Serology

Department	Department of Medical Laboratory Sciences						
Course Title /Code	**Serology** (MeLS 2104)						
Program/Target Group	BSc Degree in Medical Laboratory Sciences Year: II Semester : II						
Module Title (Code)	Immunology and Molecular Biology (MeLSM2109)						
Module Coordinator	Name						
Course EtCTS	5 EtCTS						
Course Information	Academic Year : Meeting Day _____ Meeting Time _____ Meeting Location: Class Room _____ Lab Room _____						
Instructor's Name	_____ _____						
Instructor's Contact Information	Office No. _____ Phone No. _____ E-mail _____ Office Hour _____						
EtCTS	5 CP/ 135Hrs.						
Student Work Load	Lecture	Laboratory/practical	Tutorial	Independent Study	Assignment	Assessment	Total
	32 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 for, and preparation and preservation 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 t according to procedure. • Practice HIV test and hepatitis tests applying appropriate algorithms

	• Apply appropriate specimen collection, preparation and preservation technique for diffe 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	Block

Schedule

Day	Contact Hour	Topics and Sub Topics	Reference(s)
One	4 Hr.	**Lecture** **Chapter one**: Overview on immune system **Chapter Two: Immunological Techniques** 1.1 **Material necessary for Basic serologic testes** 1.2 **Factors affecting antigen- antibody reaction** 1.3 **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.	**<u>Lecture</u>** **Chapter Two: con's** 1.4 **Secondary binding tests** 1.4.1 Precipitation Reactions. 1.4.2 Agglutination 1.4.3 Complement fixation tests 1.5 Tertiary binding tests 1.6 . Flow Cytometry 1.7 Methods of Monoclonal Antibody Production	Ref No 1
	3 Hrs.	**Laboratory** • Serum preparation and pipetting	
	2 Hrs.	**Independent study**	
Three	4 Hrs.	**<u>Lecture</u>** **Chapter Three:** Safety, specimen preparation and Shipment of serological specimens 3.1.Safety in serology laboratory, Collection, preparation and preservation of serological specimens 3.2. Shipment of serological specimens **3.3.**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	**Assignment for reading**	

	Hrs.		
Four	**4 Hr.**	**Lecture** **Chapter Four :** Common Serologic Tests for Bacterial and Parasitic disease **4.1.Serological diagnosis for syphilis** 4.1.1. **Syphilis** (Characteristics of the Organism, Mode of Transmission, Stages of the Disease, Congenital Syphilis, Nature of the Immune Response) **4.1.2. 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** 4.2.**Agglutination test for febrile diseases** 4.2.1. **Salmonella** (Characteristics and Serological Diagnosis) 4.2.2. **Rickettsial** Infections (Characteristics of Rickettsial Infections Serological Diagnosis) 4.3. Serology of Streptolysin O (SLO) and Antistreptolysin O (ASO) 4.4. Helicobacter Pylori 4.5. Serology test for Malaria 4.6. 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.	**<u>Lecture</u>** **Chapter five : Common Serologic Tests for Viral Infections** **4.1.Serologic tests for HIV** 5.1.1 Diagnosis of HIV Infection (Characteristics of HIV, Composition of the Virus , Structural Genes , Viral Replication and Immunologic Manifestations) 5.1.2 HIV Serology(HIV Antibody Tests and HIV Antibody Test Algorithm) 5.1.3 Common HIV Antigen Tests 5.1.4 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.	**<u>Lecture</u>** **Chapter five: Cont ‘** 5.1.5 Serology of Hepatitis Viruses 5.1.6 Diagnosis of Hepatitis B, C ,D , A & E 5.1.7 Serology of Infectious mononucleosis 5.1.8 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.	**<u>Lecture</u>** **Chapter six: Serologic test for Autoimmune disease** 1.1.Diagnosis of systemic lupus erythematosus. 1.2.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, 9.1.Factors that affect urine pregnancy test, 9.2.Urine specimen collection 9.3.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)

Assessment	**Type and Weight (Percentage)**	**Competence to be assessed**
• Assessment in this course will be based	**Continuous assessment** **Assignment** Two individual writing	• Define immune system, antibody, antigen and complement including other different terminologies

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<td>on written assignments (10%) .Laboratory exam,(10%) laboratory report (10%) , two continuous tests (20%) and Final exam (50%)</td>
<td>assignments 10%
Assignment 1. (5%)
Assignment 2 (5%)
Laboratory report (10%)
Two Tests (20%)
Test 1 10% Day 3
Test 2 10% Day 7
Laboratory exam 10% Day 13
Final exam (50%)
Day 13</td>
<td>• Describe basic principles of serological techniques
• Explain the collection, preparation, preservation and shipment of serologic specimens.
• List a serological tests for parasitic, bacterial and viral infections
• Describe the working principles of pregnancy test, syphilis tests, ASO, C-reactive protein
• 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.
• Practice HIV test algorithm and hepatitis tests</td>
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<td>Course Policy</td>
<td colspan="2">Refer in this curriculum.(page)</td>
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<tr>
<td>Reference (s)</td>
<td colspan="2">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
<u>Recommended study books</u>
3. District laboratory practice in tropical countries. Monica Cheesbrough part I and II
4. Immunology and Serology Lecture note.
5. Roitt . M.I and Delves.J.Peter. Immunology, 10th ed. Blackwell Scientific Pub.2001.
6. Basic Techniques for the medical Laboratory, Jean Jorgeson, Linne,2nd edition.</td>
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<tr>
<td>Approval Section</td>
<td colspan="2">Name of Module Coordinator/Course team leader: _____
Signature _____Date:_____
Name of School/Department head_____</td>
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