

AC- 29/03/2023

Item No-5.98



**Rayat Shikshan Sanstha's
KARMAVEER BHAURAO PATIL COLLEGE VASHI
(AUTONOMOUS COLLEGE)
Sector-15- A, Vashi, Navi Mumbai - 400 703**

**Syllabus for F.Y.B.Sc. Medical Laboratory
Technology.**

Program: Medical Laboratory Technology.

**(National Education Policy-2020, Grading and
Semester System with effect from the academic
year 2023-**

Rayat Shikshan Sanstha's
**Karmaveer Bhaurao Patil College Vashi Autonomous
College**

Syllabus

| Sr. No. | Heading | Particulars |
|--------------------|-------------------------------------------------|---------------------------------------------------------------|
| 1 | Title of Course | F.Y.B.Sc. Medical Laboratory Technology |
| 2 | Eligibility for Admission | 12th Science and equivalent [of recognized Boards] |
| 3 | Passing Marks | 40% |
| 4 | Ordinances/Regulation s (if any) | ----- |
| 5 | No. of Years/Semesters | One year/Two semester |
| 6 | Level | U.G. |
| 7 | Pattern | Semester |
| 8 | Status | Revised0 |
| 9 | To be implemented from Academic year | 2023-2024 |



Preamble

Medical Laboratory Technology is a branch of medical science responsible for performing laboratory investigations relating to diagnosis, treatment and prevention of disease. With this course, the basic aim is to provide students with knowledge and training that will enable them to work in various lab settings.

Educational Pedagogy:

The course design is based on NEP 2020 guidelines where learner is given a choice to have vertical mobility while pursuing this program. His annualized credits earned will be banked to allow his subsequent year's enrollment. The three-year degree program is designed as –

- ✓ 1st year BSC with Certification in Phlebotomy
- ✓ 2nd Year BSC with Diploma in Medical Technology
- ✓ 3rd Year BSC with Bachelor's Degree in Medical Laboratory Technology.
- ✓ 4th Year BSC with Bachelor's Honors in Medical Laboratory Technology

The pedagogical design is based on the core objective of making students job ready and hence a lot of focus is given in learner's engagement through Industry based skilling in Hospitals.

As anyone who seeks admission in this program comes from non-healthcare background, the course starts with the Foundation Course which is more like a platform setting to make learner understand the topicalities and Dos and Don'ts of Healthcare Organizations.

Industry interface is divided into 3 phases of learning as –

Observership – Objective is to see what is being taught in the class room through clinical sessions on the subject.

On The Job Training – Objective is to learn the job skills by working with someone.

Internship – Working independently, but under supervision as per defined job role.

Considering that the program needs to empower job readiness of learners, a lot of focus is kept in active engaging Life Skills workshops. These cover topics like Self Awareness, Objective setting, Team Work, Leadership Development, Time Management, Communication Skills, Interpersonal abilities etc. Program also focuses in creating a better path for students to pursue their higher education opportunities in healthcare sector. As such special skill enhancing modules like Basic Life Support, Bed Side Care, Hospital Administration and Public Health etc. are included in the curriculum. This will help learners to get into PG programs like Masters in Hospital Management or Masters in Hospital Administration or Masters in Public Health.

As regards to the Core expertise of the program on Lab Technology, key subjects that get covered are **Phlebotomy**:

Phlebotomy, which is the science of drawing blood, from various sites, e.g., Veins, arteries & capillaries, is among the most common procedures in healthcare and a core component of diagnosis and laboratory analysis.

Estimates indicate that nearly 70% of medical decisions are based on laboratory results which often rely on phlebotomy to produce a blood sample ready for laboratory analysis. Despite the critical role of phlebotomy, there is an insufficient level of awareness among the Health Care Professionals about the International guidelines and understand the consequences to patients and their own safety from improper sample collection practice. Poor Blood Collection Practices Introduce Serious Errors into Diagnosis and Laboratory Analysis.



Microbiology:

The diagnostic microbiology laboratory procedures are essential for the diagnosis and treatment of infectious diseases. Microbiological pathogens are divided into bacteria, fungi, viruses, prions, and protozoa. Role of Microbiology is to isolate & identify the disease-causing micro-organism.

To train the students to conduct Antibiotic Sensitivity test to provide appropriate medical treatment (antibiotics) to the patients.

Hematology:

Hematology concerns with the study of the cause, prognosis, treatment, and prevention of diseases related to blood.

It involves treating diseases that affect the production of blood and its components, e.g., blood cells, hemoglobin, blood proteins, bone marrow, platelets, blood vessels, spleen, the mechanism of coagulation & also blood parasites, e.g., Malaria

Such diseases might include hemophilia, blood clots (thrombus), other bleeding disorders, and blood cancers such as leukemia, multiple myeloma, and lymphoma.

Biochemistry:

Biochemistry combines the two traditional disciplines of biology and chemistry. Biochemistry is the science of living matter.

Medical biochemistry teaches us about:

-The chemical components of the human body, e.g., carbohydrates and lipids; amino acids and proteins; nucleic acids (DNA and RNA), etc.

-The major chemical processes in the human body, Nutrition and mineral metabolism, Molecular genetics & Heredity

Clinical Pathology:

This branch of Medical Laboratory Science deals with complete study of formation, the clinical significance of analyzing various body fluids, e.g., urine, stool, sputum, seminal fluid, CSF, pleural, peritoneal, pericardial & synovial fluids.

Histopathology & Cytology:

Histopathology & Cytology provides a diagnostic service for cancer; it handles the cells and tissues removed from suspicious 'lumps and bumps', identify the nature of the abnormality Histopathology is the examination of biological tissues in order to observe the appearance of diseased cells in microscopic detail.

Histopathology typically involves a biopsy, which is a procedure involving taking a small sample of tissue, processed by Histo-technologists and reported by the Pathologists

Immunology/serology:

Different types of serologic tests are used to diagnose various disease conditions. Serologic tests have one thing in common. They all focus on proteins made by our immune system (antibodies)



Serological testing is very helpful in the diagnosis of certain bacterial, parasitic, and viral diseases, e.g., Typhoid, Dengue, Malaria, etc.

Serological testing has proved valuable mass-screening tool, as in the detection of diseases such as syphilis, HIV/AIDS, and epidemic and pandemic infectious diseases (e.g., influenza and coronavirus disease).

Blood Bank (Transfusion Medicine):

A blood transfusion provides blood or blood components if patient has lost blood due to an injury, during surgery or have certain medical conditions that affect blood or its components. The blood typically comes from donors. Blood banks and healthcare providers ensure that the transfusions are a safe, low risk treatment.

The Transfusion Medicine Department is responsible for the collection and testing of blood to be given to patients (traditional "blood banking").

It also collects & processes hematopoietic stem cells for blood and bone marrow transplantation as well as the testing necessary for organ transplantation.

Key Objectives of this program:

- To implement NEP 2020 through this Vocational Skills development program
- Learners will inculcate right attitude, skills and knowledge to do the job role of Medical Laboratory Technologist as required by the industry.
- Program will also empower learners' abilities to pursue higher education in medical industry

After completing this program, learner will exhibit following skills and knowledge as Medical Laboratory Technologist:

- Demonstrate knowledge about the healthcare sector and diagnostic services
- Demonstrate the ability to perform clinical skills essential in providing basic diagnostic services such as Correctly collect, transport, receive, accept or reject and store blood /urine/stool and tissue samples.
- Conduct analysis of body fluids/ samples; Maintain, operate and clean Laboratory equipment; Provide technical information about test results
- Prepare and document medical tests and clinical results; etc.
- Demonstrate quality assurance in Laboratory works
- Practice infection control measures
- Demonstrate readily availability of medical and diagnostic supplies
- Demonstrate techniques to maintain the personal hygiene needs
- Demonstrate actions in the event of medical and facility emergencies
- Work as a medical laboratory professional with right attitude in any lab setting Additionally, he will be developing following allied skills and knowledge through this program:
 - CPR
 - Care giver
 - Basics on Hospital management



Program Outcomes (POs)

| | |
|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PO-1 | Disciplinary Knowledge: (i) Acquire knowledge with facts and figures related to various subjects in pure sciences such as Physics, Chemistry, Mathematics, Microbiology and Computer Science; and Biotechnology, Information Technology and its other fields related to the program. (ii) Understand the basic concepts, fundamental principles, theoretical formulations and experimental findings and the scientific theories related to various scientific phenomena and their relevance in the day-to-day life. |
| PO-2 | Communication Skills: Developed various communication skills such as reading, listening and speaking skills etc., which will help in expressing ideas and views clearly and effectively. |
| PO-3 | Critical Thinking: Think creatively to propose novel ideas in explaining the scientific data, facts and figures related to science and technology. |
| PO-4 | Analytical Reasoning and Problem Solving: Identify, describe, formulate, interpret, analyze the data systematically and solve theoretical and numerical problems in the diverse areas of science and technology and provide alternate solutions to the problems. |
| PO-5 | Sense of Inquiry: Curious for asking relevant questions like why and how for better understanding of the basic concepts, fundamental principles, scientific theories and applications related to the study. |
| PO-6 | Use of Modern Tools: Use of modern tools, equipment, instrumentation and laboratory techniques to design and perform the experiments and write the programs in different languages (software). |
| PO-7 | Research Skills: Ability to search for, find, collect, analyze, interpret and evaluate information/data that is relevant to the subjects related to science and technology being studied. |

| | |
|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PO-8 | Application of Knowledge: Develop scientific outlook with respect to the subjects related to science and technology and also participate in various social and cultural activities. |
| PO-9 | Ethical Awareness: Imbibe ethical and social values in personal and social life leading to cultured and civilized personality. |
| PO-10 | Teamwork: Work effectively within the groups and individuals, participate and take initiative for various field-based situations related to science, technology and society at large. |
| PO-11 | Environment and Sustainability: Understand how development in science and technology and interdisciplinary subjects are taking place for protecting our environment and sustainable developments. |
| PO-12 | Lifelong Learning: Ability of self-driven to explore, learn and gain knowledge and new skills to improve the quality of life and sense of self-worth by paying attention to the ideas and goals throughout the life. |

Program Specific Outcomes [PSO]: BSC [MLT]

PSO_1: Understanding different branches and their functions of medical laboratory like microbiology, biochemistry, hematology, transfusion medicine, histopathology through on the job training and internships in hospitals.

PSO_2: Learn professional guidelines and norms for patient safety and apply laboratory skills in basic diagnostic services to collect, transport, receive and accept or reject clinical samples (3*)

PSO_3: Remember laboratory procedures that are essential for the diagnosis and treatment of infectious diseases. (1&3)*

PSO_4: Understand the methods of testing & analyzing various body fluids samples (operating techniques, labelling & storing).

PSO_5: Evaluating technical information about test results and creating medical test reports.

PSO_6: Illustrate the basic molecular diagnosis & quality management in pathology.

PSO_7: Learning the latest medical instruments and equipment technology in a laboratory set up, their upkeep and error minimization.

PSO_8: Developing a professional laboratory technologist through various ability enhancement programs on communication skills, life skills, field visits and personality development workshops.

PSO_9: Understanding the larger scope of medical profession and creating an opportunity for higher education in hospital management domain and overseas work opportunities.

***Note: [1] Remembering, [2] Understanding, [3] Applying, [4] Analyzing, [5] Evaluating, [6] Creating**

| Course Outcome (CO) Semester 1 | | |
|--------------------------------|------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Course Code | Name of the Course | Course outcomes |
| UGMLTC101 | General Human Anatomy & Physiology | <p>CO1. Explain the morphology, physiology of skeletal system along with the physiology of muscle contraction in co-ordination with the joints, their articulation and skin [1-3]*</p> <p>CO2. Describe & explain the composition, function of various body fluids like blood, lymph cardiovascular and respiratory system their significance and related disorders. [2]*</p> <p>CO3. Classify the peripheral nervous system, nerves and morphology of special senses & Discuss diseases, disorders, and conditions commonly found in healthcare occupations [4]*</p> |
| UGMLTC102 | Fundamentals of Hospital Practices & Protocols | <p>CO1. Recognize, define, and spell terms related to the pathology and treatment of body systems. Analyze and apply knowledge to a real-life scenario. Define common word roots, combining forms, suffixes, and prefixes. Identify and describe the major functions and structures of the body systems [1]*</p> <p>CO2. Explain methods to prevent the spread of infection. Summarize the engineering, work practice, and environmental controls that protect against healthcare-associated infections AND Identify barriers and personal protective equipment for protection from exposure to potentially infectious material and Improve their general hygiene routine and personal image. Understand the importance and benefits of self-care.[5-4]*</p> <p>CO3 Implement strategies for Standard and Transmission-Based Precautions in healthcare settings. Prevent the spread of germs and disease by using the correct techniques for hand hygiene. Protect oneself and those served by technologist recognizing the chain of infection[3]*</p> |
| UGMLTAEC101 | Communication Skill | <p>CO1. Understanding and improving General vocabulary, properly understand the meaning and implement in academics through formal communication[1&2]*</p> <p>CO2. Applying parts of speech while framing sentences. Additionally, they will learn all the kinds of sentences that are required while having a basic interaction in English with anyone[3]</p> <p>CO3. Understanding the time mentioned in the sentences by identifying action verbs & helping verbs and then frame sentences mentioning about the proper work/event happened on specific time. [1&2]*</p> |
| UGMLTGE101B | Introduction to Chemistry | <p>CO1 Understanding chemical processes related to Biochemistry of living organisms and to understand qualitative and quantitative analytical processes routinely used in biochemical analysis[4-3]*</p> <p>CO2. Learn chemical processes, composition, and structure of elements and compounds for better understanding of biochemistry of living organism.[1]*</p> <p>CO3 Study of Interactive periodic table with up-to-date element property data .To have a better understanding in chemical element names, symbols[2]*</p> |

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|----------------------------|-----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>UGMLTC201</p> | <p>Phlebotomy</p> | <p>CO1. Understand patients and their own safety for proper sample collection method and Phlebotomy procedures to the patients, and address their questions and concerns [1-3]* CO2. Developing basic diagnostic services such as Correctly collect, transport receive and accept or reject of clinical samples. [4]* CO3. . Learn right attitude, skills and knowledge to do the job role of (Phlebotomist) in Laboratory as required by the industry and variety of different forms of phlebotomy, including venous phlebotomy, finger-prick, and arterial.</p> |
| <p>UGMLTC202</p> | <p>Fundamentals of Pathology</p> | <p>CO1. Study of medical instruments and equipment technology in a laboratory set up and. Learn aspect of patient care, from diagnostic testing and treatment [3-1]* CO2. Justify spread of Skin, Respiratory and Urinary tract infection & understanding clinical manifestation [4]* CO3. Explain diagnostic laboratory procedures are essential for the diagnosis and Treatment of infectious disease[2]*</p> |
| <p>UGMLTAEC-201</p> | <p>Communication Skill</p> | <p>CO1. Learning report writing will make practice objective and passive form of writing. Additionally, the will learn to draft and present a Power Point Presentation that will be an aid while they present their views on certain topics. [1]* CO2. Creating the respective Resume and Job application for applying in various organizations and Understanding formal, informal, spoken & written English that will bridge the gap between their thoughts and words [2-3]* CO3. Students will dramatize (Role-pay) the certain topics to get involved in context and to experience the intention behind those sentences. [4&6]*</p> |
| <p>UGMLTGE-202</p> | <p>Introduction to Zoology</p> | <p>CO1. study of all animals from tiny insects to large mammals as per Animal kingdom classification and Study of genes, genetic variations and heredity. DNA, RNA and genetic code for better understanding of genetics and molecular biology. [2-1]* CO2. to understand the vital normal physiological processes that is necessary to sustain human life[2]* CO3 To understand the normal and pathological life processes that occur for animal life to exist.[1]*</p> |

Scheme of examination for Each Semester

Continuous Internal Evaluation: 40 Marks

Common Test 20 Marks & 20 Marks for Assignment, Projects, Group discussion, Open book test, online test etc. based on Units of each paper.

Semester End Examination: 60 Marks will be as follows –

| | | |
|----------------|-------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|
| I. | Theory: The Semester End Examination for theory course work will be conducted as per the following scheme. | |
| | Each theory paper shall be of two hours duration. | |
| | All questions are compulsory and will have internal options. | |
| | Q – I | Subject questions from Unit – I (having internal options.) 15 M |
| | Q – II | Subjective questions from Unit – II (having internal options.) 15 M |
| | Q – III | Subjective questions from Unit – III (having internal options.) 15 M |
| | Q- IV | Objective type questions based on all the Units with equal weightage. 15 M |
| II. | Practical | The Semester End Examination for practical course work will be conducted as per the following scheme. |
| Sr. No. | Particulars of Semester End Practical Examination | Marks% |
| 1 | Laboratory Work | 80% |
| 2 | Journal | 10% |
| 3 | Viva | 10% |
| | TOTAL | 100% |



F.Y.BSc. Medical Lab Technology
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Semester 1

| Paper 1 [UGMLTC101]: General Human Anatomy & Physiology MAJOR | | | | |
|-------------------------------------------------------------------------------------|--------------|-----------------------------------------------------|----------------|---------------|
| Course Code | Unit | Topics | Credits | L/week |
| UGMLTC101 | I | Human Anatomy | 4 | 4 |
| | II | Human Physiology | | |
| | III | Human Diseases | | |
| Paper 2[UGMLTC102]: Fundamentals of Hospital Practices & Protocols MINOR | | | | |
| UGMLTC102 | I | Medical Terminology | 4 | 4 |
| | II | Infection control | | |
| | II | BMW & Personal Hygiene | | |
| Paper 3: [UGMLTGE103]: Introduction to Chemistry GENERIC | | | | |
| UGMLTGE103 | I | Basic Chemistry | 2 | 2 |
| | II | Organic Chemistry | | |
| | III | Tenses Hydrocarbons | | |
| Paper 4: [UGMLAEC104]: Communication Skill AEC | | | | |
| UGMLTAEC 104 | I | Vocabulary and Meanings | 2 | 2 |
| | II | Word class Nouns, Verbs, Adjectives and Adverbs | | |
| | III | Tenses | | |
| Semester 1 Practical | | | | |
| UGMLTCP101 | MAJOR | Practical in Understanding of Human body Functions | 2 | 2 |
| | | | 2 | 2 |
| UGMLTCP102 | MINOR | Practical in Norms of Healthcare Industry | 1 | 1 |
| UGMLTGEP 104 | GE | Practical in Principles & Fundamentals of Chemistry | | |

- ✓ We have designed special practical for this module to enhance allied healthcare professional skills of the learner



F.Y.BSc. Medical Lab Technology
NEP-2020
Semester 2

| Paper 1 [UGMLT201]: Phlebotomy MAJOR | | | | |
|-----------------------------------------------------------------------------------------------------------------------------------------------|--------------|-----------------------------------------------|----------------|---------------|
| Course Code | Unit | Topics | Credits | L/week |
| UGMLTC201 | I | Phlebotomy | 4 | 4 |
| | II | Introduction to Medical Laboratory Technology | | |
| | III | Safety Procedures | | |
| Paper 2: [UGMLTC202]: Fundamentals of Pathology MINOR | | | | |
| UGMLTC202 | I | Basics of Biochemistry | 4 | 4 |
| | II | Basics of Hematology & Transfusion Medicine | | |
| | III | Clinical Pathology and Microbiology | | |
| Paper 3: [UGMLTGE203]: Introduction to Zoology GENERIC | | | | |
| UGMLTGE 203 | I | Zoology Basic 1 | 2 | 2 |
| | II | Zoology Basic 2 | | |
| | II | Biotechnology | | |
| Paper 4 [UGMLTAEC204]: Communication Skill AEC | | | | |
| UGMLTAEC 204 | I | Effective Writing | 2 | 2 |
| | II | Spoken skills and Communication activities | | |
| | III | Understanding Language Expression forms | | |
| Semester 2 Practical | | | | |
| UGMLTCP201 | MAJOR | Practical in Phlebotomy Expertise | 2 | 2 |
| UGMLTCP202 | MINOR | Practical in Basic Laboratory Test | 2 | 2 |
| UGMLTGEP 202 | GE | Practical in Basics of Zoology | 1 | 1 |
| Additional 8 Credits Sem -1 SDP(2 credits), Yoga/Music/Dance(2 credits), Sem-2 SDP(2 credits)Internship(2 credits) | | | | |
| *Exit option with certification with 42 Credits | | | | |

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**F.Y.BSc. Medical Lab
Technology
NEP-2020 Semester 1**

| Paper, I MAJOR | | |
|-----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|
| Course Code | Title | Credits |
| UGMLTC 101 | GENERAL ANATOMY & PHYSIOLOGY | 4 |
| Unit I | <p>Human Anatomy .</p> <ul style="list-style-type: none"> • Cell Structure & Function, • Tissues Structure & Function • Body Membranes Structure & Function • Body Cavities, • Body Fluid Collection Procedures Clinical Relevance <p>Study of Organ system and clinical relevance</p> <ul style="list-style-type: none"> • Digestive system • Respiratory system • Circulatory system • Excretory system • Nervous system • Skeletal system • Endocrine system • Reproductive system • Lymphatic system | |
| Unit II | <p>Human physiology</p> <ul style="list-style-type: none"> • Blood: Structure & Functions • Cell types, Plasma, Serum • Blood Transfusion, Grouping, Cross matching • Digestion • Respiration and Breathing Mechanism • Circulation • Excretion & Filtration of Urine • Hormones Reproduction • Menstruation • Metabolism of Carbohydrates, Fats, Proteins. | |
| Unit III | <p>Human Communicable Diseases,</p> <ul style="list-style-type: none"> • Bacterial, • Viral • Fungal • Protozoal • Parasites • Non communicable Diseases (Metabolic Diseases) • Kidney • pancreas • Heart • Liver • Gall bladder • Blood | |

| | | |
|--|---------------------------------------------------------------------------|--|
| | <ul style="list-style-type: none">• Thyroid• Brain | |
|--|---------------------------------------------------------------------------|--|

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**F.Y.BSc. Medical Lab
Technology
NEP-2020
Semester 1**

| Paper I MINOR | | |
|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|
| Course Code | Title | Credits |
| UGMITC 102 | FUNDAMENTALS OF HOSPITAL PRACTICES & PROTOCOL | 4 |
| Unit I | Medical Terminologies <ul style="list-style-type: none"> ● Prefixes Roots, ● Suffixes, ● Short forms, ● Abbreviations, Meanings ● Medical Terminologies in Alphabets | |
| Unit II | Infection control <ul style="list-style-type: none"> ● Introduction to Infection Control ● Universal precautions Safety measures. ● Modes of Transmission ● Sterilization methods: Autoclave Disinfectants Sanitizers Personal Protective Equipment PPE use. | |
| Unit III | BMW & Personal hygiene <ul style="list-style-type: none"> ● Demonstrate Hand Wash steps ● Demonstrate methods of Donning(wearing) & Doffing(removing) of PPE ● Demonstration of BMW bags ● Methods of Segregation ● Categories & Containers ● Pretreatment Temporary Storage ● Transportation, Disposal ● Safety measures ● Waste management in Epidemics and Pandemics | |

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F.Y.BSc. Medical Lab Technology
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Semester 1

| Paper III GENERIC | | |
|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|
| UGMLTGE 103 | Title | Credits |
| | Introduction to Chemistry | 2 |
| Unit I | Basic Chemistry <ul style="list-style-type: none"> ● Chemical Bonding ● Molecular Structure ● Classification of Elements ● Periodicity in Properties | |
| Unit II | Organic Chemistry <ul style="list-style-type: none"> ● General Introduction ● Organic Compounds, ● Bond AND Types of Organic Reactions ● Qualitative and Quantitative Analysis | |
| Unit III | Hydrocarbons <ul style="list-style-type: none"> ● Alkanes AND Alkynes ● Aromatic Hydrocarbons ● Classification of Hydrocarbons ● Aliphatic Hydrocarbons | |

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Semester 1

| Paper IV – AEC | | |
|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|
| UGMITAEC 104 | Title | Credits |
| | COMMUNICATION SKILL | 2 |
| Unit I | Vocabulary and meanings <ul style="list-style-type: none"> • Word study • Basic communication • Common Errors | |
| Unit II | Word class <ul style="list-style-type: none"> • Nouns, Verbs, Adjectives, and Adverbs • Conjunction, Preposition, Pronouns, • Determines Types of Sentences • Compound, and Complex Structures | |
| Unit III | Tenses <ul style="list-style-type: none"> • Simple Past, Present Perfect, Past Perfect. • Simple + Progressive Aspect, Modal Verbs • Conditional Sentences, Verbs, and Idiom's | |

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F.Y.BSc. Medical Lab Technology
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Semester 1 Practical

| Course code | Title | Credit |
|------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|
| UGMLCP 101 | Human anatomy and physiology and diseases <ol style="list-style-type: none"> 1. Identification of Organs 2. Determination of the Physiological Processes of systems, 3. Marking of Organs by Surface Anatomy 4. Case studies of diseases | 2 |
| UGMLTCP 102 | Norms of Healthcare Industry <ol style="list-style-type: none"> 1. Demonstrate Hand Wash steps 2. Demonstrate methods of Donning(wearing) & Doffing (removing) of PPE 3. Demonstration of BMW bags 4. Demonstrate Respiratory Etiquettes 5. Identification of Personal Protective Equipment 6. Evaluate Epidemic and Pandemic Precautions | 2 |
| UGMLTGE P 103 | Principles & Fundamentals of Chemistry <ol style="list-style-type: none"> 1. Characterization of Chemical Substances 2. Determination of Melting Point of an Organic Compound. 3. Determination of Boiling Point of an Organic Compound. | 1 |

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F.Y.BSc. Medical Lab Technology
NEP-2020
Semester 2

Paper I MAJOR

| Course Code | Title | Credits |
|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|
| UGMLTC 201 | Phlebotomy | 4 |
| Unit I | Intro to Phlebotomy <ul style="list-style-type: none"> ● Orientation to Phlebotomy ● Role of the Phlebotomy Technician ● Phlebotomy Techniques | |
| Unit II | Phlebotomy Equipment & Sampling <ul style="list-style-type: none"> ● Different Phlebotomy Equipment ● Types of Samples ● Best Practices for Sample Collection ● Sample Handling, Order of Draw, Transportation | |
| Unit III | Safety Procedures <ul style="list-style-type: none"> ● Patient's Comfort & Safety ● Prevention and Treatment of Needle Stick Injury ● Patient's Rights & Responsibilities | |

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Semester 2

| Paper- II MINOR | | |
|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| Course Code | Title | Credit |
| UGMLTC 202 | Fundamentals of Pathology | 4 |
| Unit I | Basics of Biochemistry <ul style="list-style-type: none"> ● Glassware and Lab Instruments ● Different Biomolecules ● Organ profile studies ● Good Laboratory practices | |
| Unit II | 1.Basics of Hematology & Transfusion Medicine <ul style="list-style-type: none"> ● Complete Blood Count (CBC) ● Hb, RBC, WBC, Differential count ● Introduction to Blood Bank techniques ● Basic ABO & Rh blood grouping ● Cross matching and Transfusion reactions | |
| Unit III | Clinical Pathology and microbiology <ul style="list-style-type: none"> ● Urine Analysis ● Swab Collection and testing ● Body fluids test ● History and Diagnostic Microbiology ● Staining Techniques ● Mantoux test | |

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Semester 2

| Paper III GENERIC | | |
|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| Course Code | Title | Credit |
| UGMLTGE 203 | Introduction to Zoology | 2 |
| Unit I | Animal body structure <ul style="list-style-type: none"> ● Study of Cell Structure ● Organization Division of Animal Cell ● Study of Biomolecules | |
| Unit II | Animal body physiological processes <ul style="list-style-type: none"> ● Digestion and Excretion ● Respiration and Reproduction ● Skeletal movements | |
| Unit III | Molecular basis of inheritance <ul style="list-style-type: none"> ● Replication, Transcription & Translation ● Genetic diseases ● Sex-linked Inheritance | |

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Semester 2

| Paper IV AEC | | |
|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| Course Code | Title | Credit |
| UGMLT AEC204 | Functional English | 2 |
| Unit I | 1.Effective writing 1.1.1. Objectives 1.1.2. Resume, Job Application and Report Writing 1.1.3. Power of Technology, Making a PPT | |
| Unit II | 1.Spoken Skills and Communication Activities 2.1.1. Different styles of Spoken and Written English 2.1.2. Introducing Yourself and Role Playing 2.1.3. Asking questions/Answering questions | |
| Unit III | 1.Understanding Language expression forms 3.1.1. Debates/Arguments and Listening Skills 3.1.2. Casual Conversation and Listening Skills 3.1.3. Reading a Narrative Passage | |

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F.Y.BSc. Medical Lab Technology
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Semester 2 Practical

| Course code | Title | Credit |
|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|
| UGMLCP201 | Phlebotomy Expertise <ol style="list-style-type: none"> 1. Capillary Blood Collection 2. Venipuncture Collection 3. Arterial blood Collection Phlebotomy Expertise (OJT& Internship in Hospitals/Healthcare facility of Phlebotomy) | 2 |
| UGMLTCP202 | Basic Laboratory Test <ol style="list-style-type: none"> 1. Introduction to Glassware and Lab Instruments 2. Separation of Plasma and serum from blood sample 3. Basic Requirements of Bacteriology lab 4. Use of different objectives of Microscopes 5. Urine examination (Basic) | 2 |
| UGMLTGP204 | Basics of Zoology <ol style="list-style-type: none"> 1. Identification of Animal Organ Systems 2. Illustration of Physiological Processes. 3. Case Study of Diseases. | 1 |
| | | |

- ✓ We have designed special practical for this module to enhance allied healthcare professional skills of the learner



References:

1. iTransform Handbook on Anatomy, Physiology
2. iTransform Handbook on Foundation Program
3. iTransform Handbook on Medical Terminologies
4. iTransform Handbook on Phlebotomy
5. Medical Laboratory Technology, Vol. 1,2,3, Chief editor: Kanai Mukherjee CBS Publication
6. Text book of Medical Laboratory Technology, by Mrinalini Sant CBS Publication
7. Text book of Medical Laboratory Technology, by P.B.Godkar, Darshan Godkar, vol. 1,2 Bhalani Publication.
8. Medical Laboratory Technology, Methods & Interpretation, by Ramnik Sood, Jaypee Publication
9. Histological Techniques, A Practical Manual by K. Laxminaraa



A handwritten signature in blue ink, appearing to read "J. S. J. S. J. S."

HOD,
Department of Microbiology

