

Course Specification

University: Al-Azhar University

Faculty: faculty of medicine

Department: Clinical and chemical pathology

1- Data of the course: 2013 - 2014

Code of the course: 07-501-cli path-med	Title of the course: Diploma degree Clinical and Chemical pathology	Year: 2 - 3 Level: high
Specialty: Clinical Pathology	Number of teaching units: 1. Basic Microbiology 2. Basic Parasitology 3. Internal medicine 4. Clinical Pathology: 1. Clinical Chemistry 2. Hematology 3. Immunology 4. Bacteriology	Lectures:754 h Practical/ Clinical: 1300 h

2- Objectives of the course:	The objectives for each course/module/rotation are specified in conjunction with teaching/training methods, requirements for achieving these objectives and assessment methods.
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3- ILOs

A- Knowledge and understanding:

1. Explain the essential facts and principles of relevant basic sciences including, basic microbiology and clinical parasitology related to clinical pathology.
2. Mention essential facts of clinically supportive sciences including basic microbiology and clinical parasitology related to clinical pathology.
3. Demonstrate sufficient knowledge of etiology, clinical picture, early diagnosis of common diseases and situations related to clinical pathology and prevention of related complication.
4. Give the recent and update developments in the pathogenesis, early diagnosis of common diseases and situations related to clinical pathology and prevention of related complication.
5. Mention the basic ethical and medico legal principles relevant to the clinical pathology.
6. Mention the basics of quality assurance to ensure good clinical care in the field of Clinical Pathology.
7. Mention the ethical and scientific principles of medical research.
8. State the impact of common health problems in the field of clinical pathology on the society.

<p>B- Intellectual Skills:</p> <ol style="list-style-type: none"> 1. Correlate the facts of relevant basic and clinically supportivesciences with clinical reasoning and diagnosis of common diseases of the clinical pathology. 2. Demonstrate an investigatory and analytic thinking approach(problem solving) to common clinical situations related toclinical pathology. 3. Design and present case report for common problem relatedto clinical pathology. 4. Formulate management plans (diagnosis and follow up oftreatment) and alternative decisions in different situations in the field of the clinical pathology. 	
<p>C- Professional Skills:</p> <ol style="list-style-type: none"> 1. Demonstrate respect, compassion, and integrity; aresponsiveness to the needs of patients and society 2. Demonstrate a commitment to ethical principles includingprovision or withholding of clinical care, confidentiality ofpatient information, informed consent, business practices 3. Demonstrate sensitivity and responsiveness to patients'culture, age, gender, and disabilities 	
<p>D- General Skills:</p> <ol style="list-style-type: none"> 1. Perform practice-based improvement activities using asystematic methodology (share in audits and use logbooks). 2. Appraises evidence from scientific studies. 3. Conduct epidemiological Studies and surveys. D. Perform data management including data entry and analysis. 4. Facilitate learning of students and other health careprofessionals. 5. Maintain a diagnostic and ethically sound 	

<p>relationship with patients.</p> <p>6. Elicit information using effective nonverbal, explanatory, questioning, and writing skills.</p> <p>7. Provide information using effective nonverbal, explanatory, questioning, and writing skills.</p> <p>8. Work effectively with others as a member of a health care team or other professional group.</p> <p>9. Work effectively in relevant health care delivery settings and systems.</p> <p>10. Practice cost-effective health care and resource allocation that does not compromise quality of care.</p> <p>11. Assist patients in dealing with system complexities.</p>	
<p>1. Course Content:</p> <p>2. Basic microbiology:</p> <p> 1. Major pathogenicity</p> <ul style="list-style-type: none"> -mechanisms -Microscopic examination -Processing of cultures -Laboratory Safety <p> 2. Basic Virology :</p> <ul style="list-style-type: none"> -Structure -Classification of medically important viruses -Laboratory diagnosis of viral infection <p> 3. Basic Mycology:</p> <ul style="list-style-type: none"> -Structure -Classification of medically important fungus -Laboratory diagnosis of fungal infection <p>4. Laboratory strategy:</p> <p>In diagnosis of bacterial infections.</p> <p>2. Basic Parasitology</p> <p>1. Describe detailed Principles of Clinical Parasitology: (Life cycle, pathogenesis and laboratory diagnosis of</p> <p>A-Helminthiasis :</p>	

- Class Trematoda
 - Liver Flukes
 - Intestinal Flukes
 - Blood Flukes
 - Lung Flukes
- Class Cestoda
 - Taenia
 - Echinococcus
 - Hymenolepis
 - Diphyllbothriumlatum
- Class Nematoda
 - Tissue
 - Intestinal
- B-Protozoa :
 - Entamoeba
 - Giardia
 - Trichomonas
 - Trypanosoma
 - Leishmania
 - Plasmodium
 - Toxoplasma
 - Cryptosporidium
 - Balantidium Coli

3. Internal medicine course

4. Clinical Pathology:

1. Clinical Chemistry:

- 1.General Laboratory principles.
 - General laboratory supplies (glassware, plastic ware and volumetric equipments).
 - Laboratory operation (centrifugation, weighing and laboratory water)
 - Calculations in clinical chemistry.
 - Specimen collection and handling
 - General laboratory techniques (spectrophotometry techniques, fluorometry, chemiluminescence, turbidmetry, nephelometry, electrophoresis, Osmometry, electrochemistry and Chromatography).
 - Principle of immunological techniques
 - Establishment and use of reference values.

- General laboratory safety measures.
- Basic statistical techniques.
- 2. Analytic procedures
 - Carbohydrates
 - Lipids, lipoproteins and apolipoproteins
 - Proteins and amino acids
 - Water, electrolytes, blood gases and PH.
 - Non protein nitrogenous compounds.
 - Bone minerals
 - Vitamins and Trace elements.
 - Clinical enzymology
 - Nucleic acid
 - Hem – related products (iron, bilirubin and porphyrins)
 - Hormones.
 - Tumor markers
- 3. Assessment of organ system functions
 - Liver functions
 - Renal functions
 - Cardiac functions
 - Pancreatic functions
 - Gastrointestinal functions
 - Endocrinal disorders
 - Gonadal functions
 - Disorders of water and electrolytes and acid base balance.
 - Disorders of porphyrin metabolism
 - Clinical chemistry of pregnancy
 - Laboratory medicine in pediatrics and geriatrics
 - Clinical toxicology, therapeutic drug monitoring and drug abuse.
- 4. Molecular diagnostics
 - Basics of molecular biology.
 - Types of DNA, modes of inheritance and genetic abnormalities.
 - Methods of DNA separation & amplification
 - methods of detecting DNA abnormalities
 - Amplification methods for detecting DNA abnormalities
- 5. Quality management in clinical chemistry lab
 - Framework of Quality management in a health care laboratory.
 - Elements of quality assurance program.
 - Control of preanalytical and analytical variables.

- Control of analytical quality.
- Role of external quality assessment and proficiency testing programs.

6. Specialty areas of clinical chemistry:

- a. Nutritional assessment
- b. Clinical chemistry of pregnancy.
- c. Inborn error of metabolism.
- d. Body fluids analysis
- e. Laboratory medicine in pediatrics & geriatrics
- f. Clinical toxicology, therapeutic drug monitoring and drug abuse.

2. Hematology:

1. Normal hematologic system

- Haematopoiesis
- Origin and development of blood cell.
- Hematopoietic organs.
- Hematopoietic stem cells.
- Mechanisms of action of haematopoietic growth factors.
- Erythrocyte:
- Erythropoiesis.
- Biosynthesis of Hemoglobin.
- Regulation & control of erythropoiesis.
- Structural features of RBCs.
- Red cell membrane.
- Haemoglobin & erythrocyte function.
- Erythrocyte metabolism & enzymes.
- Granulocytes:
- Neutrophils:
- Neutrophils function.
- Structure & morphology.
- Eosinophils
- Differentiation & mediators.
- Structure & morphology.
- Basophils & mast cell:
- Function.
- Structure & morphology.
- Mononuclear phagocyte
- Mononuclear phagocyte production & kinetics
- Lymphocyte:
- Types.

- Morphology
- Lymphoid organs
- Megakaryocyte:
- megakaryopoiesis
- platelet structure & function

2 :Disorders of red cells

- Aplastic anaemia
- Pure red cell aplasia
- Anaemia of chronic renal failure
- Anaemia of indocrine disorder
- Congenital diserythropoietianaemia
- Paroxysmal nocturnal haemoglobinuria
- Folate,cobalamin and megaloblasticaemia
- Disorders of iron metabolism
- Anaemia of chronic disease
- Disorder of red blood cell membrane
- Disorder of red blood cell enzymes
- Disorder of globin synthesis and thalassemia
- Disorder of haemoglobin structure and sickle cell anaemia
- Methaemoglobinuria
- Haemolyticaemia
- Hypersplenism and hyposplenism
- Sideroblasticaemia

3 : Non malignant disorders of leukocytes and the spleen:

- Neutropenia
- Neutrophilia
- Chediachigashi syndrome
- Chronic granulomatous disease
- Eosinophilia and eosinopenia
- Hypereosinophilic syndrome
- Basophilia
- Monocytopenia and monocytosis
- Lipid storage disease
- Langerhans cell histiocytosis
- Haemophagocytosis syndrome
- Lymphocytosis and lymphocytopenia
- Immunodeficiency disorder

4 :Hematologic malignancies

-Myeloproliferative Disorders:

- Chronic myelogenous leukemia.
- Chronic neutrophilic leukemia.
- Polythycemia vera.

- Primary myelofibrosis.
- Essential thrombocythaemia.
- Chronic eosinophilic leukemia.
- Mastocytosis.
- Myeloproliferative neoplasms unclassifiable.

-Myelodysplastic/myeloproliferative neoplasms

-Myelodysplastic syndromes

-Acute myeloid leukemia & related precursor neoplasms

- Acute myeloid leukemia with recurrent genetic abnormalities
- Acute myeloid leukemia with myelodysplasia – related changes & therapy – related myeloid neoplasms
- Acute myeloid leukemia not otherwise specified
- Myeloid sarcoma
- Myeloid proliferation related to Down syndrome
- Blasticplasmacytoid dendritic cell
- Acute myeloid leukemia of ambiguous lineage neoplasm

-Lymphoid neoplasms:

- Non Hodgkin lymphoma
- Hodgkin lymphoma
- Precursor lymphoid neoplasms
- Mature B-cell neoplasm
- Mature B-cell neoplasm with leukemic manifestation
- Mature B-cell neoplasm with plasma cell or plasmacytoid differentiation
- Mature B-cell neoplasm with primary tissue manifestation
- Mature T-cell & natural killer cell neoplasm

5:Disorders of hemostasis

1.Disorders of platelet number

- Thrombocytopenia
- Decreased production
- Increased destruction
- Thrombocytosis
- Thrombocytosis resulting from myeloproliferative disorders

Secondary thrombocytosis

2.disorders of platelet function

-Congenital disorders
-Disorders of membrane receptors
Bernard soulier syndrome
-Glanzmannthrombathsenia
-Disorders of platelet secretion
-Abnormalities of platelet granules
-Abnormalities of prostaglandin pathway
-Acquired disorders
3.coagulation physiology and hemorrhagic disorder
-coagulation physiology
-congenital hemorrhagic disorders
-acquired hemorrhagic disorders
4. coagulation regulation and hypercoagulable states
-control mechanisms in coagulation
-thrombotic disorders
-thrombohemorrhagic disorders
6:Blood banking &Transfusion medicine
1. Introduction
Brief history of blood transfusion
The role of physician in blood centre
2. Donor testing
Pretransfusion testing
Antibodies identification
Antiglobulin tests
3. Blood groups
ABO & H blood group systems
Rh blood group systems
Kell& Kidd blood group systems
MNS & Duffy blood group systems
Lewis, I & P blood group systems
4. Blood products
5.Transfusion reactions
7:Laboratory haematology
1. Erythrocyte studies
-Polychrome staining
-Hiens body staining
-Reticulocyte enumeration
-Peripheral blood smear examination
-Haemoglobin electrophoresis
-Sickling test and solubility
-Osmotic fragility test
-Manual count of RBCs

-ESR

2. leucocyte study

-Cytochemistry

-Immunophenotyping

-Manual count of WBCs

3. hemostasis studies

-Partial thromboplastine time

-Prothrombin time

-Bleeding time

-Thrombin time

-Fibrinogen degradation products estimation

-Clotting factors assay

-Platelet aggregation

8: Genetics

-Introduction

-Genetic and gene structure

-Cytogenetic analysis

-Karyotyping

-Molecular cytogenetics

-FISH

-Spectral karyotyping

-Cell cycle regulation

3. Immunology

1. Introduction to immunity and the nonspecific immune system:

Define and classified immunity

Factors affecting immunity

Phagocytosis

Humoral factors

Lymphocytic cells

2. Antigen and immunogenicity

Immune response

Immunogenicity

Molecular differences in epitope structure

3. Immunoglobulin

Define immunoglobulins

General immunoglobulin structure

Structure and function of specific

Immunoglobulin

Antibody diversity

Describe plasma cell dyscrasias

4. The complement system

Define complement
Pathways of complement activation
The membrane attack pathway
Biologic consequence of complement activation
Regulatory mechanisms

5. The immune response system

Exposure to an antigenic substance
Lymphoid system
Cells involved in the immune response
Events in the induction of the immune response
Intracellular events occurring during cell maturation
Phases of the humoral immune response

6. Immune regulation

Immune regulation
Immunosuppression
Tolerance
Imunopotentialiation

7. Immunization

Active immunization
Passive immunization
Experimental immunization procedures
Adverse reactions to vaccines

8. Laboratory methods

In vitro antigen antibody reactions
Procedures involving direct demonstration and Observation of reaction
Complex serologic procedures
Assay of immune competence
Identification of specific allergens immediate
Hypersensitivity reactions
Detection of immune complexes
Production and use of monoclonal antibodies

9. Immunologic mechanism of tissue damage

Immediate hypersensitivity reaction
Cytotoxic reaction
Immune complex mediated reactions
Cell mediated reactions and cell mediated
Cytotoxicity reaction

10. Autoimmune diseases

General considerations of autoimmune diseases
Representative autoimmune diseases

11. Immunodeficiency disorders.

Definition and types of immunodeficiency disorder
Phagocytic cell defects
B cell deficiency disorder
T cell deficiency disorder
Combined B cell and T cell deficiency disorder
Secondary immunodeficiency conditions
Complement deficiencies

12. Transplantation genetics and immunology

Describe transplantation
Histocompatibility gene complex
Clinical transplantation immunology

13. Tumor immunology

Describe neoplasms
Tumor associated antigens
Immune response to tumor antigen
Immunologic factors favoring tumor growth
Immunotherapy

14. Immune response to Infection

Bacterial infection
Parasitic infection
Viral infection

4. Bacteriology

1- General microbiology

Microscope
Media
Sterilization
Bacterial growth curve
Epidemiological markers
Bacterial variations

2 - Systemic microbiology

Mycobacteria
Spirochetes
Legionella , mycoblasma , actinomycetes
Intracellular bacteria :
- Chlamedia
- Rickettsia
- Bartonella
Bacteremia and sepsis , pneumonia , meningitis
Infections of female genital tract
Urinary tract infection
Gastroenteritis and food poisoning

<p>Anaerobic infections Sexually transmitted dis Ear , nose , throat & eye infections Skin and soft tissue infections Non fermentative gram negative bacilli</p> <p>3 - Systemic virology</p> <p>General virology Diagnosis of viral infections DNA viruses :</p> <ul style="list-style-type: none"> - Herpes viruses - Papo viruses - Adenovruses - Pox viruses - Parvo viruses <p>RNA viruses :</p> <ul style="list-style-type: none"> - Pico viruses - Arbo viruses - Rubella viruses - Orthomyxo and paramyxo viruses <p>Hepatitis viruses</p> <p>4 – Mycology</p> <p>General mycology Diagnosis of fungal infections</p>	
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<p>1. Methods of teaching:</p>	<p>lectures, seminars, tutorial, Written assignments, Oral assignments, Observation andsupervision</p>
<p>2. Methods of teaching of handicaps</p>	<p>Non</p>

5. Students evaluation and assessment:

A- Method of assessment:	Standardized oral Examination, Written Examination, Practical Examination																				
B- Time of assessment	At the end of first part At the end of second part																				
C- Allocated marks/Distribution	<table border="1"> <thead> <tr> <th></th> <th><i>Written</i></th> <th><i>Oral</i></th> <th><i>Practical</i></th> </tr> </thead> <tbody> <tr> <td>1. Clinical Chemistry</td> <td>25</td> <td>25</td> <td>25</td> </tr> <tr> <td>2. Hematology</td> <td>25</td> <td>25</td> <td>25</td> </tr> <tr> <td>3. Immunology</td> <td>25</td> <td>25</td> <td>25</td> </tr> <tr> <td>4. Bacteriology</td> <td>25</td> <td>25</td> <td>25</td> </tr> </tbody> </table>		<i>Written</i>	<i>Oral</i>	<i>Practical</i>	1. Clinical Chemistry	25	25	25	2. Hematology	25	25	25	3. Immunology	25	25	25	4. Bacteriology	25	25	25
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6. Teaching books, notebooks, and references:

<ul style="list-style-type: none"> - Books/Notebooks: - References: 	<ul style="list-style-type: none"> - Lectures notes Staff members print out of lectures and/or CD copie - Essential books <ol style="list-style-type: none"> 1- Tietz textbook of clinical chemistry and molecular diagnostics,the seventh edition. 2- Tietz Fundamentals of clinical chemistry.Edition...seventh 3-- Postgraduate Haematology. 4- Atlas of hematology 5- Practical hematology " Dacie and Lewis 6-- Basic immunology 7- Basic and clinical immunology 8- Jawetz medical microbiology - Recommended books <ol style="list-style-type: none"> 1- Clinical chemistry (Bishop). 2- Zilva Clinical chemistry and metabolic medicine.
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	<p>3- Marshall Clinical chemistry. 4- Wintrobe,s clinical hematology. 5- Williams Hematology 6- Medical immunology 7- Diagnostic Microbiology (Koneman - Periodicals,Web sites, ... etc</p> <ul style="list-style-type: none"> · Journal of Clinical Chemistry · Molecular and cellular endocrinology · Atherosclerosis · American journal of hematology · Journal of hematology oncology · Journal of thrombosis and hemostasis · Blood · Hematologica · Egyptian journal of immunology · The journal of immunology · Journal of clinical immunology · Journal of Clinical Microbiology · Clinical Microbiology reviews · Journal of Bacteriology
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Course Coordinator:

Prof.Dr. WaelRefatHablasProfessor and head of clinical pathology departments,
Prof.Dr / NaglaaAboelazayem, Prof. Dr. Mohamad said Alshorbagy, Prof. Dr. MamdouhAtia,
Ass.Professor.Dr.SalamaSaadAbd Al Latif,Dr.Abdelmaaboud Mahmoud