No.
LT312	CLINICAL VIROLOGY	Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	3,4
		√	√	√	√		√	√	



Integral University, Lucknow

Effective from Session: 2023-24

Course Code	LT313	Title of the Course	MEDICAL MYCOLOGY	L	2	T	1	P	0	C	3
Year	III	Semester	VI								
Pre-Requisite	Nil	Co-requisite	Nil								
Course Objectives	The student will be taught about introduction, general characteristics, life cycle and laboratory diagnosis of various medically important Fungi.										

Course Outcomes

CO1	The student will be taught about Basic concepts about superficial and deep Mycoses
CO2	The student will be taught about Morphological, cultural characteristics of common fungal disease.
CO3	The student will be taught about Morphology, Diseases & lab diagnosis of various medically importance fungi.
CO4	The student will be taught about Processing of clinical samples for diagnosis of fungal infections
CO5	The student will be taught about Preservation of fungal cultures, Routine myco-serological tests and skin tests.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	INTRODUCTION TO MEDICALMYCOLOGY	Introduction to Medical Mycology Basic concepts about superficial and deep Mycoses Taxonomy and classification and general characteristics of various medically importantfungi.	6	CO1
2	MORPHOLOGY OF FUNGI	Morphological, cultural characteristics of common fungal laboratory contaminants Culture media used in mycology. Techniques used for isolation and identification of medically important fungi.	6	CO2
3	FUNGI-DISEASES & LAB DIAGNOSIS	Morphology, Diseases & lab diagnosis of: Candida, Dermatophytes, Mycetoma (Eumycetoma & Action mycetoma), Cryptococcus, Histoplasmosis, Opportunistic Fungi, Blastomyces, Coccidioides's, Nocardia. Aspergillus sp. And Penicillium sp.	6	CO3
4	MICROSCOPY IN MEDICALMYCOLOGY LABORATORY	Direct microscopy in medical mycology laboratory, Processing of clinical samples for diagnosis of fungal infections i.e., Skin, nail, hair, pus, sputum, CSF and other body fluids.	6	CO4
5	METHODS FOR IDENTIFICATION OFFUNGI	Dimorphism in fungi, Antifungalsusceptibility tests. Preservation of fungal cultures, Routine myco-serological tests and skin tests. Clinical cases of common mycological infections.	6	CO5

Reference Books:

1. Text book of Microbiology by Ananthanarayanan.
2. Medical Microbiology by Panikar & Satish Gupte.
3. Medical laboratory Technology Vol. I, II, III by Mukherjee.
4. Medical Laboratory manual for tropical countries Vol. II Microbiology by Monica Cheesbrough
5. Practical Medical Microbiology by Mackie &MacCartney Volume 1 and 2.

e-Learning Source:

1. <https://www.uoanbar.edu.iq/eStoreImages/Bank/7748.pdf>
2. [https://www.appsnet.org/Publications/Brown_Ogle/28%20Control-fungal%20diseases%20\(JFBHJO\).pdf](https://www.appsnet.org/Publications/Brown_Ogle/28%20Control-fungal%20diseases%20(JFBHJO).pdf)
3. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3536260/#:~:text=Molecular%20methods%20using%20PCR%20and,ESI%2DMS%20combined%20with%20PCR.>

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	-	-	1	-	3	3	2	2	-	2	2	-	-	-	-	1
CO2	2	-	-	2	-	3	2	2	1	-	2	3	-	-	-	-	2
CO3	2	-	-	1	-	3	3	1	2	-	1	2	-	-	-	-	1
CO4	2	-	-	1	-	3	3	2	1	-	2	3	-	-	-	-	1
CO5	2	-	-	2	-	3	2	2	1	-	2	2	-	-	-	-	1

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

Attributes & SDGs

Course Code	Course Title	Attributes								SDGs No.
LT313	MEDICAL MYCOLOGY	Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics		
		√	√	√	√		√	√		3,4



Integral University, Lucknow

Effective from Session: 2023-24							
Course Code	LT314	Title of the Course	RESEARCH METHODOLOGY & BIOSTATISTICS	L	T	P	C
Year	III	Semester	VI	2	1	0	3
Pre-Requisite	Nil	Co-requisite	Nil				
Course Objectives	The objective of this module is to help the students understand the basic principles of research and methods applied to draw inferences from the research findings. The students will also be made aware of the need of biostatistics and understanding of data, sampling methods, in addition to being given information about the relation between data and variables.						

Course Outcomes	
CO1	The student will be taught about Research Methodology, Basic concept.
CO2	The student will be taught about Data- Research tools and Data collection methods
CO3	The student will be taught about data in biostatistics,
CO4	The student will be taught about Distribution, Standard deviation, Standard errors. Coefficient of Variation, t-test, x
CO5	The student will be taught about statistical analysis,

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	RESEARCH METHODOLOGY	Research Methodology: Introduction to research methods, Identifying research problem. Ethical issues in research- Research design, Basic Concepts of Biostatistics	6	CO1
2	RESEARCH DEVELOPMENT	Types of Data- Research tools and Data collection methods, sampling methods, Developing aresearch proposal.	6	CO2
3	BIOSTATISTICS	Biostatistics: Need of biostatistics, what is biostatistics: beyond definition, understanding of data in biostatistics, How & where to get relevant data, Relation between data & variables. Type of variables: defining data set, Collection of relevant data: sampling methods.	6	CO3
4	DISTRIBUTION,	Distribution, Standard deviation, Standard errors. Coefficient of Variation, t-test, Chi square test.	6	CO4
5	CONSTRUCTION OF STUDY:	Construction of study: population, sample, normality and its beyond (not design of study, perhaps), Summarizing data on the pretext of underlined study. Understanding of statistical analysis (not methods).	6	CO5

Reference Books:

1. Statistical Methods by S.P. Gupta.
2. Methods in biostatistics for medical students by B.K.Mahajan..
3. RPG Biostatistics by Himanshu Tyagi.

e-Learning Source:

1. https://www.researchgate.net/publication/303381524_Fundamentals_of_research_methodology_and_data_collection
2. <https://en.wikipedia.org/wiki/Biostatistics>
3. <https://www.nordp.org/what-is-research-development->

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	-	2	-	-	-	2	-	-	-	-	-
CO2	-	-	-	-	-	2	-	-	-	-	-	2	-	-	-	-	-
CO3	-	-	-	-	-	2	-	1	-	1	-	2	-	-	-	-	-
CO4	-	-	-	-	-	2	2	-	-	-	-	2	-	-	-	-	-
CO5	-	-	-	-	-	2	1	1	-	-	1	2	-	-	-	1	1

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

Attributes & SDGs

Course Code	Course Title	Attributes							SDGs
LT314	RESEARCH METHODOLOGY & BIOSTATISTICS	Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	No.
				√					3,4,11



Integral University, Lucknow

Effective from Session: 2023-24

Effective from Session: 2023-24							
Course Code	LT315	Title of the Course	CYTOPATHOLOGY & CYTOTECHNIQUES- LAB	L	T	P	C
Year	III	Semester	VI	0	0	2	1
Pre-Requisite	NIL	Co-requisite	Nil	The objective of this module is to help the students understand about Collection, investigation, general & special stain used in Cytopathological Technique.			
Course Objectives							

Course Outcomes

CO1	The student will study about various cytopathological sample collection.
CO2	The student will study about various cytological fixatives and fixations.
CO3	The student will study about cryostat sectioning, its applications in diagnostic cytopathology.
CO4	The student will study about cervical screening, Equipment's & its procedure
CO5	The student will study about special stains used in cytology:

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	SAMPLE COLLECTION	1. Sample collection of various Cytopathological Specimens.	20	CO1
2	PAP-SMEAR	2. To perform Papnicolaou's stain on cervical smear.		CO2
3	CRYOSTAT-SECTIONING	3. To cut frozen sections of Gynaec tissue.		CO3
4	CSF-CYTOLOGY	4. To perform CSF sample and body fluids by cytospin.		CO4
5	CYTOLOGICAL STAIN	5. Should know the various stains used in Cytology lab: I May Grunwald Giemsa, H&E, PAS, Grocott's.		CO5

Reference Books:

1. Handbook of Histopathological Techniques by C F A Culling.
2. Medical Lab technology by Lynch.
3. An Introduction to Medical Lab Technology by F J Baker and Silverton.
4. Bancroft 's Theory and Practice of Histopathological Techniques by John D Bancroft.
5. Diagnostic Cytology by Koss Volume -II.

e-Learning Source:

- 1 <https://www.sciencedirect.com/topics/medicine-and-dentistry/cytopathology>
- 2 <https://www.thieme-connect.com/products/ejournals/pdf/10.1055/s-0039-1693098.pdf>
- 3 <https://www.slideserve.com/tevv/cytology-of-body-fluid>

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	1	1	-	3	2	2	1	1	1
CO2	1	3	2	2	-	-	-	1	1	1	-	3	2	2	1	1	1
CO3	1	3	1	2	-	-	-	1	1	1	-	3	2	1	1	1	1
CO4	2	3	1	2	-	-	-	1	1	1	-	3	2	2	1	1	1
CO5	1	3	1	2	-	-	-	1	1	1	-	3	2	1	1	1	1

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

Attributes & SDGs

Course Code	Course Title	Attribute s							SDGs No.
LT315	CYTOPATHOLOGY & CYTOTECHNIQUES- LAB	Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	3,4
		√	√	√	√		√	√	



Integral University, Lucknow

Effective from Session: 2023-24

Course Code	LT316	Title of the Course	CLINICAL ENDOCRINOLOGY & TOXICOLOGY- LAB	L	T	P	C
Year	III	Semester	VI	0	0	2	1
Pre-Requisite	Nil	Co-requisite	Nil				
Course Objectives	The objective of this module is to help the students understand about Determination of various Hormones.						

Course Outcomes

CO1	The student will study about determine T3, T4, TSH hormones conc. in serum sample.
CO2	The student will study about determine LH, PRL, FSH hormones conc. in serum sample.
CO3	The student will study about perform TRIPLE test.
CO4	The student will study about of Male & Female infertility test.
CO5	The student will study about determine BHCG hormones.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	DETERMINATION OF T3 CONC	1. To determine T3 conc. in serum sample	30	CO1
2	DETERMINATION OF T4 CONC	2. To determine T4 conc. in serum sample		CO1
3	DETERMINATION OF TSH CONC	3. To determine TSH conc. in serum sample		CO2
4	DETERMINATION OF LH CONC	4. To determine LH conc. in serum sample		CO2
5	DETERMINATION OF FSH CONC	5. To determine FSH conc. in serum sample		CO3
6	DETERMINATION OF PRL CONC	6. To determine Prolactin conc. in serum sample		CO3
7	DETERMINATION TRIPLE TEST	7. To perform TRIPLE test		CO4
8	DETERMINATION OF MALE & FEMALE INFERTILITY HORMONE	8. Demonstration of male and female infertility test		CO4
9	DETERMINATION OF BHCG	9. Beta HCG.		CO5

Reference Books:

1. Teitz (2007), fundamental of clinical chemistry, 6th edition Elsevier Publications.
2. Bison (2013), Clinical chemistry, 7th edition, wiley Publication.
3. Henry's clinical diagnosis and management by laboratory methods (2011), 22nd edition, Elsevier.
4. D M Vasudevan (2011), text book of medical biochemistry, 8th edition Jaypee Brothers.
5. M N Chatterjee & Rana Shinde (2012), textbook of medical biochemistry, 8th edition Jaypee Publications.
6. Singh & Sahni (2008), Introductory Practical Biochemistry, 2nd edition, alpha Science.

e-Learning Source:

1. <https://byjus.com/biology/hormones/>
2. https://docs.google.com/presentation/d/11DhZilsAs_nhte5NqSQ30TV1RnMQOk5/edit?usp=share_link&ouid=116700992000575491834&rtpof=true&sd=true
3. <https://www.slideshare.net/TSOLEMAN/1-introduction-15583147>

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	2	1	-	1	1
CO2	1	3	1	3	-	-	-	1	3	-	-	3	3	2	-	1	1
CO3	1	3	1	2	-	-	-	1	2	-	-	2	3	1	-	1	1
CO4	1	3	1	2	-	-	-	1	3	-	-	3	2	1	-	1	1
CO5	1	3	1	2	-	-	-	1	2	-	-	2	2	1	-	1	1

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

Attributes & SDGs

Course Code	Course Title	Attribute s							SDGs No.
LT316	CLINICAL ENDOCRINOLOGY & TOXICOLOGY- LAB	Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	3,4
		√	√	√	√		√	√	



Integral University, Lucknow

Effective from Session: 2023-24

Course Code	LT317	Title of the Course	CLINICAL VIROLOGY & MEDICAL MYCOLOGY- LAB	L	T	P	C
Year	III	Semester	VI	0	0	2	1
Pre-Requisite	Nil	Co-requisite	Nil				
Course Objectives	The objective of this module is to help the students understand about Identification and diagnosis of various viral infection,						

Course Outcomes: After the successful course completion, learners will develop following attributes:

CO1	The student will study about Structure of viruses and their multiplication
CO2	The student will study about various staining procedures for diagnosis of viral infections.
CO3	The student will study about Card test for Viral Marker.
CO4	The student will study about Elisa test for Viral marker
CO5	The student will study about mould culture by performing various identification techniques studied in theory

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	STRUCTURE OF VIRUSES	1. To demonstrate structure of viruses and their multiplication from charts etc.	30	CO1
2	STAINING PROCEDURES	2. To perform Giemsa stain, Seller 's stain, immunofluorescent staining procedures for diagnosis of viral infections.		CO1
3	CARD TEST	3. Card test for Viral Marker.		CO2
4	ELISA	4. Elisa for Viral marker		CO2
5	CULTURE MEDIA	5. To prepare culture media used routinely in mycology.		CO3
6	PREPARATION OF STAIN	6. To perform KOH preparation, Gram stain, Potassium Hydroxide - CalcofluorWhite method, India Ink preparation, Modified Kinyoun Acid Fast Stain for Nocardia, LCB preparation		CO3
7	IDENTIFICATION OF VIRUSES	7. To identify given yeast culture by performing various identification techniques studied in theory.		CO4
8	IDENTIFICATION OF VIRUSES	8. To identify given mould culture by performing various identification techniques studied in theory		CO5

Reference Books:

1. Practical Medical Microbiology by Mackie & Mac Cartney Volume 1 and 2.
2. Text book of Microbiology by Ananth Narayanan.
3. Medical Microbiology by Panikar & Satish Gupte.
4. Medical laboratory Technology Vol. I, II, III by Mukherjee
5. Medical Laboratory manual for tropical countries Vol. II Microbiology by Monica Cheesbrough Medical Mycology by Dr. Jagdish Chander

e-Learning Source:

1. <https://www.ncbi.nlm.nih.gov/books/NBK8098/>
2. <https://www.nature.com/articles/s41579-021-00535-6>
3. <https://www.sciencedirect.com/topics/agricultural-and-biological-sciences/oncogenic-viruses>

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	-	2	1	-	-	-	1	1	-	1	2	1	3	2	1
CO2	1	3	-	2	-	-	-	-	1	-	-	1	2	1	3	2	1
CO3	2	3	-	2	-	-	-	-	1	1	-	1	2	1	3	2	1
CO4	1	3	-	1	-	-	-	-	1	-	-	1	2	1	3	2	1
CO5	2	3	-	1	-	-	-	-	1	-	-	1	2	1	3	2	1

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

Course Code	Course Title	Attributes							SDGs No.
LT317	CLINICAL VIROLOGY & MEDICAL MYCOLOGY- LAB	Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	3,4
		√	√	√	√		√	√	



Integral University, Lucknow

Effective from Session: 2023-24							
Course Code	LT318	Title of the Course	HOSPITAL POSTING- LAB	L	T	P	C
Year	III	Semester	VI	0	0	12	6
Pre-Requisite	Nil	Co-requisite	Nil				
Course Objectives	The student will be taught about different type of Clinical laboratory work according to respective SOPs.						

Course Outcomes: After the successful course completion, learners will develop following attributes:	
CO1	Students are study about various specimen sample collection
CO2	Students are study about sample accountability
CO3	Students are study about laboratory -quality management system
CO4	Students are study about Calibration and Validation of Clinical Laboratory instruments
CO5	Students are study about various clinical test Reporting results.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	HOSPITAL POSTING	1. Clinical sample collection e.g., Blood, Urine, Stool, Saliva, Sputum.	150	CO1
2		2. Sample accountability- Labeling of sample, Making entries in Laboratory records.		CO1
3		3. Reporting results- Basic format of a test report, Release of examination results, Alteration in reports.		CO2
4		4. Quality Management system- Quality assurance, Internal and External quality control, Quality improvement.		CO2
5		5. Biomedical waste management in a clinical laboratory - Disposal of used samples, reagents and other biomedical waste.		CO3
6		6. Calibration and Validation of Clinical Laboratory instruments.		CO3
7		7. Ethics in medical laboratory practice in relation to the following-		CO4
8		8. Pre-Examination procedures, Examination procedures, reporting of results, Preserving medical records, Access to medical laboratory records.		CO5

Reference Books:

1. Handbook of Histopathological Techniques by C F A Culling
2. Medical Lab technology by Lynch
3. An Introduction to Medical Lab Technology by F J Baker and Silverton
4. Bancroft's Theory and Practice of Histopathological Techniques by John D Bancroft
5. Diagnostic Cytology by Koss Volume -II

e-Learning Source:

1. https://docs.google.com/presentation/d/1wFllcX0tvZ_BUAB1nDhstmj9KLU03Fb/edit?usp=share_link&ouid=106521868798423984598&rtfpof=true&sl=true
2. https://en.wikipedia.org/wiki/Complete_blood_count
3. <https://www.hopkinsmedicine.org/health/conditions-and-diseases/g6pd-glucose6phosphate-dehydrogenase-deficiency#:~:text=G6PD%20deficiency%20is%20an%20inherited,enzyme%20can%20cause%20hemolytic%20anemia.>

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

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

Course Code	Course Title	Attribute s							SDGs No.
LT318	HOSPITAL POSTING-LAB	Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	
		√	√	√	√		√	√	3,4