

DEPARTMENT OF ZOOLOGY

COURSE STRUCTURE & SYLLABI (For the students admitted from year 2023-2024 onwards)

Career Oriented Programme (COP):
Certificate Course in Medical Laboratory Technology and
Diploma Course in Medical Laboratory Technology



JAMAL MOHAMED COLLEGE (AUTONOMOUS)
Accredited with A++ Grade by NAAC (4th Cycle) with CGPA 3.69 out of 4.0
(Affiliated to Bharathidasan University)
TIRUCHIRAPPALLI – 620 020

**CAREER ORIENTED PORGRAMME (COP): CERTIFICATE COURSE IN
MEDICAL LABORATORY TECHNOLOGY**

Course Code	Course	Course Title	Total Hrs	Credit	CIA Mark	ESE Mark	Total Mark
23ZOCT1	Core - I	Human Anatomy, Physiology and Immunology	150	10	25	75	100
23ZOCT2	Core - II	General Laboratory Principles, Haematology, Biochemistry, Microbiology and Pathology	150	10	25	75	100
23ZOCT3P	Core - III	Laboratory Principles, Haematology, Biochemisty, Microbiology and Pathology - Practicals - I	150	10	20	80	100
Total			450	30	70	230	300

**CAREER ORIENTED PORGRAMME (COP): DIPLOMA COURSE IN MEDICAL
LABORATORY TECHNOLOGY**

Course Code	Course	Course Title	Total Hrs	Credit	CIA Mark	ESE Mark	Total Mark
23ZODM1	Core – I	Clinical Haematology and Biochemistry	150	10	25	75	100
23ZODM2	Core – II	Clinical Microbiology and Pathology	150	10	25	75	100
23ZODM3P	Core – III	Clinical Haematology, Biochemistry, Microbiology and Pathology – Practicals	150	10	20	80	100
Total			450	30	70	230	300

***Practical Examinations will be conducted at the end of the year**

Semester	Course Code	Course Category	Total Hours	Credits	Marks for Evaluation		
					CIA	ESE	Total
-	23ZOCT1	Core – I	150	10	25	75	100

Course Title	HUMAN ANATOMY, PHYSIOLOGY AND IMMUNOLOGY
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Objective:

To promote an integrated approach to the study of various organs with their functions and Immune systems in man.

SYLLABUS		
Unit	Contents	Hours
I	HISTOLOGY: Cell, tissue, organs and organ system - Skeletal system - Osteology GASTROINTESTINAL SYSTEM: Alimentary canal and digestive glands - Function of liver and liver function tests	30
II	RESPIRATORY SYSTEM: Trachea, lungs including other air passages - Functional anatomy of respiratory system, mechanism of breathing and exchange of gases in the lungs. MUSCULAR SYSTEM: Structure of Sarcomere - Important muscles and muscle proteins - Innervation of muscles.	30
III	LYMPHATIC SYSTEM: Lymph vessels, lymph nodes and lymphoid organs - Structure and functions. IMMUNE SYSTEM: Antigen –Antibodies - Types of Immunity - Innate immunity and Acquired immunity - Factors involved in immunity - Immune Response - Pregnancy test – ELISA - Auto immune diseases.	30
IV	EXCRETORY SYSTEM: Structure and function of kidney, ureter, urinary bladder, skin and its derivatives. SENSE ORGANS: Eye, Ear, Nose, Taste buds and subcutaneous organs – Physiology of vision, hearing test and olfaction.	30
V	NERVOUS SYSTEM: Structure of Neuron and its function – Central, Peripheral and Autonomic nervous system. ENDOCRINE SYSTEM: Pituitary, Thyroid, Parathyroid, Adrenal glands and Gonads – Location and functions.	30

Text Book(s):
Medical Laboratory Technology, Procedure manual for routine diagnostic tests by Kani L Mukherjee and Swarajit Ghosh. 2nd Edition (Volume I - III) Mc Graw Hill Pub.(2010).
Reference Book(s):
<ol style="list-style-type: none"> 1. Text Book of Practical Medical Lab Technology by Z. Navatha Rao, Rushi bookhouse, Vijayavada. 2. Text Book of Practical Medical Laboratory Technology by C.R. Maiti, New Central book agency (P) Ltd, Kolkata. 3. Manual for Medical Laboratory Technology by S. Raja, Anjana book house Chennai. 4. Text Book of Preventive and Social Medicine by K. Park, M/s Banarsidas Bhanot (Publishers), 1167, Prem Nagar, Jabalpur – 482001, India, 2009.

Course Coordinator: Dr. I Joseph A. Jerald

Semester	Course Code	Course Category	Hours	Credits	Marks for Evaluation		
					CIA	ESE	Total
-	23ZOCT2	CORE - II	150	10	25	75	100

Course Title	GENERAL LABORATORY PRINCIPLES, HAEMATOLOGY, BIOCHEMISTRY, MICROBIOLOGY AND PATHOLOGY
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Objective:

To understand the application of laboratory and diagnostic medical instruments and to study different parameters of Human Blood

SYLLABUS		
Unit	Contents	Hours
I	LABORATORY TECHNOLOGY AND BIO SAFETY PROCEDURES: Introduction and scope – First Aid –Rules & Regulations, Safety Measures followed in Lab – maintenance of Records, samples and their collecting methods – Role of Anticoagulants and its types - Basic Instrumentation – pH meter, Autoclave, Incubator, Colorimeter – principles and working methodology.	30
II	HAEMATOLOGY: Component of Blood – Plasma and Serum - Blood Clotting factors – Blood coagulation - Collection of blood (Venous and Capillary) Preservation of blood – Importance of blood bank, anticoagulants used in blood bank - ABO Blood grouping - Rh typing - Blood transfusion	30
III	BIOCHEMISTRY: Metabolism – Digestion and Assimilation - Carbohydrates, Proteins, Lipids and Minerals – Sugar, Urea, Cholesterol, Phosphorous.	30
IV	MICROBIOLOGY: Classification and Morphology of bacteria - Culture media and their preparation - Culture techniques - Culture characteristics - Isolation of pure culture and maintenance of stock culture - Disinfection and sterilization	30
V	CLINICAL PATHOLOGY: Physical examination - Microscopic analysis of Urine – uric acid crystals - Urine sugar, protein, urea – pathological conditions – polyuria, haematuria.	30

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Semester	Course Code	Course Category	Hours	Credits	Marks for Evaluation		
					CIA	ESE	Total
-	23ZOCT3P	Core - III	150	10	20	80	100

Course Title	LABORATORY PRINCIPLES, HAEMATOLOGY, PATHOLOGY, BIOCHEMISTRY, MICROBIOLOGY AND PATHOLOGY – PRACTICALS - I
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Objective:

To develop skill in handling clinical laboratory equipments; and to obtain a holistic knowledge on pathology, biochemistry, microbiology and haematology parameters

SYLLABUS		
Unit	Contents	Hours
	<p>Experiments:</p> <ol style="list-style-type: none"> 1. Collection and Processing of Specimen (Blood, Urine, Sputum) 2. Sampling Handling and Disposal 3. Identification of Blood group and Rh type 4. Bleeding Time and Clotting time 5. Erythrocyte count 6. Leucocyte count and Differential count 7. Plasma and Serum preparation 8. Blood Glucose level – Fasting, Post Prandial (PP) 9. Blood Protein level – A/G ratio 10. Blood Cholesterol level 11. Media Preparation – (NA, MC) 12. Streaking techniques – Plating, Slant culture 13. Culture morphology – Gram positive and negative 14. Urine – Physical and Microscopic analysis 15. Urine Sugar and Urea 	150

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Semester	Course Code	Course Category	Hours/ Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
-	23ZODM1	Core - I	150	10	25	75	100
Course Title CLINICAL HAEMATOLOGY AND BIOCHEMISTRY							

SYLLABUS		
Unit	Contents	Hours
I	FUNCTIONS TESTS: Liver function test - Renal function test - Thyroid, pancreas gastric analysis (FTM). SPECIAL TESTS: Lipid profile – TGL, HDL, LDL, VLDL.	30
II	URINE: Collection, preservation, routine examinations – Protein – Glucose – Acetone – Bile salts – Bile pigments – Urobilin – Urobilinogen – Microscopical examination of urine. FAECES: Microscopical examination – Intestinal parasites – Helminthes, nematodes, cestodes, trematodes and protozoa.	30
III	CEREBROSPINAL FLUID: Composition – CSF cells total and differential count - Estimation of protein, Sugars and chlorides SEMEN ANALYSIS: Collection of semen – Microscopic examination – smear, sperm motility and count.	30
IV	SPUTUM: Collection – Microscopical and naked eye inspection – Clinical examination. Examination of sputum – Examination of body fluids.	30
V	HISTOPATHOLOGY: Introduction – Fixatives - Microtechnique – Tissue processing, Fixation – Dehydration – Embedding , sectioning, staining and mounting - Cancer staining - Pap's stain - Biopsy.	30

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3. Text Book of Pathology by C.K. Shiha and Kr. Pankaj, Vijay Bhagat, Scientific Book Company, Ashok Rajpath, Patna – 800004, 2005.
4. Text Book of Anatomy, Physiology and Health Education by N. Kumar, A.I.T.B.S. Publishers, J-5/6, Krishan Nagar, Delhi – 110 051, India, 2009.

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Semester	Course Code	Course Category	Hours/ Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
-	23ZODM2	Core - II	150	10	25	75	100
Course Title		CLINICAL MICROBIOLOGY AND PATHOLOGY					

SYLLABUS		
Unit	Contents	Hours
I	STAINING AND STAINING PROCEDURE: Types, Gram staining - Acid fast staining -Antimicrobial agents, drug resistance, drug sensitivity test - Bacteriology of water, milk and food.	30
II	INVASION OF PATHOGENS: Symptoms - Diseases and Diagnosis in Human - Common cold, Cholera, Typhoid, Malaria, Elephantiasis, Jaundice, Flu, Measles, Hepatitis B.	30
III	SEXUALLY TRANSMITTED DISEASES: HIV, Syphilis, Gonorrhoea, Chancroid or Soft sore, Donovanosis, Genital candidiasis - Antibiotic sensitivity test - Minimum Inhibitory Concentration (MIC) and Minimum Bactericidal Concentration (MBC).	30
IV	VIROLOGY: Introduction – Morphology - General properties - Common viral diseases - Viral vaccines and antisera. MYCOLOGY: General properties - Mycotoxins - Common fungal diseases.	30
V	PARASITOLOGY: Diagnostic parasitological techniques - Entamoeba - Trypanosoma -Plasmodium - Ascaris - Tape worm - Schistosoma - Wucheria.	30

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Semester	Course Code	Course Category	Hours/ Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
-	23ZODM3P	Core - III	150	10	25	75	100
Course Title							
CLINICAL HAEMATOLOGY, BIOCHEMISTRY, MICROBIOLOGY AND PATHOLOGY PRACTICALS							

SYLLABUS		
Unit	Contents	Hours
I	INSTRUMENTS: Incubator, centrifuge, Autoanalyser, Sphygmomanometer, Electrophoresis, Light microscope, Weighing balance, Haemocytometer - Albuminometer - Urinometer - Sahlis haemoglobinometer.	30
II	<ol style="list-style-type: none"> 1. Estimation of blood sugar 2. Glucose tolerance test 3. Estimation of urea in blood 4. Estimation of serum cholesterol 5. Estimation of serum creatinine 6. Estimation of albumin in serum 7. Estimation of Total protein in serum 8. Estimation of serum acid phosphatase 9. Estimation of serum amylase 	30
III	<ol style="list-style-type: none"> 10. Urine analysis (normal constituents) 11. Urine analysis (abnormal constituents) 12. Urea clearance test 14. Estimation of bilirubin 	30
IV	<ol style="list-style-type: none"> 15. Sperm motility and sperm count 16. Haemagglutination-Demonstration 17. Examination of stool 18. Examination of sputum 19. Examination of Body fluids 20. Pregnancy test 	30
V	<ol style="list-style-type: none"> 21. Serum analysis-sugar, cholesterol, SGOT, SGPT, triglycerides, bilirubin, creatinine, urea, uric acid, total protein, albumin and globulin estimation. 22. Urine analysis-pH, sugar ketone bodies, albumin, bile and bile salts, bile pigments, sulpha drugs, occult blood, urobilinogen and sugars. 23. Microscopical examination of urine-cells, cast, crystals, Alkaline, urine, miscellaneous objects. 24. Preparation of Histopathological specimens. 25. Testing sensitivity of bacteria to antibiotics. 26. Assessing minimum inhibitory concentration (MIC) and minimum bactericidal concentration (MBC) to antibiotics. 27. Microbiology-streak plate method, simple staining, Gram staining, Acid fast Bacilli staining of fungi, flagella and capsula-Motility test-biochemical, indole, unheated serum test, widal test and formal gel test. 28. Serology-VDRL Slide flocculation test and Widal test. 	30

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