



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	LT304	Basic Preventive Medicine & Community Health Care	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													
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	LT304	Basic Preventive Medicine & Community Health Care	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

Effective from Session: 2019-20							
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/>

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	PSO4	PSO5	PSO6	PSO7
	CO1	1	3	1	2	-	-	-	1	2	-	-	2	2	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.	
		Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics		
LT301	GENERAL & CLINICAL PATHOLOGY	√	√	√				√	√	3,4



Integral University, Lucknow

Effective from Session: 2019-20							
Course Code	LT304	Title of the Course	BASIC PREVENTIVE MEDICINE AND COMMUNITY HEALTH CARE	L	T	P	C
Year	III	Semester	V	2	1	0	3
Pre-Requisite	Nil	Co-requisite	Nil				
Course Objectives	This curriculum impart the knowledge of various types of diseases and functioning of various programs.						

Course Outcomes	
CO1	Students are study about important health acts & health related programme, and also about the different concepts of epidemiology.
CO2	Students know about communicable disease like- malaria, TB, hepatitis, dengue, etc.
CO3	Students are able to know about many different national disease control programs like, DOTS, NACP, UIP, etc.
CO4	Students are study about problems related to population, growth rate, death rate, etc.
CO5	Students are able to known about various national immunization programs and organizations like- WHO, UNICEF, UNFPA, FAO, etc.

Unit No.	Title of the Unit	Content of Unit	Contact Hrs.	Mapped CO
1	HEALTH	Definition and concepts of health, important public health acts, health problems of developed and developing countries, environment and health. Definition and concepts of epidemiology, diseases, types and use of epidemiology. Basic emergency care and first aid.	6	CO1
2	COMMUNICABLE DISEASE	Epidemiology, etiology, pathogenesis and control of communicable disease like malaria, cholera, tuberculosis, leprosy, diarrhea, poliomyelitis, viral hepatitis, measles, dengue, rabies, AIDS.	6	CO2
3	NATIONAL PROGRAMS	National Health Policy and Programs, DOTS, National AIDS control programs, National cancer control programs, universal immunization programs etc. Nutrition and major nutritional problems etiology, manifestations and prevention, components of RCH care. Examination of water, food adulteration, role of regular exercise and yoga in prevention and management of various diseases	6	CO3
4	POPULATION	Population, problems of population growth, birth rates, death rates, fertility rates, MMR., CPR, Approaches and methods of contraception, Reproductive and child health. Hygiene and sanitation, sanitation barriers, excreta disposal.	6	CO4
5	IMMUNIZATION	Immunization programs, various national immunization programs and vaccine schedules, Family welfare and planning, communicable and non-communicable disease, Health planning in India including various committees, national health policy and health goals. Objectives and goals of WHO, UNICEF, Indian Red Cross Society, UNFPA, FAO, ILO.	6	CO5

Reference Books:	
1. Harsh Mohan (2017), Textbook of Pathology, 7 th edition, Jaypee Publications.	
2. K. Parks & Sunder Lal, (2015), Textbook of Preventive Social Medicine, 3 rd edition, Bhanot Publications.	
e-Learning Source:	
1. https://acphd.org/communicable-disease/	
2. https://main.mohfw.gov.in/sites/default/files/Chapter615.pdf	
3. https://www.nhp.gov.in/universal-immunisation-programme_pg	

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.	
		Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value		Professional Ethics
LT304	BASIC PREVENTIVE MEDICINE AND COMMUNITY HEALTH CARE	√	√	√	√		√	√	3,4



Integral University, Lucknow

Effective from Session: 2019-20							
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

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: 2019-20							
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

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

2- 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	
LT308	MEDICAL PARASITOLOGY - LAB	√	√	√	√		√	√	3,4



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**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: 2019-20							
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 a research 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 No.
		Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	
LT314	RESEARCH METHODOLOGY & BIOSTATISTICS			√					3,4, 11



Integral University, Lucknow

Effective from Session: 2019-20							
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:

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

e-Learning Source:

- <https://byjus.com/biology/hormones/>
- https://docs.google.com/presentation/d/11DhZilsAs_n_hte5NgSQ30TV1RnMQOk5/edit?usp=share_link&ouid=116700992000575491834&rtpof=true&sd=true
- <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	Attributes							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: 2019-20							
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 - Calcofluor White 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	
https://www.sciencedirect.com/topics/agricultural-and-biological-sciences/oncogenic-viruses	
3.	

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.
		Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	
LT317	CLINICAL VIROLOGY & MEDICAL MYCOLOGY- LAB	√	√	√	√		√	√	3,4



Integral University, Lucknow

Effective from Session: 2019-20							
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_BUAB1nDhstmj9KLU0-3Fb/edit?usp=share_link&ouid=106521868798423984598&rtfpof=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	2	3	-	2	1	-	-	-	1	1	-	1	2	1	3	2
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	Attributes							SDGs No.
		Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	
LT318	HOSPITAL POSTING-LAB	√	√	√	√		√	√	3,4