



## KING ABDULAZIZ UNIVERSITY

**FACULTY OF APPLIED MEDICAL SCIENCES**

**DEPARTMENT OF MEDICAL LABORATORY TECHNOLOGY**

**COURSE NAME: BASIC IMMUNOLOGY**

**COURSE NUMBER: MLT 203**

**YEAR: SECOND YEAR**

**SEMESTER: SECOND Semester**

## **LECTURE: 01**

**Title:**

### **COURSE DESCRIPTION**

#### **LEARNING OBJECTIVES:**

- To welcome the students to the immunology course, and inform them that it is a pleasure to have them for a certain period of time hoping they will enjoy the subject.
- To introduce the teaching staff members; doctors, lecturers, technicians, and etc.... (If it possible all will be present) to the students.
- To inform the students about the main purposes of teaching this course.
- To inform the students about the applied teaching skills (lectures, tutorials, laboratories, etc...).
- To inform the students about the required main references "textbooks, notes, journals, websites, etc..... for helping them in their studies.
- To inform the students about the laboratory reports and the procedure of handling them.
- To inform students about the attendance, types and numbers of examinations, grades distributions, and grade scale etc.....
- To introduce students to major definitions related to the science of immunity
- Answering students questions and to clarify if there is any thing unclear to some of them.

## INSTRUCTORS INFORMATIONS

### Dr. Mustafa Hasan Linjawi (Course Coordinator)

- Telephone: 6400000 Ext. 25957
- Mobile: 0505351628
- E-mail: Mlinjawi@Kau.edu.Sa
- Homepage: <http://www.kau.edu.sa/Mlinjawi>
- Office Location: 1<sup>ST</sup> floor, Room No. 1D. 008
- Office Hours: Tuesday 11:00 – 01:00 Noon

### Contributing faculty members

Mr. Salem Alkully

## A welcome letter to the student

Welcome my sons and daughters to the most attractive scientific course in the Applied Medical Laboratory department. We all students and teaching staff will dive together inside the ocean of the human immunity to get the valuable treasures, which are represented in the information related to immune system and its elements. Also all will feel more the beauty, mercy and greatness of Allah the creator, through recognition of the behavior of each immunological element of the immune system in health and disease, also the most sophisticated, organized cooperation between these elements just in order to protect you. The entire faculty members participate in teaching this course hope you enjoy being in this course, and they will practice their experiences in delivering this course with you in a proper way. Finally all the faculty teaching members including my will feel happy to guide you to learn through the electronic e-mail, office hours, and the tutorial sessions.

**Dr. Mustafa Hasan Linjawi**  
Course coordinator

## **COURSE INFORMATION**

**COURSE NAME:**      Basic Immunology

**COURSE NUMBER:**    MLT 203

**COURSE MEETING TIMES:**

**Lecture hours:**    2 hours/week for 15 weeks (Total 30 hours)

**Practical hours:**   2 hours/week for 15 weeks (Total 30 hours)

**Tutorial hours:**    1 hours/week for 15 weeks (Total 15 hours)

<b><u>LECTURES</u></b> <b>TWO/WEEK</b>	<b><u>PRACTICALS</u></b> <b>_ONE/WEEK</b>	<b><u>TUTORIALS</u></b> <b>ONE/WEEK</b>
Sat 09:00 - 09:50 AM	Mon 01:00 - 02:500 PM (Group B)	Sun 1-1:50 (G: A+B)
Wed 10:00 -10:50 AM	Tues 10:00 - 11:50 AM (Group A)	

**COURSE MEETING PLACES:**

1<sup>st</sup> year classroom  
Medical center - male section  
Faculty Building  
First floor  
Room number

**COURSE WEBSITE ADDRESS:**

<http://www.kau.edu.sa/Mlinjawi>

## **COURSE PREREQUISITES AND REQUIREMENTS:**

- English (ELCT 101, ELCT 102, and ELCT 201).
- General Biology (BIOT 101, and BIOT 102) + Haematology (MLT 205).
- General (CHMT 101), organic (CHMT102), and biochemistry BCHT 201).
- Physics (PHST 101).
- Biostatistics (TREQ202).
- Anatomy and physiology (PHYT 201).

## **ENTRY LEVEL KNOWLEDGE AND LABORATORY SKILLS:**

The student should have previously covered certain essential topics in some subjects (in the first year as indicated in the course prerequisites) to be as a fundamental and infra structure to what will be given in our course, and that in order to end up with an effective useful and clear course in basic immunology. On the other hand, the students should have gained some laboratory skills in handling certain laboratory basic equipments.

## **DESCRIPTION OF THE COURSE:** *(what, why, philosophy)*

This course will provide a foundation of basic immunology and manual skills for the medical laboratory technology students. Such knowledge and skills are well chosen, designed and arranged within the course in such a way to be as a prerequisite for the understanding and application of advanced core pre-clinical and clinical diagnostic courses. This will result in a distinctive outcome from the course, and provide the either or both the educational and health sector with a confident, will skilled medical laboratory technologist.

## **TEACHING METHODOLOGY:**

Class time will consist of lecture by the instructor and note taking by the student. Use of various audio visual aids, transparencies, handouts, videotapes, discussions, tutorials, assignments as "study cases", body languages, communication skills, and demonstrations will be employed. Students are exposed to a group discussion strategy in order to create his/her confident. During these sessions students are encouraged to ask questions and make comments relating to lecture materials. Also various laboratory sessions will be employed to stress proper and safe laboratory techniques.

# COURSE OBJECTIVES

## GENERAL OBJECTIVES:

Upon completion of this course the student should:

1. Realize the importance of studying the sophisticated mechanisms performed by collections of immunological elements "immunology" for providing body protection through an enjoyable basic immunology course.
2. Define the immunological and immunomedical terms that the student would be encounter through out the following years (3<sup>rd</sup>, 4<sup>th</sup>, intern ship, and during working in the related areas), e.g., the term "Immune" in connection with the term immunology, and the term "System" in relation to the process of human body protection, immunodeficiency, autoimmunity, hypersensitivity, etc.....
3. List the various kinds of human body cells, which are directly or indirectly involved in the processes of human body protection, including; precursor, the classification of these immune cells, site of production, site and stages of maturation, distinctive cell surface receptors (CDs) for each cell type, mechanisms of their antigen recognition and activation, and mechanisms of their communications.
4. List the different types of human body soluble mediators, which are directly or indirectly involved in the processes of human body protection, including; the various different types of the immunoglobulins and their diversity, complement proteins, and the major cytokines, site of production, mechanism of formation, activation, and antigen recognition and binding, mechanisms of binding to the corresponding targets.
5. Classify the human immune system in regarding to the physical characteristic of its elements (e.g., cellular, and humoral immunity), and in the other hand, in regarding to the nature of its immunological responses and actions (e.g., Natural, and acquired immunity) with providing examples for each classification.
6. Define the two terms "Immune response", and "immune tolerance" supporting the definitions with example of each (e.g., self, and non-self molecules) including in the definition the factors which trigger and inactivate the immune responses, accompanied the discussion with

clarification of the major Histocompatibility class I, and II (MHC I, and II) in these responses, the time (stage of lymphocyte maturation) of lymphocyte when confronted with the non-self molecules, the site of encounter, the nature of cells evolve, and the production of co-stimulating molecules.

7. Discuss the reasons that make the elements of the immune system reject and fight all the non-self molecules, supporting the discussions with the definitions of the terms "Antigenicity" and "Immunogenicity", the properties of the Immunogenicity (their related terms e.g., antigen, immunogen, epitope, haptens, adjuvants, foreignness, autologous, autograft, syngeneic antigens, isograft, allogeneic antigen, allograft, xenogeneic "heterogenous" antigen, heterophile antigens, sequestered antigens, and Tissue-specific "organ-specific" antigens), and the use of immunogens in vaccinations.

8. Explain the principle of each laboratory technique, and to gain satisfied experienced skills in applying the method, and proper using of the equipments.

9. Understand proper presentation and interpretation of laboratory results.

10. Recognize the importance of the laboratory safety precautions, and emphasizing on practicing these precautions.

11. Recognize the importance the laboratory medical ethics.

12. Realize the importance of the good attitude, and keep promoting this character.

13. Like immunology.



# LEARNING RESOURCES

## TEXT BOOKS & OTHER MATERIALS:

### 1- IMMUNOLOGY

ROITT I, BROSTOFF J, MALE D

Mosby

6<sup>th</sup> edition (Latest edition) 2002 G

(This textbook is the highly recommended for this course)

### 2- CELLULAR AND MOLECULAR IMMUNOLOGY

ABUL K. ABBAS. ANDREW H. LICHTMAN

Elsevier Saunders

5<sup>TH</sup> edition (Latest edition) 2005 G

### 3- IMMUNOLOGY "NATIONAL MEDICAL SERIES FOR INDEPENDENT STUDY. Richard M. Hude

## OTHER SUGGESTED TEXTBOOKS:

(This textbook is the highly recommended for this course)

### 1. IMMUNOLOGY & SEROLOGY. IN LABORATORY MEDICINE

MARY LOUISE TURGEON

Mosby

2<sup>ND</sup> edition (Latest edition if available would be better) 1996 G

### 2. CLINICAL IMMUNOLOGY PRINCIPLES AND LABORATORY DIAGNOSIS

CATHERINE SHEEHAN

Lippincott

2<sup>nd</sup> edition (Latest edition if available would be better) 1997 G

### 3. HOW THE IMMUNE SYSTEM WORKS

LAUREN SOMPAYRAC

Blackwell Science

1999 G

## WORLD WIDE WEB SITES:

<http://www.med.sc.edu:85/book/immunolsta.htm>

<http://www.jdaross.cwc.net/>

[http://www. Medscape.com](http://www.Medscape.com)

## LABORATORY MATERIALS:

During each laboratory sessions practical procedure sheet will be distributed to all students.

## LABORATORY LOCATION:

Teaching laboratory in the medical center  
First floor  
Faculty of Applied Medical Sciences

## LABORATORY HOURS:

LECTURES	TUTORIALS	PRACTICALS ONCE/WEEK
Sat 09:00-09:50 AM	Sun 01:00-01:50 PM	Mon 01:00-02:50 PM (Group B)
Wed 10:00-10:50 AM		Tues 10:00-11:50 AM (Group A)

## LABORATORY SAFETY PRECAUTIONS:

1. Handle all glassware, equipment and specimens with care.
2. Label all reagents and specimens properly and legibly.
3. Be mindful of your fellow students. Coordinate with other students when sharing of equipment or reagents. Help your fellow students when appropriate.
4. Keep a clean working area. Books, clothes, etc., and paper should not clutter the area.
5. Keep cabinet doors and drawers closed. Keep chair/tables recessed under cabinets when not in use.
6. Follow the guidelines for waste disposal (some items are discarded in regular trash cans, other are not). Avoid excess biohazardous waste supplies and equipment to the appropriate areas.
7. Do not leave until you have cleaned up your work area and returned supplies and equipment to the appropriate areas. Disinfect your work area before and after lab session.
8. Treat laboratory reports as confidential medical information, which is not to be shared with unauthorized persons.
9. There will be no smoking and no eating or drinking.
10. Use proper universal precautions and infection control
11. Wear proper personal protective equipments when dealing with hazardous substances.

## **REQUIRED PURCHASES:**

1. Laboratory coats.
2. Text book and instructor's lecture and practical notes.
3. Gloves.
4. Waterproof markers.
5. A file for laboratory assignments.

# **COURSE REQUIRMENTS & GRADING**

## **COURSE REQUIREMENTS:**

In order for students to successfully complete MLT 203 the following requirements must be met:

1. Students must attend lectures and practical sessions consistently.
2. Take and pass two written tests, final written and practical examinations.

## **ATTENDANCE:**

Learning in this class is an active, ongoing process. Information will be presented in class that can not be effectively communicated by reading another student's notes. Students need to experience each class him/her self. His /her performance in class depends on a great deal on his /her attendance. It is important that students are on time, have few or no absences, and remain in class the full period. Attendance is taken at the beginning of class.

Some times in class quizzes or other graded activities occur. These may be individual or in groups, as determined by the instructor. If students miss a class in which one of these takes place, he or she has a zero for that quiz / activity.

## **WITHDRAWALS:**

If a student wishes to withdraw for the course, it is this or her responsibility to inform the instructor. Appropriate withdrawal procedures will be followed. When a student accumulates unofficial absences in excess or two lectures or two labs or more, the instructor may, but is not obligated to file a withdrawal.

## IMPORTANT NOTE:

If a student must be absent on the day of a test, he/she must notify the instructor prior to test time in order to be allowed to take a make-up test. A grade of zero (0) will be assigned if the instructor is not notified. If the student exceeds the maximum absences of 10%, this will result in his / her being dropped from the course.

## EVALUATION STRATEGIES/GRADING

<b>CONTINUOUS ASSESSMENT (40%)</b>	
<b>Practical Reports</b>	<b>2.0 %</b>
<b>Student activities</b>	<b>0.5 %</b>
<b>Quizzes</b>	<b>1.0 %</b>
<b>Attendance</b>	<b>0.5 %</b>
<b>Test 1</b>	<b>18.0 %</b>
<b>Test 2</b>	<b>18.0 %</b>
<b>FINAL EXAMINATION (60%)</b>	
<b>Final Practical Exam</b>	<b>20%</b>
<b>Final Written Exam</b>	<b>40%</b>

## GRADING SCALE:

Excellent (A <sup>+</sup> )	95 - 100 %
Excellent (A)	90 - 94 %
Very good(B <sup>+</sup> )	85 - 89 %
Very good (B)	80 - 84 %
Good (C <sup>+</sup> )	75 - 79 %
Good (C)	70 - 74 %
High -Pass (D <sup>+</sup> )	65 - 69 %
Pass (D)	60 - 64 %
<b>Fail (F)</b>	<b>less than 60 %</b>
IP	IN-PROGRESS
IC	IN-COMPLETE
DN	DENILE
NP	NOGRADE- PASS
NF	NOGRADE - FAIL
W	WITHDRAWN

# DETAILED COURSE SCHEDULE

<u>WEEK</u>	<u>DATE</u>	<u>L.No</u>	<u>LECTURE TOPICS</u>	<u>READING ASSIGNMENT</u>
01	Sat: 28-Feb-2009 G	L1	Course description	
		L2	Introduction and overview to the immune system	
02	Sat: 07-Mar-2009 G	L3	Cells involved in the immune response	
		L4	Natural immunity and protective barriers	
03	Sat: 14-Mar-2009 G	L5	Acquired immunity and Clonal selection theory	
		L6	Lymphoid system and locations of immune cells activities	
04	Sat: 21-Mar-2009 G	L7	Immune cell surface receptors and their functions	
		L8	Cytokines network	
05	Sat: 28-Mar-2009 G	L9	T lymphocyte production and maturation	
		10	T-lymphocyte surface receptors	
☺ 06	Sat: 04-Apr-2009 G	11	B lymphocyte production and maturation	
		12	B-lymphocyte surface receptors	
07	Sat: 11-Apr-2009 G	13	Macrophage (monocytes) surface receptors	
		14	Natural killer cells and their cell surface receptors	
08	Sat: 18-Apr-2009 G	15	Neutrophil, Basophils, Eosinophils, & platelets surface receptors	
		16	Cellular adhesion molecules	
09	Sat: 25-Apr-2009 G	17	Major Histocompatibility (MHC)	
		18	Antigen and immunogens	
10	Sat: 02-May-2009 G	19	B-Lymphocyte Activation and Antibody Production	
		20	Immunoglobulin Structure	
☺ 11	Sat: 09-May-2009 G	21	Immunoglobulins Functions and their receptors	
		22	Immunoglobulin Diversities	
12	Sat: 16-May-2009 G	23	T lymphocyte and B cell cooperation	
		24	T lymphocyte and antigen presenting cells cooperation	
13	Sat: 23-May-2009 G	25	Monoclonal Antibodies	
		26	Simple serological techniques	
14	Sat: 30-May-2009 G	27	Complexed serological techniques	
		28	The complement system	
15	Sat: 06-Jun-2009 G	29	Complement functions and their receptors.	
		30	Regulation of the immune responses	
			FINAL WRITTEN EXAMINATION	

☺ ☺ Dates for Tests.

**Dr. MUSTAFA HASAN LINJAWI**  
**COURSE COORDINATOR**

# PRACTICAL SESSION SCHEDULE

<u>WEEK</u>	<u>DATE</u>	<u>PRACTICAL TOPICS</u>	<u>READING ASSIGNMENT</u>	<u>ASSIGNMENT DUE DATE</u>
1	Sat: 28-Feb-2009 G	Course description & safety in immunology and serology lab	HANDOUT	
2	Sat: 07-Mar-2009 G	Types of specimens, collections, serial dilutions	HANDOUT	
3	Sat: 14-Mar-2009 G	Immunofixation Electrophoresis for serum immunoglobulins	TEXTBOOK	
4	Sat: 21-Mar-2009 G	Agglutination reaction "Blood Grouping"	TEXTBOOK	
5	Sat: 28-Mar-2009 G	Immunoassay for Qualitative determination of Human Chorionic Gonadotropin (HCG)	HANDOUT	
6	Sat: 04-Apr-2009 G	Rapid Plasma Reagin (RPR)	TEXTBOOK	
7	Sat: 11-Apr-2009 G	Treponema Pallidum Haemagglutination Assay (TPHA)	HANDOUT	
8	Sat: 18-Apr-2009 G	Determination of serum IgM	HANDOUT	
9	Sat: 25-Apr-2009 G	Determination of serum IgA	HANDOUT	
10	Sat: 02-May-2009 G	Determination of serum IgG	HANDOUT	
11	Sat: 09-May-2009 G	Rheumatoid Factors (RF)	HANDOUT	
12	Sat: 16-May-2009 G	C-Reactive Protein (CRP)	HANDOUT	
13	Sat: 16-May-2009 G	Suspension Anti-Streptolysin O (ASL)	HANDOUT	
14	Sat: 30-May-2009 G	Stained Brucella	TEXTBOOK	
15	Sat: 06-Jun-2009 G	Complement Fixation Test	TEXTBOOK	
		FINAL PRACTICAL EXAMINATION		

**Dr. Mustafa Hasan Linjawi**  
Course Coordinator