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| **Department** | | **Department of Medical Laboratory Sciences** | | | | | | | | | |
| Course Title /Code | | **Serology** (MeLS2116) | | | | | | | | | |
| Program/Target Group | | BSc Degree in Medical Laboratory Sciences  Year: II Semester : II | | | | | | | | | |
| Module Title (Code) | | Molecular Biology and Immunology (MeLS-M2113) | | | | | | | | | |
| Course EtCTS | | 5 EtCTS | | | | | | | | | |
| Instructor’s Name | | Yibeltal Akelew | | | | | | | | | |
| Instructor’s Contact Information | | Office No. \_\_\_\_\_\_\_\_\_\_\_  Phone No. +251 923233376  E-mail aayibeltal21@gmail.com  Office Hour \_\_\_\_\_\_\_\_\_\_\_ | | | | | | | | | |
| EtCTS | | 5 CP/ 135Hrs. | | | | | | | | | |
| Student Work Load | | Lecture | | | Laboratory/practical | Tutorial | Independent Study | Assignment | | Assessment | Total |
| 1. Hrs. | | | 48 Hrs. | 0 Hrs. | 41 Hrs. | 8 Hrs. | | 6 Hrs. | 135 Hrs. |
| Course Description | | This course describes the overview of immune system; antibodies and complement system; Immunological Techniques, preparation and preservation of serological specimens; Dilution, serology of syphilis; febrile agglutinins (Widal and Weil-Felix tests); Serology of Streptolysin O (SLO) and Antistreptolysin O (ASO); Toxoplasmosis; Helicobacter Pylori;; Common Serologic Tests for Viral Infections; Diagnosis of HIV Infection; Hepatitis Viruses, Infectious mononucleosis; Diagnosis of autoimmune disease ; systemic lupus erythematosus, thyroid diseases, Rheumatoid arthritis; Acute-phase reactants; Urine pregnancy test and Quality assurance in serology laboratory | | | | | | | | | |
| Course Objective | | **General Objectives**  At the end of this course the student will be able to describe the overview of the immune system, antibody, complement, and immune technique as they relate to serology: apply different serological techniques and procedures, and preparation of serological samples in the laboratory.  **Instructional Objectives**  At the end of the course, students will be able to:  **Knowledge**   * Define immune system, antibody, antigen and complement including other   different terminologies   * Describe basic principles of serological techniques * Explain the collection, preparation, preservation and shipment of serologic   specimens.   * List common serological tests for parasitic, bacterial and viral infections * Describe the working principles of pregnancy test, syphilis tests, ASO,   C-reactive protein   * Describe the factors affecting a serological tests in the serology lab * Identify possible factors involved in diagnosis of infectious disease   **Skill**   * Perform specific and non-specific tests for syphilis * Prepare dilution of serum specimen in serology lab * Perform infectious mononucleosis; rheumatoid factor and acute phase protein tests according to procedure. * Practice HIV test and hepatitis tests applying appropriate algorithms * Apply appropriate specimen collection, preparation and preservation technique for different types of serological tests * Report the overall serological test results based on internal quality control   **Attitude**   * Follow different manufacturer instructions * Maintain privacy of patients and confidentiality of their information/records * Apply safety precaution in serology laboratory * Demonstrate appropriate patient handling during specimen collection | | | | | | | | | |
| Pre-requisite(s) | | Basic Immunology | | | | | | | | | |
| Course Status | | Core | | | | | | | | | |
| Mode of Delivery | | Semester based | | | | | | | | | |
| **Schedule** | | | | | | | | | | | |
| **Day** | **Contact Hour** | | **Topics and Sub Topics** | | | | | | **Reference(s)** | | |
| **One** | 1. Hr. | | **Lecture**  **Chapter one**: Overview on immune system  **Chapter Two:** **Immunological Techniques**   * 1. **Primary binding test** * Immunofluorescence * ELISA * Radioimmunoassay | | | | | | Ref No 1 | | |
| 3 Hrs. | | **Laboratory**  **•** Instrument in Serology laboratory | | | | | |  | | |
| 1 Hrs. | | **Independent study** | | | | | |  | | |
| 1 Hrs. | | **Assignment for reading** | | | | | |  | | |
| **Two** | 4 Hrs. | | **Lecture**  **Chapter Two: con’s**   * 1. **Secondary binding tests**      1. Precipitation Reactions.      2. Agglutination      3. Complement fixation tests   2. Tertiary binding tests   3. . Flow Cytometry   4. Methods of Monoclonal Antibody Production | | | | | | Ref No 1 | | |
| 3 Hrs. | | **Laboratory**   * Serum preparation and pipetting | | | | | |  | | |
| 2 Hrs. | | **Independent study** | | | | | |  | | |
| **Three** | 4 Hrs. | | **Lecture**  **Chapter Three:** Safety, specimen preparation and Shipment of serological specimens   * 1. Safety in serology laboratory, Collection, preparation and preservation of serological specimens   2. Shipment of serological specimens   3. Dilution (Serial dilutions and Determination of end point and titer) and Complement inactivation | | | | | | Ref No 1 | | |
| 3 Hrs. | | **Laboratory**   * Serum preparation, Serum dilution and pipetting | | | | | |  | | |
| 1 Hrs. | | **Assessment**   * Test one | | | | | |  | | |
| 3 Hrs. | | **Independent study** | | | | | |  | | |
|  | 1 Hrs. | | **Assignment for reading** | | | | | |  | | |
| **Four** | **4 Hr.** | | **Lecture**  **Chapter Four :** Common Serologic Tests for Bacterial and Parasitic disease   * 1. **Serological diagnosis for syphilis**       1. **Syphilis** (Characteristics of the Organism, Mode of Transmission, Stages of the Disease, Congenital Syphilis, Nature of the Immune Response)      2. **Laboratory Diagnosis** Syphilis (Dark field Microscopy and Serologic Tests). | | | | | | Ref No 1&2 | | |
| **3 Hrs.** | | **Laboratory**   * RPR and VDRL test for syphilis( qualitative and quantitative methods | | | | | |  | | |
| **4 Hrs.** | | **Written Assignment one** | | | | | |  | | |
| **Five** | 4 Hrs. | | **Lecture**   * 1. **Agglutination test for febrile diseases**      1. **Salmonella** (Characteristics and Serological Diagnosis)      2. **Rickettsial** Infections (Characteristics of Rickettsial Infections Serological Diagnosis)   2. Serology of Streptolysin O (SLO) and Antistreptolysin O (ASO)   3. Helicobacter Pylori   4. Serology test for Malaria   5. Toxoplasmosis(Characteristics and Serological Diagnosis) | | | | | | Ref No 1,2& 4 | | |
| 3 Hrs. | | **Laboratory**   * Widal and Weil-Felix tests * Demonstration of ELISA | | | | | |  | | |
| 3 Hrs. | | **Independent study** | | | | | |  | | |
| 1Hrs. | | **Assignment for reading** | | | | | |  | | |
| **Six** | 4 Hrs. | | **Lecture**  **Chapter five :**  **Common Serologic Tests for Viral Infections**   * 1. **Serologic tests for HIV**       1. Diagnosis of HIV Infection (Characteristics of HIV, Composition of the Virus , Structural Genes , Viral Replication and Immunologic Manifestations)      2. HIV Serology(HIV Antibody Tests and HIV Antibody Test Algorithm)      3. Common HIV Antigen Tests      4. Common HIV Antibody Tests( Enzyme Linked Immunosorbent Assays (ELISA), Rapid Tests and Western Blot) | | | | | | Ref No 1,2&4 | | |
| 3 Hrs. | | **Laboratory**   * ELISA | | | | | |  | | |
| 4 Hrs. | | **Writing Assignment Two** | | | | | |  | | |
| **Seven** | 4 Hrs. | | **Lecture**  **Chapter five: Cont** ‘   * + 1. Serology of Hepatitis Viruses     2. Diagnosis of Hepatitis B, C ,D , A & E     3. Serology of Infectious mononucleosis     4. Serology of Dengue viruses | | | | | | Ref No 1,2&4 | | |
| 3 Hrs. | | **Laboratory**   * Test for HIV and Infectious mononucleosis | | | | | | . | | |
| 1 Hrs. | | **Assessment**   * Test two | | | | | |  | | |
| 4 Hrs. | | **Independent study** | | | | | |  | | |
| **Eight** | 4 Hrs. | | **Lecture**  **Chapter six: Serologic test for Autoimmune disease**   * 1. Diagnosis of systemic lupus erythematosus.   2. Serology of Rheumatoid Factor   **Chapter seven :** Acute-phase reactants/ Acute-phase Proteins(C-reactive  protein (CRP**).**  **Chapter eight: serology of Troponin I**  **Chapter Nine :**Serology of Human Chorionic Gonadotrophin Hormone  (HCG) (Urine pregnancy tests,   * 1. Factors that affect urine pregnancy test,   2. Urine specimen collection   3. method of determining HCG   **Chapter Ten:** Laboratory Automation and Quality Assurances in serology  Laboratory | | | | | | Ref No 1,4&3 | | |
| 3 Hrs. | | **Laboratory**   * Hepatitis and reactive protein | | | | | |  | | |
| 2 Hrs. | | **Independent study** | | | | | |  | | |
| 2Hrs. | | **Assignment for reading** | | | | | |  | | |
| **Nine** | 6 Hrs. | | **Laboratory**   * Demonstration of Flow Cytometry Principle. * Rheumatoid Factor and Urine pregnancy tests. | | | | | |  | | |
| 4 Hrs. | | **Independent study** | | | | | |  | | |
| **Ten** | 6 Hrs. | | **Laboratory**   * Serial dilution And pipetting * Weil-Felix tests and Widal | | | | | |  | | |
| 6 Hrs. | | **Independent Study** | | | | | |  | | |
| **Eleven** | 6 Hrs. | | **Laboratory**   * ASO titer and Helicobacter Pylori (Antibody and antigen detection) * Serology test for HIV(Rapid test )and Demonstration of ELISA | | | | | |  | | |
| 5 Hrs. | | **Independent Study** | | | | | |  | | |
| **Twelve** | 6 Hrs. | | **Laboratory**   * ELISA * Rheumatoid Factor and Urine pregnancy tests. | | | | | |  | | |
| 6 Hrs. | | **Independent study** | | | | | |  | | |
| **Thirteen** | 4 Hrs. | | **Assessment**   * Practical exam * Final written examination | | | | | |  | | |
| **Teaching and Learning Methods**   * Lecture/ Classroom contact * Brainstorming * Laboratory /Practice * Group discussion * Computer assisted instruction( animation ) | | | | | | | | | | | |
| Course Policy | | | | **Attendance**:   * Students are expected to attend each class. Your attendance determines whether you sit for exam or not as per university legislation. * 100% laboratory practice is mandatory | | | | | | | |
| **Reference (s)** | | | | **Required texts:**   1. **Stevens C D.,** Clinical Immunology and Serology, a laboratory perspective. 3rd ed, F.A. Davis Company, Philadelphia,2010. 2. **Laboratory** Immunology and Serology. Naville J. Bryant. 3rd edition. Serological services Ltd. Toronto, Ontario, Canada, 1992   **Recommended study books**   1. **District** laboratory practice in tropical countries. Monica Cheesbrough part I and II 2. Immunology and Serology Lecture note. 3. Roitt . M.I and Delves.J.Peter. Immunology, 10th ed. Blackwell Scientific Pub.2001. 4. Basic Techniques for the medical Laboratory, Jean Jorgeson, Linne,2nd edition. | | | | | | | |