Course Content/Syllabus

Course Information:

School/ Department:	Glocal Collage Of Paramedical Science and Research Center
Programme:	BMLT
Course Tile:	CLINICAL BIOCHEMISTRY-I
Course Code:	MLT 301
Course Level (UG/PG)	UG
Credits	4 L ----- T 2 P.
Prerequisite	
Year/Semester	3RD year

Course Objectives: This course will demonstrate about automation and introduction and significance of endocrinology

Course Outcomes: 1. At the end of the course the student should know basic bio stats
2. the student should know automation in biochemistry
3.should have knowledge of normal ranges
4. should know toxicology
5. should know endocrinology

Teaching Methodology:

Methodology	Mention Appropriate Methods (Yes/No)
Explanations by the Instructor	Yes
Group/Pair Work	Yes
Class Discussion	Yes
Assignment/s	Yes
Viva Voice	Yes
Audio/video Class	Yes
Practical/ Case Study/Diary	Yes
Presentations	Yes
Hospital Posting	Yes

Course Content

Course Content/Syllabus

COURSE CONTENT

No	Description	Weightage (%)
1	Basic bio-statics for clinical quality control. Standard deviation, standard error, coefficient of variation, normal distribution, t-test and chi-square test. s Establishment and maintenance of quality control for laboratory tests based upon medical usefulness. Terminology of quality control and quality control charts.	40
2	Normal ranges of various bio-metabolites and their confidence limits. Automation: Handling of automatic analyzers, organization and management of hospital laboratory.	30
3	Toxicology: Alcohol, heavy metals (Zinc, Hg etc.) salicylates, drug abuse, screening and drug interference with laboratory findings. Endocrinology: Estimation of growth hormone, ACTH, sex hormone binding globulin, eldosterone, parathormon, cortisol and 17 – hydroxyprogesteron and their clinical significance.	30

Lecture Plan

Module Number	Module Title	Number of Lectures
Module 1	BASIC BIOSTATS	
Module 2	AUTOMATION	
Module 3	TOXICOLOGY	

Practical

1. Estimation of Serum / Plasma Glucose Level by different Method.
2. Perform the OGTT or GGT
3. Estimation of Total Serum Protein & Albumin Level
4. Estimation of Serum Urea and Creatinine Level
5. Estimation of Serum Cholesterol & Triglyceride Level
6. Estimation of Serum Total Lipid Level
7. Estimation of Serum Uric acid Level
8. Estimation of Urine Protein Level
9. Any other practical's based on theory paper

Credit Hours: 2/week

Literature/Reference: Lab Manual

Evaluation Scheme

	External	Internal	Total
Assessment (theory)	70	30	100
Evaluation of Practical/Dissertations	35	15	50

Internal Evaluation of Theory	Class TestClass Test(2 best out of 3)	Assignment	Attendance	Total
	20	5	5	30

Textbooks, Supplementary Materials

1. Text Book of Medical Laboratory Technology by Praful B Godkar; Bhalani Publishing House; Mumbai
2. U Satyanarayan, text book of Biochemistry, Elsevier Health Sciences, 2014 / Book & allied Kolkatta
3. M N chatergee, Medical biochemistry, Jaypee brothers medical publishers
4. Shivrajashankara, manual of practical biochemistry, jaypee
5. Sriniwas B Rao, Practical biochemistry for medical students, Academic publication
6. B. Raghu , Practical Biochemistry for medical students, jaypee

Cos\ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1										✓		
CO2											✓	
CO3											✓	
CO4											✓	
CO5										✓		

Departmental Quality Assurance Committee Approval			
No.	Name	Digital Signature	Date
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Course Content/Syllabus

School/ Department:	Glocal Collage Of Paramedical Science and Rearch Center
Programme:	BMLT
Course Tile:	CLINICAL BIOCHEMISTRY-II
Course Code:	MLT 302
Course Level (UG/PG)	UG
Credits	4 L ----- T 1 P.
Prerequisite	
Year/Semester	3RD year

Course Information:

Course Objectives: this course will demonstrate brief knowledge of enzyme and its action on human body

Course Outcomes: 1. At the end of the course the student should know the diagnostic enzymology including principle and clinical significant.
2. the student should know about analytic biochem
3.should have knowledge of normal ranges of endocrinology
4. should know medical biochem
5. should know about analytic endocrinology

Teaching Methodology:

Methodology	Mention Appropriate Methods (Yes/No)
Explanations by the Instructor	Yes
Group/Pair Work	Yes
Class Discussion	Yes
Assignment/s	Yes
Viva Voice	Yes
Audio/video Class	Yes

Practical/ Case Study/Diary	Yes
Presentations	Yes
Hospital Posting	Yes

Course Content

COURSE CONTENT

No	Description	Weightage (%)
1	1. Principles of enzyme activity determination. Units for expressing enzyme activity. Factors affecting enzyme activity. Mechanisms responsible for abnormal enzyme levels. 2. Isoenzymes –serum CPK,CK-MB, LDH, SGOT (AST), SGPT (ALT), cholinesterase HBDH, amylase, alpha amylase, lipase, aldolase and myoglobin.	40
2	1. Serum leucine, amino peptidase, alkaline and acid phosphatases. 2. Fructosamine test in semen. 3. Analysis of renal biliary and prostatic stones. Tests for foetalwell being by amniotic fluid. Analysis for alpha-foetoprotein and lactogen and their clinical significance.	30
3	1. Gastric analysis, free and total acidity, pentagastrin test, histamine and caffeine stimulation tests. 2. Thyroid function test: T3, T4, TSH, Free T3, Free T4, protein bound iodine (PBI) thyroglobulin and LATES. 3. Infertility profile: TSH, FSH, LH, testosterone, estrogen, prolactin and DHEA sulphate.	30

Lecture Plan

Module Number	Module Title	Number of Lectures
Module 1	ENZYME and ISOENZYME	
Module 2	ANALYTIC BIOCHEM	
Module 3	ANALYTIC ENDOCYNOLOGY	

Practical

1. Estimation of BUN.
2. Estimation of Bilirubin.
3. Estimation of sodium.
4. Estimation of potassium.
5. Estimation of calcium.
6. Estimation of HDL.
7. Estimation of cholesterol.
8. Estimation of total lipid.
9. Estimation of albumin.

Credit Hours: 2/week

Literature/Reference: Lab Manual

Evaluation Scheme

	External	Internal	Total
Assessment (theory)	70	30	100
Evaluation of Practical/Dissertations	35	15	50

Internal Evaluation of Theory	Class TestClass Test(2 best out of 3)	Assignment	Attendance	Total
	20	5	5	30

Textbooks, Supplementary Materials

7. Text Book of Medical Laboratory Technology by Praful B Godkar; Bhalani Publishing House; Mumbai
8. U Satyanarayan, text book of Biochemistry, Elsevier Health Sciences, 2014 / Book & allied Kolkatta
9. M N chatergee, Medical biochemistry, Jaypee brothers medical publishers
10. Shivrajashankara, manual of practical biochemistry, jaypee
11. Sriniwas B Rao, Practical biochemistry for medical students, Academic publication
12. B. Raghu , Practical Biochemistry for medical students, jaypee

Cos\ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1											✓	
CO2											✓	
CO3										✓		
CO4											✓	
CO5											✓	

Departmental Quality Assurance Committee Approval			
No.	**Name**	**Digital Signature**	**Date**
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Course Information:

School/ Department:	Glocal Collage Of Paramedical Science and Rearch Center
Programme:	BMLT
Course Tile:	Medical Microbiology-I
Course Code:	MLT 303
Course Level (UG/PG)	UG
Credits	4 L ----- T 1 P.
Prerequisite	
Year/Semester	3RD year

Course Objectives: this course will demonstrate about virology including lab diagnosis

Course Outcomes: 1. At the end of the course the student should know introduction to virology.
2. the student should know pathology and ld of misc microbes like nocardia
3.should have knowledge of classification of viruses
4. should know cultivation method of virus
5. should know pathology and ld of of medically important viruses

Teaching Methodology:

Methodology	Mention Appropriate Methods (Yes/No)
Explanations by the Instructor	Yes
Group/Pair Work	Yes

Class Discussion	Yes
Assignment/s	Yes
Viva Voice	Yes
Audio/video Class	Yes
Practical/ Case Study/Diary	Yes
Presentations	Yes
Hospital Posting	Yes

Course Content

COURSE CONTENT

No	Description	Weightage (%)
1	1. Misc. microbes: Actinomyces, Nocardia, Donovania, Treponema, Chlamydia, Rekettsiae, Mycoplasma and pathogenic fungi. Pathogenesis, Pathology and lab diagnosis. 2. Pox-viruses: Smallpox, Vaccinia, Molluscumcontagiosum. 3. Herpes Virus: H Simplex, Chickenpox-Zoster, CMV, IMN and burkitts Lymphomas. 4. Adenoviruses: Pharyngeal infections Respiratory infections and conjuctival infections.	40
2	1. Orthomixoviruses (Influenza Types A,B,C, etc,): Influenza. 2. Paramyxovirus: Respiratory infections, mumps and measles. 3. Miscellaneous Viruses: Rubella, Crona arena viruses: Rubella common cold lymphocytic choriomeningitis. 4. Picorna Viruses: Enteroviruses poliomyelitis Aseptic meningitis and Epidemic Myalgia, Rhinoviruses-common cold.	30
3	Hepatitis Viruses: Infectious and Serum Hepatitis. Arbo Viruses: Encephalitis Yellow fever, Dengue fever. Rhabdo Viruses: Rabies	30

	Slow and oncogenic Viruses: ScrapieKuru and animal virus tumors. Cell Culture and observation of effect of viruses on cell: Technique, procedure and interpretation of results.	

Lecture Plan

Module Number	Module Title	Number of Lectures
Module 1	VIROLOGY 1	
Module 2	VIROLOGY 2	
Module 3	VIROLOGY 3	

Credit Hours: 2/week

Literature/Reference: Lab Manual

Evaluation Scheme

	External	Internal	Total
Assessment (theory)	70	30	100
Evaluation of Practical/Dissertations	35	15	50

Internal Evaluation of Theory	Class TestClass Test(2 best out of 3)	Assignment	Attendance	Total
	20	5	5	30

Textbooks, Supplementary Materials

1. Medical Laboratory Technology by Kanai Lal Mukherjee; Tata McGraw Hill Publishers, New Delhi

Textbook of Microbiology by Ananthanarayan and Panikar; Orient Longman, Hyderabad

Practical Book of Medical Microbiology by Satish Gupta; JP Brothers, New Delhi

Text Book of Medical Microbilogy by Satish Gupta; JP Brothers, New Delhi

Text Book of Medical Laboratory Technology by Praful B Godkar; Bhalani Publishing House; Mumbai

Medical Laboratory Science Theory and Practice by J Ochei and A Kolhatkar

Cos\ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1												✓
CO2												✓
CO3												✓
CO4												✓
CO5												✓

Departmental Quality Assurance Committee Approval			
No.	**Name**	**Digital Signature**	**Date**
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Course Content/Syllabus

Course Information:

School/ Department:	Glocal Collage Of Paramedical Science and Rearch Center
Programme:	BMLT
Course Tile:	Medical Microbiology-II
Course Code:	MLT 304
Course Level (UG/PG)	UG
Credits	4 L ----- T 1 P.
Prerequisite	
Year/Semester	3RD year

Course Objectives: this course will demonstrate about medical parasitology

Course Outcomes: 1. At the end of the course the student should know introduction to parasitology.
2. The students should able to identify common pathogenic parasitic agents and the diseases that they cause,
3.should have knowledge of classification of parasite
4. should know their general and specific mechanisms by which parasite causes disease. able to perform diagnostic skills by using basic and advanced diagnostic exercises using microscopy etc, apply appropriate microbiology laboratory techniques, methodologies, instruments and equipment in accordance with current laboratory safety protocol
5. should know how to calculate, record, and report clinical microbiology results/reports according to clinical laboratory protocol

Teaching Methodology:

Methodology	Mention Appropriate Methods (Yes/No)
Explanations by the Instructor	Yes
Group/Pair Work	Yes
Class Discussion	Yes
Assignment/s	Yes
Viva Voice	Yes
Audio/video Class	Yes
Practical/ Case Study/Diary	Yes

Presentations	Yes
Hospital Posting	Yes

Course Content

COURSE CONTENT

No	Description	Weightage (%)
1	1. Preparation of container and swabs for collections of specimens for microbial examinations. 2. Portal regulation and transport of specimen. 3. Flowchart of lab diagnostic procedures. 4. Documentation of specimen in laboratory. Preservation of Micro-organisms: Periods subculture method, cold storage, freezing, deep freezing, lypholization methods. Total and viable counts of bacteria.	20
2	1. Human parasitology: Protozoa, rhizopoda and helminths. 2. Immunology and sero-diagnosis. 3. Prophylactic mass immunization 4. Nosocomial infection and sterility testing of I.V. fluids and processing of various samples for various hospital infections.	50
3	1. Pathology, Lab-diagnosis and control of common infections and infestations. 2. Cell, tissue and organ culture. 3. Specific serological methods of diagnosis. 4. Test for bacterial sensitivity to antimicrobial agents and their interpretation. 5. Specific culture and drug sensitivity methods. 6. Advanced diagnostic techniques in Medical Microbiology: Torch profile, mycodot, IgG, IgA, IgM and IgE testing, Australia Ag (HBsAg) etc.	30

Course Content/Syllabus

Lecture Plan

Module Number	Module Title	Number of Lectures
Module 1	LAB DIAGNOSIS	
Module 2	PARASITOLOGY	
Module 3	DIAGNOSTIC MICROBIOLOGY	

Practical

1. Collection, Preservation and processing of Stool Sample.
2. Stool Examination by Direct wet Mount and Concentration Method
3. Stool Examination by concentration method to identify the eggs and larva
4. Identification of Ova ,Cyst ,Trophozoitesby slide or Chart
5. Identification of Round Worm and Hook Worm in Stool Sample
6. Identification of E. Histolytica, Giardia Lambliain Stool Sample
7. Any other practical's based on theory paper

Credit Hours: 2/week

Literature/Reference: Lab Manual

Evaluation Scheme

	External	Internal	Total
Assessment (theory)	70	30	100
Evaluation of Practical/Dissertations	35	15	50

Internal	Class TestClass	Assignment	Attendance	Total

Evaluation of Theory	Test(2 best out of 3)			
	20	5	5	30

Textbooks, Supplementary Materials

1. Parasitology by KD Chatterjee; Chatterjee Medical Publishers, Kolkatta
2. Medical Laboratory Manual for Tropical Countries Vol. I and II by Monica Cheesbrough; Cambridge University Press; UK
3. Text Book of Medical Laboratory Technology by Praful B Godkar; Bhalani Publishing House; Mumbai
4. Text Book Of Medical Parasitology second edition by Arora&AroraJaypee
5. Text Book Of Medical Parasitology CBS Publication by KD Chatterjee
6. A Textbook of Microbiology, New Central Book Agency, Kolkata by P Chakraborty 3rd edition

Cos\ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1												✓
CO2												✓
CO3												✓
CO4												✓
CO5												✓

Departmental Quality Assurance Committee Approval			
No.	**Name**	**Digital Signature**	**Date**
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Course Content/Syllabus

Course Information:

School/ Department:	Glocal Collage Of Paramedical Science and Research Center
Programme:	BMLT
Course Tile:	PATHOLOGY &ALLIED SUBJECT-I
Course Code:	MLT 305
Course Level (UG/PG)	UG
Credits	4 L ----- T 1 P.
Prerequisite	
Year/Semester	3RD year

Course Objectives: this course will demonstrate about antigen and antibody and response of our immune system

Course Outcomes: 1. Students should know about immune system (antigen and antibody)
2. Student should know about humoral and cellular immune response.
3. Students should know the infection, inflammation and the immune system.
4. Students should know about various laboratory investigation for demonstration of antigen-antibody reaction and megaloblastic anemia.
5. At the end of course students should know the cytogenetic in hematology.

Teaching Methodology:

Methodology	Mention Appropriate Methods (Yes/No)
Explanations by the Instructor	Yes
Group/Pair Work	Yes
Class Discussion	Yes
Assignment/s	Yes
Viva Voice	Yes
Audio/video Class	Yes
Practical/ Case Study/Diary	Yes
Presentations	Yes
Hospital Posting	Yes

COURSE CONTENT

Course Content/Syllabus

No	Description	Weightage (%)
1	1. Introduction and antigens. 2. Cells and organs of the immune system. 3. Immunoglobulin and antibodies. 4. Humoral& Cellular immune response. 5. Detection of various allergic agents and immunopathology of allergy. 6. Rheumatological diseases: Pathogenesis and Lab diagnosis.	40
2	1. Infection, inflammation and the immune system. 2. Cancer immunology & Tumor markers. 3. Tissue typing for kidney transplant & bone marrow transplant. 4. Laboratory tests for demonstration of antigen-antibody reaction and cell mediated immunity. 5. Laboratory investigations in megaloblasticanaemias (Iron deficiency, megaloblastic, haemolytic).	35
3	1. Pathogenesis and laboratory investigation in Leukemia's. 2. Laboratory investigation in coagulation disorder, bleeding disorder, disseminated intravascular coagulation (DIC), Platelet functions etc. 3. Cytogenetics in hematology. 4. Radioisotopes and their applications.	25

Lecture Plan

Course Content/Syllabus

Module Number	Module Title	Number of Lectures
Module 1	IMMUNOLOGY	
Module 2	IMMUNITY AND ANAEMIA	
Module 3	LEUKEMIA	

Practical

1. Demonstration of Transplant technology
1. Determination of Hormone & Enzyme As tumor Marker
2. Perform the ABO Compatibility
3. Identification of micro-organism in transplant patients
4. Any other practical's based on theory paper

Credit Hours: 2/week

Literature/Reference: Lab Manual

Evaluation Scheme

	External	Internal	Total
Assessment (theory)	70	30	100
Evaluation of Practical/Dissertations	35	15	50

Internal Evaluation of Theory	Class Test (2 best out of 3)	Assignment	Attendance	Total
	20	5	5	30

Textbooks, Supplementary Materials

1. Operative Techniques in Transplantation Surgery 1 Har/Psc Edition by Michael J. Englesbe M.D. (Editor), Michael W Mulholland MD PhD
2. Regenerative Medicine Applications in Organ Transplantationby: Giuseppe Orlando
3. Abdominal Organ Transplantation: State of the Art

Cos\ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1											✓	
CO2											✓	
CO3											✓	
CO4											✓	
CO5											✓	

Departmental Quality Assurance Committee Approval			
No.	Name	Digital Signature	Date
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Course Content/Syllabus

Course Information:

School/ Department:	Glocal Collage Of Paramedical Science and Research Center
Programme:	BMLT
Course Tile:	PATHOLOGY &ALLIED SUBJECT-II
Course Code:	MLT 306
Course Level (UG/PG)	UG
Credits	--- L ----- T ----P.
Prerequisite	
Year/Semester	3RD year

Course Objectives: this course will demonstrate the handling of histopathological samples and processing.

Course Outcomes:

1. Student should know types of tissues in histopathology.
2. Students should know the handling of fresh histological specimen cryo/frozen section of fresh and fixed tissues.
3. Students should know the enzyme histochemistry demonstration .
4. At the end of course should know immunohistochemistry.
5. At the end of course should know about FNAC.

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Teaching Methodology:

Methodology	Mention Appropriate Methods (Yes/No)
Explanations by the Instructor	Yes
Group/Pair Work	Yes
Class Discussion	Yes
Assignment/s	Yes
Viva Voice	Yes
Audio/video Class	Yes
Practical/ Case Study/Diary	Yes
Presentations	Yes
Hospital Posting	Yes

Course Content

COURSE CONTENT

No	Description	Weightage (%)
1	1. Types of tissue seen in histopathology i.e. Connective tissue, epithelial tissue, glandular, Begin malignant Tumor tissue, Bone tissue etc. 2. Handling of fresh histological specimen (Tissues) cryo/frozen sections of fresh and fixed tissues, freezing drying. 3. Lipids, identifications and demonstration. 4. Micro-organism in the tissue-various staining, techniques for their demonstration and identifications. 5. Nucleic acids DNA and RNA special stains and procedures.	40
2	1. Cytoplasmic constituents and their demonstration. 2. Tissues requiring special treatment i.e. eyeball B.M. biopsy, undercalcified bones. 3. Neuropathological techniques. 4. Enzyme histochemistry demonstration of phosphates, dehydrogenases, oxidase and peroxidases. etc. Electron microscope, working principles, components and allied techniques for electron microscopy, ultra-microtomy	30
3	1. Immunohistochemistry. 2. Cervical cytology-basis of detection of malignant and pre-malignant lesions. 3. Hormonal assessment with cytological techniques. 4. Demonstration of sex chromatin Aspiration cytology principles indication and utility of the techniques with special emphasis on role of cytotechnician in FNAC clinics	30

Lecture Plan

Module Number	Module Title		Number of Lectures

Module 1	HISTOPATHOLOGY		
Module 2	TECHNIQUES		
Module 3	CYTOLOGY		

Practical

1. Vaginal, Cervical & Urethral sample collection of cytological examination
2. Staining of cervical smear by PAP method
3. Fixation of Smear for Staining.
4. Preparation of PAP Stain.
5. Perform the routine Haematoxyline and Eosin staining
6. Collection of Sample for Fine needle aspiration cytology
7. Preparation of smear by automatic method
8. Preparations of stains for cytology examination
9. Any other practical's based on theory paper

Credit Hours: 2/week

Literature/Reference: Lab Manual

Evaluation Scheme

	External	Internal	Total
Assessment (theory)	70	30	100
Evaluation of Practical/Dissertations	35	15	50

Internal Evaluation of Theory	Class TestClass Test(2 best out of 3)	Assignment	Attendance	Total
	20	5	5	30

Textbooks, Supplementary Materials

1. Cellular Pathology Techniques by CFA Culling, Butterworths Co., London
2. Theory of Practice of Histopathological Techniques by Bancroft and Stevens
3. Histological Techniques by Carleton, Harry, Oxford
4. An Introduction to Medical Laboratory Technology by FJ Baker et. al., Butterworths Co., London
5. Laboratory Methods of Histotechnology by Armed Forces Institute of Pathology, Washington DC

Cos\ POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1											✓	
CO2										✓		
CO3										✓		
CO4										✓		
CO5											✓	

Departmental Quality Assurance Committee Approval			
No.	**Name**	**Digital Signature**	**Date**
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