

**(Lab.Technology) Course Catalogue**

**2022-2023**

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| **College/ Institute** | **Shaqlawa technical college** | |
| **Department** | **Medical Laboratory Technology** | |
| **Module Name** | **Lab. Technology** | |
| **Module Code** | **LAT205** | |
| **Semester** | **2** | |
| **Credit** | **7** | |
| **Module type** | **core** | |
| **Weekly hours** | **4** |  |
| **Weekly hours (Theory)** | **( 2 )hrs Class** | **( 3 )hrs Workload** |
| **Weekly hours (Practical)** | **( 2 )hrs Class** | **( 1 )hrs Workload** |
| **Lecturer (Theory)** | **Dr Nzar Ali Ameen Shwan** | |
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| **Lecturer (Practical)** | **Shanya Wasfi** | |
| **Email** |  | |

**Course Book**

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| * **Course overview:**   This course aims to provide a comprehensive theoretical knowledge of medical microbiology diagnosis technique and medical physiology disorder, diagnosis of disease disorder of human system and advanced practical training in this diverse field. | | |
| * **Course objective:** * Demonstrate and understanding of basic laboratory technique on the medical microbiology examination of disease. * Demonstrate an understanding of basic concepts of medical physiology disorder, diagnosis of disease disorder of human system and advanced practical training in this diverse field. * Have advanced skills on processing blood and physiological analysis and disease diagnosis. | | |
| **Student's obligation**  Attendance in lecture is expected. You are responsible for everything covered, mentioned, discussed and displayed in class. If you miss a class, get a classmate's notes as my notes will not be available. You cannot excel in this course if you do not come to class.  **1- Attendance:** students are strongly encouraged to attend class on a regular basis, as participation is important to understanding of the material. This is student opportunity to ask questions. **Students are responsible for obtaining any information during the class which provided.**  **2**- **Lateness:** Lateness to class is disruptive  **3**- **Electronic devices:** All cell phones are to be turned off at the beginning of class and put away during the entire class.  4-**Talking:** During class please refrain from side conversations. These can be disruptive to your fellow students and your professor | | |
| * **Forms of teaching**   The material will be presented at a level suitable for advanced undergraduates by lecturing, discussion, video, power points, moodle e-learning and seminar | | |
| * **Assessment scheme**   ‌10% Mid. Theory exam  15% Mid. practical exam  4% Quiz  36% Activity  20% final practical  20% final theory | | |
| * **Specific learning outcome:**   competency to perform a full range of testing in the contemporary medical laboratory encompassing pre-analytical, analytical, and post-analytical components of laboratory services, including haematology, chemistry, microbiology, urinalysis, body fluids, phlebotomy, and immunohematology | | |
| * **Course Reading List and References‌:**   **1-Manual of medical Laboratory Techniques S Ramakrishnan and KN Sulochana. JAYPEE. 2012**  **2- Introduction to Medical Laboratory Technology,** Berhanu Seyoum, 2006  **3- Diagnostic Microbiology. Bailey and Scott̕s. 13 edition 2014** | | |
| **Course topics (Theory)** | **Week** | **Learning Outcome** |
| **Safety procedures and principles of sterilization** | Week1 | Introducing the general safety procedures and different methods of sterilizations |
| **Laboratory glassware and instruments** | Week2 | Familiarizing the students with the basic glassware in the lab and the instruments that mainly used in a diagnostic medical laboratory. |
| **Collection, Transport, Examination & reporting of specimens** | Week3 | Understand how different specimens are collected and transported to the lab, as well as the proper way to write a lab report |
| **Molecular diagnostic techniques: Chromatography** | Week4 | Gain the knowledge on how different chromatography technique works |
| **Molecular diagnostic techniques: Electrophoresis** | Week5 | Principles of electrophoresis, specifically gel electrophoresis |
| **Enzyme-Linked Immunosorbent Assays (ELISAs)** | Week6 | Understanding the principle of ELISA, and the applications of this technique in the lab. |
| **Polymerase Chain Reactions (PCR)** | Week7 | Getting up to date knowledge on different types of PCRs and the main applications of PCR in diagnosis of different types of specimens. |
| **Western blotting technique** | Week8 | An introduction to Western blotting and its applications |
| **Serological diagnostic**  **techniques** | Week9 | Understand how different serological techniques are used in the lab for diagnosis |
| **Hematology Part:**  **Common blood tests techniques, Haemoglobinopathy**  **tests** | Week10 | Understanding different Haematological test |
| **HEMATOLOGY ANALYZER (COULTER)** | Week11 | Understanding the principle of coulter counter |
| **Biochemistry Part:**  **Cell homogenization and fractionation** | Week12 | Getting knowledge on different methods for cell homogenization and fractionations |
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| **Practical Topics (If there is any)** | **Week** | **Learning Outcome** |
| **Sterilization methods& disinfection with difference physical and chemical methods** | Week1 | Student be able to know the methods of sterilization and the differences between sterilization and disinfection |
| **Phlebotomy and blood drawing** | Week2 | Learning of how to collect of blood sample |
| **General urine examination** | Week3 | Urine collection and analysis |
| **Sperm count and seminal fluid examination** | Week4 | Seminal fluid collection and analysis |
| **Blood smear and identifying of blood component** | Week5 | Manual preparation of blood smear and examining under microscope |
| **Bacterial smear preparation and identifying of bacterial shape** | Week6 | Microscopic examination of bacterial shape |
| **Bacterial media preparation and inoculation of bacteria on culture media** | Week7 | Media preparation and inoculation of bacterial on media culture |
| **Bacterial isolation and bacterial staining** | Week8 | Cultivation bacterial and bacterial staining |
| **Preparation and examination of microscopic stool slide** | Week9 | Manual preparation of stool slide and examining under microscope |
| **Preparation and examination of microscopic sputum slide** | Week10 | Manual preparation of sputum slide and examining under microscope |
| **Serology test (reaction) antigen –antibody interaction** | Week11 | Be able to know about serological methods in diagnosing disease |
| **ELIZA** | Week12 | Be able to know on this apparatus ELIZA |
| **Examinations (question design):**   1. **swab b- aspiration c- saliva**  |  |  | | --- | --- | | **Type of question** | **Example** | | **Multiple choice** | Which of the below answer is not correct? 10 Marks  1- The medical laboratory services play an essential role in  a. Monitoring the development and spread of infectious and dangerous pathogens (disease causing organisms),  b. Deciding effective control measures against major prevalent disease,  c. Deciding health priorities and allocating resources.  d. None of the above is correct  2- Without Reliable Laboratory Services:  a. The source of a disease cannot be identified correctly.  b. Patients are more likely to receive the best possible care.  c. Resistance to essential drugs may not not develop.  d. Epidemic diseases may not be identified on time and with confidence.  3- Doctors use laboratory tests to help:  a. Identify changes in your health condition before any symptoms occur.  b. Diagnose a disease or condition even before you have symptoms  c. Educate patients in order to practice healthy lifestyle  d. Monitor the course of a disease over time | | **Short answer** | Q/ Explain the following:  1-cathepsin  2- alpha giardin | | **Matching pairs** | **Match the following statements in the column A with the definitions in the column B:** | | **Definition and explain** | **A. How many separate random stool specimens are recommended and why?**  **B. What media are used for Routine Stool Culture and why the solid type should be selective?** | | **Problem situation** | Critical Thinking questions will be addressed by students. Eg. Give an example of a discrete analyser and describe how it differs from a continuous flow analyser? | | **Quiz** |  |   **-** | | |  |
| * **Extra notes:** | | |
| * **External Evaluate** | | |