

Introduction to Anatomy and General Embryology

(4) Credit Hours

0502109

(3 hrs) 2 lecture + 1 practical

1 (general embryology)

This course covers: introduction in gross anatomy to all parts of the body (upper limb & lower limb, thorax, abdomen, head & neck, and neuroanatomy) including terms, region, muscles, blood vessels, and nerves also introduction in the nervous system. This course also covers the general embryology including the development of embryo from the zygote also the fetal membranes, placenta and congenital malformations.

I. General Embryology:

A. Contents:

Gametogenesis-ovulation-implantation
Bilaminar germ disc – trilaminar germ disc
Foetal period – congenital malformations
Foetal membranes and placenta

B. Objectives:

- Describe how sperm cells are produced
- Explain the roles of hormones in regulating male reproductive functions
- Describe how oocytes are produced
- Define the ovarian and menstrual cycles and explain how they are related to the female reproductive hormones
- Discuss the formation of the primary germ layers and the extraembryonic membranes during the embryonic period
- List representative body structures produced by the primary germ layers
- Describe the formation of the placenta and umbilical cord

C. References:

- Langmans Medical embryology, Sadler, 8th edition
- Before we are Born essentials of embryology and birth defects, Moore persaud, 6th edition

II. Gross Anatomy:

A. Contents:

- anatomical position and anatomical terms
- human skeleton (general features)
- muscular system (muscle-nerve relation, brachial plexus, origin and insertion of selected muscles of the upper and lower limbs)
- cardiovascular system (brief account on the heart and major vessels)
- respiratory system (pleural cavity, mediastinum, lungs)
- gastrointestinal tract (general survey of its components peritoneal cavity, liver & biliary passages)
- reproductive system (general survey of its components)
- renal system (general survey of its components) kidneys.
- nervous system (survey of its components)

B. Objectives:

- describe the anatomical position
- describe the general features of the different bones forming the skeleton using the anatomical terms
- describe the basic structure of a spinal nerve and discuss nerve-muscle relationship describe the origin and insertion of selected muscles of the upper and lower limbs and discuss the types of contraction (isotonic & isometric)
- describe the basic structure of brachial plexus
- describe the major anatomical features of the human heart and briefly discuss the cardiac cycle
- name the major blood vessels & discuss sites of feeling pulsations
- describe the basic structure of the pleural cavity & mediastinum. Discuss the anatomy of the lungs
- describe the different parts of the gut and discuss the basic structure of the peritoneal cavity
- describe the anatomy of the liver and discuss the components of the biliary passages
- describe the different components of the male and female reproductive systems
- describe the different components of the renal system with special reference to the kidneys
- describe the different parts of the brain and spinal cord
- Nomenclature of the cranial nerves

32 Lecture	No. Lect.	16 Practical	No. Prac.
<p style="text-align: center;">Upper Limb</p> <ul style="list-style-type: none"> - Introduction & terms - Region - Muscles - Blood vessels - Nerves 	5	<p style="text-align: center;">Upper Limb</p> <ul style="list-style-type: none"> - Bones of the U.L - Bones of the U.L - Practical on the Cadaver 	3
<p style="text-align: center;">Lower Limb</p> <ul style="list-style-type: none"> - Region - Muscles - Blood vessels - Nerves 	4	<p style="text-align: center;">Upper Limb</p> <ul style="list-style-type: none"> - Bones of the U.L - Bones of the U.L - Practical on the Cadaver 	3
<p style="text-align: center;">Thorax</p> <ul style="list-style-type: none"> - Thoracic wall - Mediastinum - Heart - Blood Vessels - Respiratory organs 	5	<p style="text-align: center;">Thoracic Cage</p> <ul style="list-style-type: none"> - Thoracic cage & Bones - Thoracic wall - Thoracic organs - Blood Vessels 	3
<p style="text-align: center;">Abdomen Wall</p> <ul style="list-style-type: none"> - Muscles - Peritoneum - Abdomen viscera & organs - Blood vessels - Nerve 	5	<p style="text-align: center;">Abdominal Wall & Bones</p> <ul style="list-style-type: none"> - Abdominal viscera - Abdominal viscera 	3
<p style="text-align: center;">Head & Neck</p> <ul style="list-style-type: none"> - Scalp & face - Muscles – face, neck - Blood vessels - Cranial - Lymph nodes - Nervous system 	8	<p style="text-align: center;">Head & Neck</p> <ul style="list-style-type: none"> - Bones (skull & mandible) & cervical vertebra - Muscles - Blood vessels - Sinuses & meninges 	4
<p style="text-align: center;">C.N.S</p> <p style="text-align: center;">P.N.S</p> <p style="text-align: center;">Aut. N.S</p>	4		

السنة الأولى – الفصل الصيفي
مقدمة في الكيمياء الحيوية

Introduction to Biochemistry (2 credit Hours)

Medical students

1st year / Summer course

(0501112)

This course aims at introducing first year medical students to the basic chemical & biological foundations of biochemistry before studying metabolism & disorders in the second year. Topics in this introduction include water, acids, bases, pH & buffers. Structure and properties of the major biomolecules such as carbohydrates, lipids & proteins; Characterization, purification & determination of protein structure; Structure-function relationship of selected protein; Enzymes kinetics, mechanism of action & control; Clinical application of enzymes & isoenzymes.

Topics	No. of Lec.
Lectures & small group discussions	
Relationship of organic chemistry to biochemistry	1
Water structure, properties, polarity, & ionization	2
Acid bases & buffers	3
Carbohydrates: classification, structure, properties	4,5,6
Lipids: major classes, structure & functions	7,8,9
Amino acids: structure classification ionic properties of amino acids	9,10
Peptides	11
Protein: structure purification & characterization	12,13,14
Structure function	15,16,17
Enzymes: general properties classification & nomenclature of enzymes kinetics, inhibition, regulation, mechanisms, clinical enzymology	18,19,20 21,22,23
Relationship between cell biology & biochemistry	23,24
Cell signaling & chemical messengers	25,26,27

1. Water, acids, bases & buffers
covalent & non-covalent interactions in biomolecules.
2. the major classes of biomolecules:
 - I Carbohydrates & complex carbohydrate.
 - II Lipids & membrane structure
 - III Amino – acids in proteins.
3. Protein structure & function
 - I Structure of proteins, globular proteins, fibrous proteins, physical properties of protein.
 - II Enzymatic reactions**
Thermodynamics, enzyme kinetics, reactions types & mechanism, clinical enzymology.
 - III Oxygen transporters:**
Hemoglobin & myoglobin

السنة الأولى – الفصل الصيفي
مقدمة إلى علم وظائف الأعضاء
Introduction to Physiology
(0501110)

Introduction to physiology is a two credit hours course that covers the definition of physiology and the systems involved. It includes the study of basic principles of physiology that involve subjects like, physiological units, biological membranes, transport, homeostasis, body fluids, membrane potentials, hemodynamics and laws of blood flow.

Introduction to Physiology: Topics

1. Introduction to Physiology: General outline of physiology
2. Unites
 - A. Mole
 - B. Osmole
 - C. Equivalent
 - D. Osmolarity, Osmolality, isotonic, hypotonic, hypertonic etc.
3. Concepts of feedback mechanism (negative and positive feedback)
- 4- Homeostasis
 - A. Composition of ECF.
 - B. Composition of ICF.
5. Body Water
 - A. Distribution.
 - B. Osmosis
 - C. Measurements.
6. Cell Membrane Structure
7. Transport (Passive)
 - A. Simple Diffusion (criteria, factors determine diffusion)
 - B. Facilitated Diffusion.
8. Transport (Active)
 - A. Primary Active.
 - B. Secondary Active: Co-and countert-transport
9. Phagocytosis and Pinocytosis
10. Excitable membranes
Resting Membrane potential: origin and determinants.
11. Electrochemical Equilibrium (Nernst equation).
12. Goldman-Hodgkin-Katz Equation
13. Action Potential
Determinants and propagation
14. Special Types of AP: (Slow Response AP) and the Pacemaker concept
15. Cardiac Action Potential (Fast Response AP)
16. Latent and ectopic pacemakers.
17. All or none versus graded AP
18. Basic neuronal circuits:
19. Synapses: types, transmission of AP, neurotransmitters, facilitation, inhibition, summation, electrical events, processing, fatigue...etc.
20. Excitatory postsynaptic potential
21. Inhibitory postsynaptic potential
22. Receptors: types and adaptation
23. Neurons: types, classification

- 24. Signal Transduction (Regulation of cellular machinery)
 - Extracellular regulators: nervous, endocrine, paracrine and autocrine.
 - Receptors: membrane or intracellular
 - Ion channels
 - G-protein
 - Enzyme linked
 - Intracellular
 - Second messengers
 - cAMP and cGMP
 - Phospholipid
 - Calcium calmodulin
 - IRS
- 25. Steroids: Their Signal Transduction And Mechanism Of Action
- 26. Autonomic Nervous System (I)
 - Organization: Sympathetic and Parasympathetic
- 27. Autonomic Nervous System (II)
 - Neurotransmitters, types, synthesis, location (preganglionic, postganglionic)
 - Receptors: types and location.
 - Adrenal medulla
- 28. Microcirculation
 - Capillary structure; fluid filtration (forces) & reabsorption;
- 29. Starling law of capillary exchange
- 30. Lymphatic system
- 31. Interrelationship Among Pressure, Flow And Resistance.
 - Poiseuille's Law.
 - Types of flow laminar versus turbulent.

السنة الأولى – الفصل الصيفي
مادة علم الأنسجة العام
General Histology
(2) Credit Hours
0502111
السنة الثانية – الفصل الأول

- (2) Credit hours: (1) Credit hour theoretical knowledge (16 lectures)
(1) Credit hour practical skills (16 practical sessions)

This course covers, how to use the microscope, the microscopic structure of the cell, cell division and the basic tissue of the human body including, epithelial tissue, connective tissue, muscular and nervous tissue.

16 Lectures	No. Lecture	No. Practical
- Introduction	1	1
- Microscopic Tech.		
- Cell	3	3
- Epithelium	3	3
- Connective Tissue	3	3
- Cartilage	1	1
- Bone	1	1
- Blood	1	1
- Muscle	1	1
- Nervous Tissue	2	2

Objectives:

- Name and describe the main parts of the cell
- Describe the structure and functions of the plasma membrane, cytoplasm, cytosol, organelles and the nucleus
- Outline the sequence of events involved in protein synthesis
- Discuss the stages, events and significance of somatic cell division
- Describe the characteristics of the four basic types of tissue that make up the human body
- Discuss the general features of epithelial tissue and the structure, location and function of the various types of epithelia
- Describe the general features of connective tissue and the structure, location and function the various types of connective tissues
- Describe the general features of muscle tissue and contrast the structure location and mode of control of the three types of muscle tissue
- Describe the structural features and function of nervous tissue.

Textbooks:

- 1- Color textbook of Histology
Leslie Qartner and James Hiatt 3rd edition 2001
- 2- Basic Histology Junqueira et al 9th edition, publisher Appleton & lange

السنة الثانية – الفصل الأول

الكيمياء الحيوية

Biochemistry

(0501213)

(3 Credit Hours)

The aim of this course is to present the biochemical events at the molecular & cellular level. Major topics include: Nucleic acids & gene structure. Bioenergetics, citric acid cycle and oxidative phosphorylation; metabolism of carbohydrate, lipids, amino acids & nucleotides & their regulation; vitamins, minerals & biochemical basis of nutrition. Through out the course, aspects of human biochemistry are presented in the context of their function. This is followed by descriptions of how these functions are disrupted in the presence of disease at the biochemical level.

No.	Topic	No. of Lectures
1.	Plasma proteins	2
2.	Immunoglobulins: types, function & structure	2
3.	Bioenergetics	2
4.	Oxidative phosphorylation	3
5.	Introduction to metabolism, digestion & absorption of carbohydrate & general regulation of metabolism	2
6.	Glycolysis	2
7.	Tricarboxylic acid cycle	2
8.	gluconeogenesis	1
9.	Glycogen metabolism	2
10.	Metabolism, of monosaccharides & disaccharides	1
11.	Pentose phosphate pathway, ROS & anti-oxidants	2
12.	Glycosaminoglycans & glycoproteins	1
13.	Lipid metabolism	9
14.	Nitrogen metabolism: -Amino acids: disposal of nitrogen -Amino acid degradation & synthesis -Conversion of amino acids to specialized products. -Nucleotide metabolism.	7
15.	nutrition	1
16.	vitamins	2

References:

Main: Lippincott's 3rd edition

Supplement: 1. Lippincott's Illustrated Review: Biochemistry
2. Harper's illustrated biochemistry 27th edition
3. Basic medical biochemistry (smith, marks & marks)

UNIVERSITY OF JORDAN
FACULTY OF MEDICINE
DEPARTMENT OF PATHOLOGY, MICROBIOLOGY & FORENSIC MEDICINE
INTRODUCTION TO MICROBIOLOGY
COURSE NO. (504204), (3) CREDIT HOURS

Instructors :

- Prof. Dr. Asem Shehabi
- Prof. Dr. Azmi Mahafzah
- Dr. Hassan Abu Al-Ragheb

Objectives :

By the end of this course the students should be able to:-

1. Mention types of microorganisms, their classification and structure.
2. Describe the pathogenesis and manifestations of diseases caused by microorganisms.
3. Describe methods of diagnosis of infections including; specimen selection, handling and processing.
4. List major classes of antimicrobial agents, describe their mechanisms of action and mention the commonly used individual antimicrobials & development of antimicrobial resistance

Introduction and Classification

- **Bacteriology -20 hours:**
 - Cell Structure and classification of bacteria
 - Growth and death of bacteria
 - Bacterial genetics
 - Control of microorganisms by sterilization and disinfection
 - Antimicrobial Agents
 - Gram- Positive Cocci (Staphylococci ,Streptococci, Enterococci)
 - Gram- Positive Bacilli (Bacillus, Corynebacteria)
 - Gram–Negative Cocci (Neisseria, Moraxella) & Gram–Negative cocobacilli (Haemophilus, Bordetella)
 - Gram–Negative Bacilli – Enteric Bacteria (E.coli, other coliform, Salmonella spp. , Shigella spp.).
 - Gram–Negative Bacilli -Nonfermenting Organisms (Pseudomonas spp., Acinetobacter spp. Aeromonas spp., Vibrio cholerae)
 - Gram- Positive Spore forming anaerobes bacilli (Clostridia)
 - Anaerobic Gram-negative bacilli (Bacteriodes & others)
 - Mycobacteria, Spirochetes, Chlamydia, Mycoplasma, Legionella & Rickettsiae

Fungi-2 hours:

- **General Characteristics**
- **Classification**
 - Agents of superficial Infections
 - Agents of subcutaneous Infections
 - Agents of systemic Infections
 - Opportunistic fungi

Parasitology-4 hours:

- **Introduction and Classification**
- **Protozoa**
 - Ameba
 - Flagellates
 - Sporozoa
 - Ciliates
- **Helminthes** (general features and life cycles).
 - Nematodes-intestinal
 - Tissue
 - Cestodes
 - Trematodes
- **Arthropods**

Virology-20 hours:

- General characteristics and classification
- Viral Replication
- Viral genetics cultivation of viruses and their laboratory diagnosis
- Antiviral agents
- Pathogenesis of viral infections
- Immunity to viral infections

DNA Viruses:

- Parvoviruses
- Papovaviruses
- Adenoviruses
- Herpesviruses
- Poxviruses
- Hepadnaviruses

RNA Viruses:

- Picornaviruses
- Orthomyxoviruses
- Paramyxoviruses
- Coronaviruses
- Rubellavirus
- Rhabdoviruses
- Reoviruses
- Retroviruses

- Hepatitis C virus
- Hepatitis E virus

Others :

- Arthropod-borne viruses
- Slow viruses
- Oncogenic viruses

Recommended Textbooks

1. Medical Microbiology
Jawetz, Melnick and Adelberg's, 24th Edition
2. Medical Microbiology
David Greenwood and et al.
Churchill Livingstone, England, 18th Edition

UNIVERSITY OF JORDAN
FACULTY OF MEDICINE
DEPARTMENT OF PATHOLOGY, MICROBIOLOGY &
FORENSIC MEDICINE
OUTLINE OF INTRODUCTION TO PATHOLOGY
FOR SECOND YEAR MEDICAL STUDENTS
No. (0504205), (2) CREDIT HOURS

Instructors

Dr. Maha Shomaf -

DEFINITIONS

CAUSES OF CELL INJURY

MECHANISMS OF CELL INJURY

Ischemic and hypoxic injury

Free radical mediation of cell injury

Chemical injury

FORMS AND MORPHOLOGY OF CELL INJURY

Patterns of acute cell injury

Reversible injury

Necrosis

Apoptosis

Subcellular Responses o injury

Intracellular accumulations

Pathologic calcification

CELLULAR ADAPTATIONS OF GROWTH AND DIFFERENTIATION

Atrophy

Hypertrophy

Hyperplasia

Metaplasia

CELLULAR AGING

ACUTE AND CHRONIC INFLAMMATION

ACUTE INFLAMMATION

Vascular changes

Changes in vascular flow and caliber

Increased vascular permeability (Vascular leakage)

Leukocyte Cellular Events

Margination and rolling

Adhesion and transmigration

Chemotaxis and activation

Phagocytosis and degranulation

Leukocyte-induced tissue injury

Defects in leukocyte function

Summary of the acute inflammation response

Chemical mediators of inflammation

Vasoactive amines
Plasma protease
Arachidonic acid metabolites
Prostaglandin's and leukotrienes
Platelet- Activating factor, cytokines
Nitric oxide and oxygen- derived free radicals
Lysosomal constituents

Summary of the chemical mediators of acute inflammation

Outcomes of acute inflammation

ROLE OF LYMPHATICS AND LYMPH NODES IN INFLAMMATION

MORPHOLOGIC PATTERNS IN ACUTE AND CHRONIC

INFLAMMATION

SYSTEMIC EFFECTS OF INFLAMMATION

REPAIR: CELL REGENERATION, FIBROSIS, AND WOUND HEALING

REGENERATION

Control of cell growth and differentiation at sites of injury

Cell cycle and the proliferative Potential of different cell types

Molecular events in cell growth

Growth inhibition

Growth factors

Extracellular matrix and cell-matrix

Interactions

REPAIR BY CONNECTIVE TISSUE

Angiogenesis

Fibrosis (Fibroplasia)

Scar Remodeling

WOUND HEALING

Healing by first intention

Healing by second intention

Wound strength

PATHOLOGIC ASPECTS OF REPAIR

OVERVIEW OF THE INFLAMMATORY-REPARATIVE RESPONSE

NEOPLASIA

DEFINITIONS

NOMENCLATURE

CHARACTERISTICS OF BENIGN AND MALIGNANT NEOPLASMA

Differentiation and anaplasia

Rate of growth

Local invasion

Metastasis

EPIDEMIOLOGY

Cancer incidence

Geographic and environmental factors

Age
Hereditiy
Acquired preneoplastic disorders

CARCINOGENESIS: THE MOLECULAR BASIS OF CANCER

Oncogenes and cancer

Protein products of Oncogenes
Activation of Oncogenes
Cancer suppressor genes
Protein products of tumor suppressor
Genes
Genes that regulate Apoptosis
DNA repair genes
Molecular basis of multistep
Carcinogenesis
Karyotypic changes in tumors

BIOLOGY OF TUMOR GROWTH

Kinetics of tumor cell growth
Tumor angiogenesis
Tumor progression and heterogeneity
Mechanisms of local and distant spread
Invasion of extracellular matrix
Vascular dissemination and homing of tumor cell
Molecular genetics of metastases

ETIOLOGY OF CANCER: CARCINOGENIC AGENTS

Chemical carcinogens
Direct- acting agents
Indirect- acting agents
Mechanisms of action of chemical
Carcinogens
Radiation Carcinogenesis
Viral oncogenesis
RNA oncogenic viruses
DNA oncogenic viruses

CLINICAL FEATURES OF NEOPLASIA

Effects of tumor on host
Cancer cachexia
Paraneoplastic syndromes
Grading and staging of cancer
Laboratory diagnosis of cancer
Morphologic and molecular methods
Biochemical assays

GENERAL PATHOLOGY OF INFECTIOUS DISEASES

CATEGORIES OF INFECTION AND HOW THEY BREAK DOWN

Skin
Urogenital tract
Respiratory tract

Intestinal tract

Spread of microbes throughout the body

Release of microbes from the body

HOW INFECTIOUS AGENTS CAUSE DISEASE

Mechanisms of Virus- induced injury

Mechanisms of bacteria- induced injury

Bacterial adhesions and toxins

IMMUNE EVASION BY MICROBES

SPECIAL TECHNIQUES FOR DIAGNOSIS OF INFECTIOUS AGENTS

INFLAMMATORY RESPONSE TO INFECTIOUS AGENTS

Recommended textbook:

Kumar, Cotran and Robbins

Basic pathology

Saunders

السنة الثانية – الفصل الأول
مقدمة في علم الأدوية

Introduction to Pharmacology

(503201)

2 credit Hours

This course is divided to three units as the following:

- I- Fundamentals of Pharmacology
- II- Autonomic Nervous System
- III- Chemotherapy

The course is given in 17 weeks, 2 one-hour lectures are given in each week.

I.a. The learning objectives of the first Unit:

By the end of this unit, the student should be able to:

1. Mention the different names and sources of drugs
2. Describe the different pharmaceutical preparations and methods of drug administration.
3. Describe pharmacokinetic of drugs including absorption, distribution, biotransformation (metabolism) and excretion .
4. Mention drug pharmacodynamics, in terms of structure activity relationship and the action of drugs through different human body targets such as ion channels, receptors, enzymes, macromolecules, carriers. etc.....
5. Explain the effects of pharmacokinetics on pharmacodynamics .
6. Discuss general strategies for maximizing the therapeutic effects of drugs.
7. Describe how interactions between drugs and foods could be minimized.
8. List the most serious adverse effects of drugs .
9. Write and read an ideal drug prescription

I.b. The Unit Contents:

This unit will describe fundamental topics in pharmacology like:

1. Mechanisms of drug action
2. Drug absorption and distribution
3. Metabolism and excretion of drugs
4. Pharmacokinetics
5. Drug metabolism and disposition in pediatric and gerontological stages of life
6. Drug toxicity and adverse effect
7. Drug-drug interactions
8. Drug legislations
9. Pharmacology of drugs in:-
 - Newborns
 - Pregnancy
 - Elderly
10. Prescription of drugs
11. Drug information

II. Autonomic Nervous System Unit:

II.a. The Learning objectives of this unit:

By the end of this unit, the student should be able to:

1. Differentiate the types of receptors in the autonomic nervous system.
2. Describe the effects of various drugs on the autonomic nervous system.
3. Correlate the effects of these drugs with their clinical applications and toxicity.

II.b. The unit contents:

1. General framework for the autonomic nervous system and receptors.
2. Action of agonists and antagonist drugs on the sympathetic system.
3. Action of agonists and antagonists, i.e. drugs on the parasympathetic system.
4. Action of drugs on the ganglia.

III. The Chemotherapy Unit:

III.a. The learning objectives of this unit:

By the end of this unit, the student should be able to:

1. Describe the actions of drugs on bacteria, viruses, fungi, and parasites.
2. Describe the primary therapeutic uses for the major chemotherapeutic classes .
3. Mention core antibacterial agents, antiviral agents, anti-fungal agents and anti-parasites agents, identify their doses, indications and side effects .

III.b. The unit contents:

1. Introduction to chemotherapy
2. Synthetic organic antimicrobials: Sulfonamides, Trimethoprim, Nitrofurans, Quinolones, Methenamine
3. β -lactam Antibiotics
4. Aminoglycoside Antibiotics
5. Tetracyclines, Chloramphenicol, Macrolides, and Lincosamides
6. Bacitracin, Glycopeptide Antibiotics, and the Polymyxins
7. Drugs used in Tuberculosis and Leprosy
8. Antiviral Drugs
9. Antifungal Drugs
10. Antiprotozoal Drugs
11. Anthelmintic Drugs

Tests & Evaluation:

Mid term course exam	40%
Quiz	10%
Final Exam	50%

Reference Books:

1. Modern Pharmacology, 6th edition, 2004
2. Rang and Dale Pharmacology, 2nd edition, 2003
3. Basic and clinical Pharmacology 7th edition, 1998

السنة الثانية – الفصل الأول
طب المجتمع
Community Medicine
4 Credit hours
Course Code 0505203
Second Year
First Semester

I. Course Description

This course has two components. the theoretical part constitutes 3 credit hours and covers an introduction to the topics of population , primary health care, mother and child health, basic concepts of community nutrition , ecology , health care systems and health planning . It also covers the concept of environmental health , studies the sources of pollution, classification of pollutants including water , air, soil and occupational pollutants, the relationship between pollution and work and social behavior, the effect of pollution on health and methods of prevention of pollution and the equipments used in this regard . The course also includes one credit hour practical (2 practical hours) of practical work in this regard . Students will be exposed to practical applications to appropriate areas in the field of community medicine .

II. Course Outline

a. The following topics will be covered in the theoretical part of the course:

Introduction /Concepts and levels of prevention	1 hour
History of Medicine	2 hours
Infant health	1 hour
Maternal health	1 hour
Family planning	1 hour
Health Education	1 hour
School health	1 hour
Disabilities /Injuries and rehabilitation	1 hour
Maternal nutrition	1 hour
Child nutrition	1 hour
Adolescent nutrition	1 hour
Monitoring child growth	1 hour
Assessing community nutrition	1 hour
Early childhood development	1 hour
Immunization programs	1 hour
Population and health	1 hour
Communication for health	1 hour
Ethics	1 hour
Quality of health care	1 hour
Health services organization management	1 hour
Economics of health care	2 hours
Common public health issues /depression	1 hour
Common public health issues/ Alzheimer	1 hour
Common public health issues /Breast cancer	1 hour
Common public health issues /CVD	1 hour
Common public health issues Obesity	1 hour
Common social conditions impacting on health (domestic violence and child abuse)	1 hour
Health care systems	1 hour

Introduction to environment	1 hour
Environment and health	1 hour
Water pollution	2 hours
Air Pollution	2 hours
Soil contamination	1 hour
Food contamination	1 hour
Radiation	2 hour
Pesticides	1 hour
Plastics	1 hour
Occupational health	2 hours
Occupational diseases	1 hour
Worker protection methods and equipment	1 hour

b. Practical application:

32 hours

السنة الثانية – الفصل الثاني

الجهاز الحركي والجلد

Skin and Locomotor System (Musculoskeletal System)

(500281)

(6) Credit Hours

Objectives:

By the end of this course, the student should be able to :

1. Describe the orientation of the body in the anatomical position.
2. Relate the common names of the corresponding anatomical descriptive terms of various regions of the human body.
3. Define the anatomical planes and sections used to describe the human body.
4. Describe the structure and function of bones, joints, ligaments and skeletal muscles.
5. Analyze the movements of individual joints and the body as a whole.
6. Describe the development of muscle and bone tissues.
7. Describe the microscopic anatomy of bones, ligaments, muscles and skin.
8. Mention skin manifestations of systemic diseases.
9. Describe the properties of muscle proteins.
10. Outline the steps involved in the muscle contraction.
11. Describe the structure and functions of neurons and nerve supply of muscles and bones.
12. Describe mechanisms of movement and its control.
13. Mention pathologic disorders of skin, muscles, bones and peripheral nerves.
14. List drugs used in the treatment of diseases of the skin, muscles and bones.
15. Take proper history and perform clinical examination of the Musculoskeletal system.

Content summary:

	<u>Lectures</u>	<u>Practical (including tutorials)</u>
Histology	06	04
Physiology	08	-
Anatomy of Upper limb	10	08
Anatomy of Lower limb	10	08
Anatomy of the abdominal wall, Muscles of the head & neck & spine	06	04
Embryology of limbs & spine	02	-
Pathology	08	-
Microbiology	05	-
Biochemistry	02	-
Pharmacology	03	-
Clinical Examination	06	-
Total		90 Contact hours

Contents:

Anatomy of Upper limb:

(10) lectures:

1. Introduction (Anatomical Terms, Bones of Upper Limb)
2. Pectoral Region & Axilla
3. Axilla & Scapular Region
4. Shoulder Joint, Sterno-Clavicular & Acromio- Clavicular Joints
5. Upper Arm

6. Cubital Fossa / Forearm ant.
7. Forearm Ant. Comp.
8. Forearm Post. Comp.
9. Hand
10. Joints & Nerve

(8) practical

1. Bones & pectoral region
2. Axilla
3. Axilla/ Scapular region
4. Upper arm
5. Forearm & Hand
6. Forearm & Hand
7. Joints
8. X - Rays

2- Anatomy of Lower limb

10 lecture:

1. Bones of lower limb
2. Gluteal region (1 ½ h.)
3. Ant. Compartment of thigh (1 ½ h.)
4. Ant. Compartment of thigh / cont.
Medial comp. of thigh
5. Popliteal fossa (1 ½ h.)
- Hip joint -
6. Ant. and Lat. Comp. of leg (1 ½ h.)
7. Post. Comp. of leg
8. Sole of foot
Joints of lower limb (1 ½ h.)
9. Joints of lower limb/cont. (1 ½ h.)
10. Nerve injuries

(8) Practical

1. Bones of lower limb
2. Gluteal region
3. Ant. Compartment of thigh
4. Medial & post. comp. of thigh
5. Hip joint & Popliteal fossa
6. Leg compartments
7. Leg / cont. of sole
8. Joints of L.L.

Anatomy of the abdominal wall

Muscles of the Head & Neck & spine

(6) Lectures (4) Practical:

1. Anatomy of anterior abdominal wall & diaphragm (2 lectures), (1 practical)
2. Anatomy of thoracic wall (1 lecture, 1 practical)
3. Anatomy of the muscles of head & neck & spine (3 lectures, 2 practical)

Embryology of limbs & spine :

(2) Lectures:

1. Embryology of limbs
2. Embryology of spine

Histology :

(6) Lectures, (4) Practical:

1. Histology of skeletal muscles & cartilage (2 lectures, 1 practical)
2. Histology of bone (1 lecture, 1 practical)
3. Histology of ossification (1 lecture, 1 practical)
4. Histology of skin (2 lecture, 1 practical)

Physiology :

Physiology (8 hours)

Nerve & Muscle

Excitable tissue

Membrane physiology & the basis of excitability

Transport of materials across membranes

Modalities of transport

- Diffusion through membrane
- Factors that affect diffusion
- Osmotic pressure

- Osmolarity

- Tonicity

Role in living cells

Active transport

Primary

Secondary

Role in living cells

Vesicular transport

Transport through cellular sheet

Resting membrane potential & its relation to physiology properties of biological membranes.

Movement of charges particles across membrane

Membranes, capacitance, conductance & current flow

Nerve:

Neurons (parts) & classifications

Supportive cell & function

Nerve action potential:

Event of action potential

Recordings of action potentials (biphasic Vs monophasic)

- ionic basis

- the role of Na⁺ & K⁺ channels (Voltage gated channels)

- the role of other ions

condition along nerve fibers by local current flow

conduction in myelinated fibers

factors that affect velocity of conduction in nerve fibers & classification of nerve fibers

Synaptic transmission:

Release of remitters
Role of Ca⁺⁺

Modulation of membrane potentials by transmitter (receptor gated channels)
Facilitation & inhibition of postsynaptic membranes
EPSP (Excitatory post synaptic potentials) , IPSP (Inhibitory post synaptic potentials)

Presynaptic inhibition
Integration of neural function

Muscle:

Introduction

Skeletal muscle structure muscle, fibers, myofibrils, filaments
Arrangement & composition of contractile proteins in striated muscle contraction

Molecular basis of muscle contraction (sliding theory)
Energetic of contraction

Characteristics of muscle contraction

Mechanics of contraction
Motor unit summation
Tetanization
Muscle fatigue
Sarcomere length – tension relation & muscle length – tension relation
Muscle load – velocity of contraction relation

Electrical activity of skeletal muscle membrane & generation of action potential by Ach.

Excitation – contraction coupling
The role of Ryanodine receptors (foot protein)
The role of Ca⁺⁺ in muscle contraction

Relaxation of skeletal muscle (mechanism)

Adaptation of skeletal muscle to demands
Skeletal muscle pathology (medical students)
Comparison of skeletal, cardiac & smooth muscle.

Pharmacology

(3) lectures:

(2 hours)

1. Drugs for Osteoporosis
2. Drugs for Osteomalacia
3. Drugs for Paget's Disease
4. Drugs for Osteoarthritis
5. Drugs for rheumatoid arthritis
6. Drugs for crystal arthritis (Gout)
7. Drugs for systematic lupus erythematosus
8. Drugs for seronegative arthritis

9. Drugs for musculoskeletal infections

Microbiology

(5) Lectures:

Bacterial infections:

Clostridia perfringens. Staph. Aureus. Strep. Group A
Actinomyces. Nocardia. Rickettsia. Bacterids and others

Viral infections:

Papilloma viruses. Mossuscum contagiosum. Coxsakie viruses
Viral exanthemas. Hemorrhagic fever viruses

Fungal and parasitic infections:

Tinea species. Dermatophytes. Fungi causing subcutaneous infections candida.
Trichinella. Leishmania. Filarial worms. Dracunculus medinensis Arthropods

Biochemistry

(2) Lectures:

Muscle Proteins: structure properties

Actin Myosin interaction

Motility in non-Muscle Cells

Calcium Metabolism

Regulation of calcium Metabolism

Pathology :

Pathology (11 hours) :

1. Introduction and developmental abnormalities

2. Diseases associated with abnormal matrix
(osteogenesis imperfecta)

osteoporosis

Diseases associated with osteoclast dysfunction

Osteopetrosis

Paget disease

Diseases associated with abnormal mineralization

Rickets and osteomalcia

Hyperparathyroidism

Renal osteodystrophy

3. Infections – Osteomyelitis

Pyogenic osteomyelitis

Tuberculous osteomyelitis

Fractures:

Osteonecrosis (avascular necrosis)

4. Bone tumors & tumors like conditions

5. Joints:

Arthritis, osteoarthritis

Rheumatoid arthritis

Seronegative spondyloarthropathies

Infectious arthritis

Gouty arthritis

Skin:

- Histology

- Physiology
- Pathology
- Microbiology
- Examination

Examination of Limbs and spine

Clinical aspects (6 hours)

General guide lines (look, feel, move)

1. Inspection (Look)

a. Inspect joints while static for

- Deforming
- Swelling
- Discoloration
- Muscle wasting
- Skin changes & skin lesions

b. Inspect joints while active

1. Look for:

- Range of movement
 - Quality of movement
2. compare with the other side
3. compare with the examiner joints

2. Palpation (Feel)

Palpate for

- points of tenderness
- temperature
- soft tissue or bony swelling
- look for effusion within the joint
- active movement repeated to detect crepitus or clicks
- special maneuvers for ligaments tears or range of movement...etc.

3. Move: active movement (look for range of movement, abn. Movement)

General Examination of Musculoskeletal System:

Start by:

1. Posture:

- a. make sure patient can stand and walk
- b. view the patient from behind and front
- c. view the patient from the side
- d. if the patient has scoliosis, ask him to bend forward with legs straight to differentiate functional from anatomical deformity.

N.b. student should know the types of normal and pathological postures

2. Gait: patient should be stripped as much as possible
observe patient while walking and going upstairs
observe for arm swinging
student should know about types of gait

- a. painful
- b. painless - osteogenic

- Arthrogenic
- Myogenic
- Neurogenic
- Psychogenic
- Prosthetic

Temporo mandibular joints :

1. Ask patient to open his mouth, look for the range of movement.
2. Palpate each joint looking for swelling and tenderness.
3. feel and listen for crepitation.

Neck:

1. inspect neck for range of movement and abnormal posture
 2. palpate for tenderness in the cervical spine and trapezius muscles
 3. test range of movement
- ask patient to touch his chest by the chin, move the chin to each shoulder, move each ear to corresponding shoulders, put his head back.

Hands:

1. inspect for swelling, redness nodules deformity, muscular atrophy
2. palpation:
 - a. palpate medial & lateral aspect of each interphalangeal joint between examiners thumb and index finger
 - b. by thumbs palpate the MCP joints
 - c. palpate each wrist joint by thumbs on dorsum of the wrist & fingers beneath.
3. Movement:
 - a. extend & spread fingers of both hands
 - b. make a fist with thumbs across the nucleus
 - c. flex & extend his wrists, adduct & abduct them.

Elbow:

1. inspect the elbow while flexed & extended for malalignment and deformities
2. palpation
support elbow flexed at 90 & palpate the elbow start:
 1. extensor surface of the ulna and the olecranon process
 2. palpate the groove on each side of the olecranon
 3. check for tenderness of the epicondyles

Shoulder:

1. inspect shoulders
 - a. anteriorly looking for swelling, deformity, muscular atrophy.
 - b. Posteriorly look for the scapulae and related muscles
2. palpation
for tenderness at the joints related to the shoulder, i.e. sternoclavicular, Acromioclavicular
and shoulder itself including greater tubercle and biceps groove.
3. Move:
Move the shoulder
Internal rotation
External rotation

Flexion
Extension
Adduction
Abduction

References:

1. Snell, R.: Clinical Anatomy, 7th edition, 2002
Lippincott, Williams & Wilkins.
2. Guyton & Hall: Textbook of Medical physiology, 10th edition
Saunders, 2002.
3. Kumar, Cotran, Robins: Basic Pathology 7th edition, 2003 Saunders.
4. Craig, CR. & Stitzel, RE: Modern Pharmacology
with clinical applications 6th edition 2004
5. Devlin K: Textbook of Biochemistry with clinical applications 5th edition
Wiley liss
6. JAWETZ, Melnick & Adelberg: Medical Microbiology. 5th edition, LANGE

السنة الثانية – الفصل الثاني
الجهاز الهضمي
The Digestive System
(0500251)
(6) Credit Hours

Objectives:

By the end of this course, the student should be able to:

1. Describe the gross and micro anatomy of the digestive system as well as the development of organs of the system.
2. Mention the biochemical constituents of saliva, stomach juice, bile and pancreatic secretions and their functions.
3. Describe the functions of the different organs of the system.
4. Describe the process of digestion and absorption of food.
5. List pathologic disorders of the GI systems.
6. Mention drugs used in the treatment of GI diseases.
7. Discuss the Epidemiology of diseases of the GI system, their prevention and control.
8. Take proper history and perform physical examination of the GI system.

Content Summary:

(1)	Anatomy	24	:	14 Lecture + 10 Lab
	Histology	4	:	2 Lecture + 2 Lab
	Embryology ²		:	2 Lect
				Total 30 hrs
(2)	Biochemistry		:	4 Lecture
				Total 4 hrs
(3)	Physiology		:	9 Lecture + 2 Lab
				Total 11 hrs
(4)	Community Med		:	2 Lecture
				Total 2 hrs
(5)	Pathology		:	12 Lecture + 3 Lab
				Total 15 hrs
(6)	Microbiology		:	12 Lecture + 2 Lab
				Total 14 hrs
(7)	Pharmacology		:	4 Lecture
				Total 4 hrs
(8)	Clinical aspects		:	10 hrs

(1) Anatomy, Histology & Embryology 30 hrs

Anatomy:

- Anterior abdominal wall
- Rectus sheath – inguinal canal – spermatic cord
- Peritoneum
- Abdominal viscera (stomach, small intestine, large intestine, liver gall bladder, pancreas)
- Posterior abdominal wall
 - vesseles of posterior abdominal wall
 - nerves of posterior abdominal wall

Histology :

- the lip, teeth, sublingual , submandibular & parotid glands

- Dental Histology, vallate and filiform papilla of the tongue
- oesophagus, stomach, duodenum, jejunum, ileum & colon
- Pancreas- liver and gallbladder

Embryology:

- The foregut – development of the esophagus, stomach, duodenum
development of the liver, gallbladder and biliary apparatus
development of the spleen
- The midgut – rotation of the midgut loop – fixation of the intestine
- The cecum and appendix
- The Hindgut – the cloaca – the anal canal

(2) Biochemistry 4 hrs

- Constituents of the saliva. Gastric constituents and production of gastric HCl
- Constituents of pancreatic secretions. Constituents of intestinal secretions
- Composition of hepatic and gall-bladder bile & bile acids
- Absorption of biochemicals
- Investigation of liver diseases disorders & pancreatic enzymes

(3) Physiology 11 hrs

- Introduction of GI Physiology
 - Physiology of smooth muscle
 - Neural hormonal control of GI
 - Blood flow and GI activities
- GI motility:
 - Mastication and swallowing
 - Gastric motor activities and control
 - Small intestinal movements and control
 - Defecation and control
- GI secretions:
 - Introduction to secretions
 - Salivary secretion, Mechanisms of secretion, Function, Control
 - Gastric secretion, Mechanisms, Function, Control
 - Intestinal secretions
 - Pancreatic secretion, Mechanisms, Function, Regulation
 - Liver and Gallbladder: Bile secretion, Function, Control
- Digestion and Absorption:
 - Intestinal specialization
 - Digestion and Absorption of Carbohydrates
 - Digestion and Absorption of Proteins
 - Digestion and Absorption of Lipids
 - Absorption of water, electrolytes, Ca⁺⁺, Fe⁺⁺
 - Absorption of Vitamins
 - Body Energetics, Dietary balance and Regulation of food intake

(4) Community medicine 2 hrs

- Investigation of the digestive diseases

(5) Pathology 15 hrs

ESOPHAGUS

- Hiatal hernia
- Achalasia
- Lacerations
- Other anatomic & motor disorders
- Varices

Esophagitis

Types, mechanisms & appearances

Barrett's Esophagus

Carcinoma

Types, epidemiology, clinical

Morphology

Stomach

Acute Gastritis

Chronic Gastritis

Types (superficial atrophic, granulomatous...etc)

Gastric atrophy

Mechanisms, pathogenesis, morphology

Peptic Ulcer

Pathogenesis, epidemiology

Morphology, complications

Clinical

Tumours

Polyps, other benign

Malignant tumours

Carcinoma, types, morphology, clinical, outcome & risk factors

Lymphoma

Carcinoid

Other

LOWER GI TRACT DISEASES

Congenital Anomalies

Meckels

A tresia and stenosis

Imperforate anus

Hirschsprung disease

Ischemic Bowel disease

Angiodysplasia

Hemorrhoids

Diarrheal diseases

Infection enterocolitis

Idiopathic inflammatory bowel disease

Crhon's Disease

Ulcerative colitis

Diverticulosis

- Tumors

Benign (polyps)

Malignant

LIVER PATHOLOGY

Definitions

Cirrhosis

Hepatic encephalopathy

Jaudice

Cholestarios

Hepatitis

Viral

Antoimmune

Liver abscess

Drug induced liver disease

Alcoholic liver disease

Hemochromatosis
Antitrypsin deficiency
Rye's syndrome
Biliary cirrhosis
Cholangitis
Congenital anomalies of the biliary tree
Vascular disorders of the liver
Liver transplantation
Tumors of the liver

GALLBLADDER DISEASE

Gall stones
Cholecystitis
Tumors and associated disease
Injury iatrogenic
Extrahepatic bile duct disorders
Cholelithiasis
Ascending cholangitis
Choledochal cyst

PANCREAS

Congenital anomalies
Cystic fibrosis
Pancreatitis
tumors

(6) Microbiology 14 hrs

Natural defense of the gastrointestinal tract

Normal flora
Immune responses

Viral infections of the intestinal Tract

Rotavirus
Adenoviruses
Caliciviruses
Astroviruses
Enteroviruses

Bacterial infections of the gastrointestinal tract:

Campylobacter
Vibrioses
Diarrhea agent
Salmonella
Plesiomonas
Food poisoning agent
Shigella
Yersinia
E. coli
Helicobacter
Clostridium perfringens
cereus
Clostridium difficile
botulinum

Parasitic infections of the Gastrointestinal Tract

Protozoa:

Giardia lamblia
Cryptosporidium parvum
Entameba histolytica

Helminths:

Enterobius vermicularis
Trichuris trichiura
Ascaris lumbricoides
Hook worms
Strongyloides stercoralis
Tapeworms
Trematodes

Bacterial Infection of the liver

Leptospira spp
Coxiella burnettii
Brucella spp
Mycobacterium

Viral Infections of the liver

EBV, CMV, YF and others
Hepatitis A virus
Hepatitis E virus
Hepatitis B virus
Hepatitis D virus
Hepatitis E virus

Epidemiology

Pathogenesis
Clinical features
Diagnosis
Prevention and control

Parasitic Infections of the liver

Schistosomes
Hydatid disease
Fasciola hepatica

(7) Pharmacology 4 hrs

Drugs in peptic ulcer disease
Antidiarrheal, Laxatives, Antispasmodic drugs
Emetics, antiemetics
Drugs in G.I.T inflammatory conditions.

(8) Clinical aspect 10 hrs

SYMPTOMS AND SIGNS

Painful mouth
Dysphagia and Odynophagia
Regurgitation and Belching
Heartburn
Nausea and Vomiting
Abdominal pain
Dyspepsia
Anorexia and Weight loss
Flatulence
Abdominal distension-(bloating)
Altered bowel habits
Rectal bleeding-Tenesmus
Hiccups

Jaundice
Abdominal masses
Ascitis
Hernial orifices and Hernias

HISTORY TAKING AND EXAMINATION OF THE ABDOMEN AND G.I SYSTEM

Regions of the abdomen
General approach

Inspection: Hair, Skin, Umbilicus, Contour of the abdomen Peristalsis, Pulsation's, Veins, Movements, and Hernias

Palpation:

Light palpation, Deep Palpation, Palpation of the liver, Dipping technique, Palpation of the spleen, Palpation of the kidneys.

PERCUSSION:

The distended abdomen, the liver the spleen, Assessing for Ascitis. (Shifting dullness and Fluid Thrill)

AUSCULTATION:

Bowel sounds, Arterial bruits, Venous Hum, Friction sounds, and Succession splash

EXAMINATION of the Hernial orifices and external genitalia

Ano-rectal examination:

Inspection of the anal area
Digital rectal examination
Proctoscopic examination

السنة الثانية – الفصل الثاني

الغدد الصم والاستقلاب

Endocrinology and Nutrition

(0500222)

(3) Credit Hours

Objectives:

By the end of this course students are expected to understand:

1. Structures of various endocrine glands, development and histology.
2. The normal functions, physiologic roles and mechanisms of action of hormones
3. Hormone regulation and pathophysiological effects of abnormal endocrine functions
4. Pathogenesis, morphological changes and complications of diseases affecting the endocrine system
5. The use of hormones and drugs in diagnosis and treatment of endocrine disorders.
6. Clinical application of major endocrine functional changes.

Content Summary:

Histology	8	teaching sessions
Biochemistry	7	teaching sessions
Pathology	8	teaching sessions
Physiology	14	teaching sessions
Pharmacology	8	teaching sessions
Nutrition	23	teaching sessions
Clinical Aspect	4	teaching sessions

Total **72 teaching sessions**

Methods Of Instruction:

- Lectures
- Practical Classes

Evaluation and Distribution of Marks:

- Mid-term exam 40 %
- Practical 10 %
- Final end- course exam at the end of the semester 50%

Learning (Specific) Objectives of the module:

After studying the material covered in the lectures, practicals, the student is expected to achieve the following specific objectives.

NUTRITION

1. Metabolism, general concepts and design, bioenergetics and the role of ATP
2. Stages in energy extraction from food stuff, activated carriers & the role of NADPH
3. Glycolysis
4. Anaerobic Glycolysis, metabolism of fructose, galactose.
5. Gluconeogenesis: reciprocal regulation of glycolysis and gluconeogenesis
6. Pentose phosphatase pathway, glycogen breakdown
7. Glycogen synthesis, regulation of metabolism
8. β Oxidation of fatty acids
9. Oxidation of unsaturated & Odd-chain fatty acids
10. Ketone bodies and ketoacidosis
11. Fatty acids biosynthesis
12. Modification of fatty acids by elongation.

- 13 Triacylglycerol synthesis and mobilization
- 14 Lipoprotein and plasma lipid transport
- 15 Cholesterol metabolism
- 16 Biosynthesis of membrane lipids.
- 17 Amino acid metabolism, transmission, deamination
- 18 Urea cycle
- 19 Purine and pyrimidines biosynthesis and degradation
- 20 Integration of fat metabolism, well fed and fasting states.
- 21 Macronutrition
- 22 Micronutrition
- 23. Molecular genetics of metabolism disorders

GENERAL: Introduction to endocrinology

- 24. General endocrinology (I)
- 25. General endocrinology (II)
- 26. Hormones, Cascade system..
- 27. Transmembrane, Helix receptors, G protein
- 28. Phosphatidy inositol cascade, Calcium.
- 29. Hormone synthesis, Degradation,
- 30. Eicosanoid
- 31. Hormone receptors

NEUROENDOCRINE. (Hypophysis / Pineal glands)

- 32. Developmental anatomy, gross anat. Of hypophyseal and pineals
- 33. **PRACTICAL**
- 34. Hypoth. Pit Axis
- 35. Neural integration of endocrine functions, Pineal gland
- 36. GH, Developmental and metabolic functions.....
- 37. Posterior Pituitary
- 38. Hypothalamic and Pituitary hormones
- 39. Pathology of Pituitary gland
- 40. Clinical aspects of the hypothalamus and pituitary glands.

Thyroid / Parathyroid

- 41. Developmental anatomy and microscopic structure of thyroid & parathyroid glands
- 42. Developmental anatomy and microscopic structure of thyroid & parathyroid glands
- 43. Thyroid Gland, Iodine economy, thyroid hormone regulation
- 44. TRH/TSH physiology, Thyroxin function
- 45. Calcium homeostasis, function, dynamics, Parathyroid gland functions
- 46. Vit D synthesis, Role in calcium homeostasis, Calcitonin
- 47. Anti thyroid drugs
- 48. Parathyroid and calcium metabolism
- 49. Pathology of the parathyroid glands
- 50. Pathology of the thyroid gland (I)
- 51. Pathology of the thyroid gland (II)
- 52. Clinical aspects of the thyroid and parathyroid

PANCREAS

- 53. Histology of endocrine pancreas
- 54. Receptors, tyrosine kinase structure, activation, defects in signaling pathway.
- 55. Glucose homeostasis, fuel flow
- 56. Role of pancreatic Hormone id fuel flow
- 57. Insulin and oral hypoglycemic drugs

58. Insulin and oral hypoglycemic drugs
59. Pathology of the endocrine Pancreas
60. Clinical aspects of the endocrine pancreas

ADRENAL

61. Developmental anatomy and histology of adrenal
62. **PRACTICAL** : adrenal and pancreas
63. Steroid hormones, structure, synthesis, control
64. Adrenal gland,
65. Adrenal gland, regulation.....
66. Corticosteroids,
67. Androgens and anti androgens
68. Pathology of the adrenal gland (I)
69. Pathology of the adrenal gland (II)
70. Clinical aspects of the adrenal glands
71. **PATH : PRACTICAL I**
72. **PATH : PRACTICAL II**

B. Practical Laboratory Sessions

1. Morphological and microscopic anatomy of endocrine glands (Anat.)
2. Pathology of Endocrine glands I (Path.)
3. Pathology of Endocrine glands II (Path.)

Recommended Text Book and Atlases:

*** Anatomy:**

- Clinical Anatomy for Medical Student By R.S Snell Latest edition
- Basic Histology by L Carlos Junqueira Latest edition
- Before we are born By K.L Moore and T.V.N Persaud Latest edition

*** Biochemistry:**

- Harper's Biochemistry By Robert K Murray and Co Latest edition
- Supplementary Departmental Handouts

*** Physiology:**

- Textbook of Medical physiology by Guyton and Hall 10th edition 2000
- Review of Medical physiology by William F Ganong 20th edition 2001

*** Pathology:**

- Essential Pathology by Emanuel Rubin 3rd edition 2001
- Basic Pathology by Kumar Cotran and Robbins Latest edition

*** Pharmacology:**

- Modern Pharmacology By Craig and Sitizel Latest edition

*** Nutrition:**

*** Clinical Aspects:**

- McLoed' Clinical Examination, Last edition, edited by John F. Munro, Ian W. Campbell. ISBN: 0443061726. CHRURCH HILL LIVINGSTONE.

Optional Readings

- Physiology. By Robert M. Berne and Mathew N. Levy. Publisher Mosby. Latest edition
- Basic and Clinical Endocrinology, last edition. By Francis S. Greenspan and David G. Gardner. ISBN: 0-07-118222-5. McGraw Hill Companies.

University of Jordan
Faculty of Medicine
Department of Pathology, Microbiology and Forensic Medicine

Course Number: 0504206
Course Title: Introduction to Medical Immunology
Course weight: 2 credit hours (32 Lectures)

Intended Learning Outcomes (ILO):

By the end of this course, the student should be able to:

- Mention landmarks in the history of Immunology as a discipline of Medicine
- Describe the anatomy of the Immune system including the cells, tissues and organs that make up the system.
- List the types of an immune response, their components and their interactions.
- Distinguish between Immunogens, antigens and haptens, and mention their Biochemical and molecular characteristics.
- Describe Immunoglobulins from the standpoints of structure, functions and structural functional relationships.
- Explain the mechanisms of generation of diversity of immunoglobulins at the genetic and molecular levels.
- List the components of the complement system, describe the cascade of events in complement activation pathways, list the complement cleavage products and their biological functions and the regulatory mechanisms of complement activation.
- Describe the different types of antigen-antibody interactions, their characteristics and their use in diagnosis of disease and applications in research.
- Describe the pathways of T & B cell production, differentiation and maturation, their different subsets and their biological functions and interactions.
- Describe the structure and expression by different cells of the major histocompatibility complex, its functions particularly its role in the generation of an immune response.
- Mention the molecular and cellular events that take place between different cells in the generation of the different types of an immune response and the effector mechanisms activated and generated.
- Explain the concepts of tolerance and autoimmunity and mention the mechanisms involved in maintaining tolerance to self and abnormalities that lead to the break down of the state of tolerance leading to autoimmune diseases, their pathogenesis, types, characteristics, immunopathology and behavior.
- Discuss the principles of transplantations, graft rejection, types of rejection, donor recipient matching, promotion of graft survival and management of transplant recipients, and discussion of the common types of tissue and organ transplantation.
- Mention the principles of tumor immunology including the details of tumor antigens, host immune response to tumors, mechanisms of tumor escape from immune elimination, diagnostic tumor markers, tumor Immunotherapy and tumor vaccines.

- Mention the classification of allergy and hypersensitivity reactions, the mechanisms involved, clinical manifestations, disease categories, diagnosis and management.
- List the types of primary immunodeficiency disorders, the molecular defects underlining the different disorders, their clinical manifestations, diagnosis and management.
- Describe the immunologic principles that govern transfusion of blood and its components including red blood cell antigens, antibodies, transfusion reactions and their prevention and management.
- Mention the most common and important immune modulators used in management of disorders like those used in transplantation, autoimmunity, allergy and hypersensitivity or others.

LECTURES

Day	Date	Topic
Week 1		
Sun	10/6	Introduction to Immunology
Mon	11/6	
Tue	12/6	Cells, Tissues and Organs of the Immune System
Wed	13/6	Immunogens, Antigens, and Haptens
Thu	14/6	Nonspecific Defense Mechanisms
Week 2		
Sun	17/6	Immunoglobulins: Structure
Mon	18/6	
Tue	19/6	Immunoglobulins: Biological Properties
Wed	20/6	Immunoglobulins: Generation of Diversity
Thu	21/6	Immunoglobulins: Generation of Diversity
Week 3		
Sun	24/6	The Complement System
Mon	25/6	
Tue	26/6	Antigen – Antibody Reactions
Wed	27/6	Antigen – Antibody Reactions
Thu	28/6	T Cell Development
Week 4		
Sun	1/7	T Cell Development
Mon	2/7	
Tue	3/7	B Cell Development
Wed	4/7	B Cell Development
Thu	5/7	The Major Histocompatibility Complex
Week 5		
Sun	8/7	Generation of the Immune Response
Mon	9/7	
Tue	10/7	Generation of the Immune Response
Wed	11/7	Immunological Tolerance
Thu	12/7	Autoimmunity

Week 6		
Sun	15/7	Immunology of Transplantation
Mon	16/7	Immunopharmacology
Tue	17/7	Immunology of Transplantation
Wed	18/7	Tumor Immunology
Thu	19/7	Allergy and Hypersensitivity
Week 7		
Sun	22/7	Allergy and Hypersensitivity
Mon	23/7	Immunopharmacology
Tue	24/7	Primary Immunodeficiency
Wed	25/7	Primary Immunodeficiency
Thu	26/7	Immunopharmacology

Recommended Books:

1. **Basic and Clinical Immunology**
Mark Peakman, Diego Vergani
Churchill Livingstone
Second Edition, 2009

2. **Review of Medical Microbiology and Immunology**
Waren Levinson
Lange, Eleventh edition, 2010

السنة الثانية – الفصل الصيفي
أساسيات الوراثة والبيولوجيا الجزيئية
Principles of Genetics & Molecular Biology
(0501302)
(2 credit Hours)

Objectives:

By the end of this course the student should be able to:

1. Mention the details of the central dogma of molecular biology:
DNA→RNA→protein.
2. List the basic principles of gene expression of its regulation in different cells under normal & abnormal conditions.
3. Discuss at the different diseases from a molecular genetics point of view.
4. Describe the basic techniques in DNA recombinant technology & their medical applications.

Contents:

This course covers the main principles of molecular Biology & Medical Genetics.

* **The molecular biology** part will introduce the student the main principles including: Nucleic acid structure & function, DNA replication, RNA transcription, protein synthesis, regulation of gene expression, recombinant DNA technology & the molecular biology of cancer.

* **The medical genetics** part will deal with, the science of human biological variations as it relates to health & disease including:

Molecular Genetics: gene organization & manipulation & general approach to major classes of genetic diseases. Cytogenetics: general principles of chromosome structure & analysis & major clinical disorders associated with chromosomal abnormalities. Biochemical genetics: major metabolic pathways & associated disorders. Population genetics: quantitative genetics, population screening, risk assessment, multifactorial inheritance & some ethical consideration.

Nucleic acid structure.
DNA replication
RNA transcription
Protein synthesis
Regulation of gene expression
Recombinant DNA technology
Molecular biology of cancer
Background & history
Basic cell biology: structure & function of genes & chromosomes.
Genetic variation: its origin & detection
Autosomal dominant & recessive inheritance
Sex linked & mitochondrial inheritance
Clinical cytogenetics: the chromosomal basis of human disease
Biochemical genetics: disorders of metabolism
Developmental genetics

Prenatal diagnosis
Cancer genetics
Multifactorial inheritance & common disease
Genetic screening, genetic diagnosis & gene therapy

Tests & Evaluation:

Mid term course exam	40%
Quiz	10%
Final Exam	50%

References:

1. Molecular Biology, Robert F. Weaver, 2nd edition, McGraw Hill 2002.
2. Genes VII, Benjamin Lewin, edition 1, Oxford Univ. Press, January 2000.
3. Medical Genetics, Jorde, Carey, Bamshad, White, Mosby.
4. Elements of Medical Genetics, Muller & Young, Churchill & livingstone.

السنة الثالثة – الفصل الأول
الجهاز القلبي الوعائي
Cardiovascular System
0500331
(5) Credit Hours

Course Objectives:

By the end of the course the student should have a fundamental clinically-oriented grasp of the normal structure and function of the cardiovascular system, together with the pathological abnormalities that may afflict the system and drugs that are used in treatment.

Intended Learning outcomes :

A) Knowledge and Understanding

By the end of the course the medical student should have knowledge and understanding of the following :

1. Gross, microscopic and surface anatomy of the heart with particular reference to the heart conductive system, valves, chambers, coronary arteries and autonomic nerve supply.
2. Embryological development of the heart and blood vessels. Congenital malformations.
3. Action potential and electrical activity of the conductive system and myocardium, including the ionic events that underlie their behaviour and the relation to electrical impulses generated on the electrocardiogram.
4. Biochemical characteristics of cardiac muscle and its energy utilization including the role of Calcium. Myoglobin, cardiac enzymes and troponin, their role in diagnosis of myocardial disease.
5. Electrocardiography and the tri-axial system. Normal ECG.
6. Relation of the electrical activity of the heart to its mechanical contractility, pressure changes and blood flow through the chambers and valves and the generation of heart sounds.
7. Auscultation for heart sounds. Production of murmurs. Degenerative and rheumatic valvular disease, infective endocarditis
8. Heart rate and its humoral and nervous control. Stroke volume and cardiac output. Normal heart rhythm. Cardiac arrhythmias. Drugs used in the treatment of arrhythmias viz. sodium channel blockers, beta adrenergic blockers, drugs prolonging the refractory period and calcium channel blockers.
9. Gross and microscopic anatomy of blood vessels of the body. Surface anatomy of relevant blood vessels in particular for pulse examination and other clinical procedures. Techniques of examination of peripheral pulses.
10. Systolic, diastolic and mean systemic arterial blood pressures. Nervous, biochemical and mechanical factors that control arterial blood pressure.
11. Measurement of blood pressure.
12. Hypertension : systemic and pulmonary, their aetiology, pathology and complications. Drugs used in the treatment of hypertension viz. vasodilators, sympatholytic agents, angiotensin inhibitors, diuretics and calcium channel blockers.
13. Central venous pressure. Factors that influence CVP. Clinical inspection of jugular venous pressure.
14. Hypotension, its pathogenesis and treatment.
15. Ischaemic heart disease aetiology, risk factors, pathology and clinical manifestations, with particular reference to angina, myocardial infarction and heart failure. Drugs used in treatment.

16. Haemodynamics and clinical manifestations of heart failure and oedema.
17. Diseases of the pericardium and myocardium.
18. Drugs used in the treatment of heart diseases viz. Cardiac glycosides, diuretics, catecholamines and phosphodiesterase inhibitors.
19. Atherosclerosis pathogenesis, pathology and complications. Drugs used in hyperlipidaemic states.
20. Thrombosis and embolisation. Haemorrhage.
21. Varicose veins.
22. Types of shock, pathogenesis, clinical manifestations and drugs used in treatment.
23. Vasculitis pathogenesis, pathology and complications.
24. Microorganisms that cause infectious lesions in the cardiovascular system viz. Spirochaetes, Rickettsiae and viruses. Bacteria causing endocarditis.
25. Principles of heart transplantation.
26. Relevant X-ray examination.

B) Cognitive/intellectual skills

The student should be able to observe, interpret and correlate information to attain the right conclusions regarding normal and abnormal conditions.

C) Subject specific skills

Palpation of pulses, auscultation of heart sounds, observation of CVP, measurement of blood pressure, normal ECG interpretation, normal X-ray interpretation, recognition of gross and microscopic abnormal conditions.

D) Transferable skills

Demonstrate good command of clinical skills and knowledge of the course with the ability to impart these to colleagues and juniors.

Content Summary:

Duration : 5 credit hours (75 contact hours excluding exams).

Contact hours are distributed as follows

1. Anatomy : 15 hours.
2. Histology : 4 hours.
3. Physiology : 18 hours.
4. Biochemistry : 3 hours.
5. Pathology : 16 hours.
6. Microbiology : 5 hours.
7. Pharmacology : 8 hours.
8. Clinical Medicine : 6 hours.

Teaching Methods :

Teaching methods comprise lectures, practicals and seminars.

Tests and evaluations :

MCQ ; OSCE ; Assignments

Course Content:

Histology (4 contact hours)

1- Introduction

2- Capillaries

- a. Types and structures
- b. Capillary permeability
- c. Metarteriols

3- Arteries

- a. Arterioles
- b. large arteries (elastic arteries)
- c. Arteriovenous anastomosis

4- Veins

- a. Venules
- b. Small – sized veins
- c. Large veins

5- Heart

Special features

Physiology (20 contact hours)

1. Introduction

- Functions of the Cardiovascular System
- Functions of the Cardiovascular Components, Cardiac Output
- Cardiovascular System Circuitry
- General Features of the Heart Circuitry

2. Cardiac Physiology

- Structure
- Cell-Cell connections: Gap Junctions
- Membrane Properties: Cardiac Action Potential
- Ionic Conductance Changes during the Action Potential
- The Absolute and Relative Refractory Periods
- Excitation-Contraction Coupling
- Calcium Entry across Sarcolemma
- Calcium Release from the Sarcoplasmic Reticulum
- Calcium Activation of Contraction
- Role of Sarcoplasmic Reticulum and Sodium-Calcium Exchange in Relaxation
- Mechanics
- Force-Length Relation
- Grading of Force
- Force-Velocity Relation
- Energetic

3. Conduction System of the heart

- Transmembrane Potentials
- Types of Action Potentials
 - a. Fast
 - b. Slow
 - Ionic Conductance Changes During the Action Potential
 - The Absolute and Relative Refractory Periods
 - Pacemakers and the conduction System
 - Effect of Autonomic Stimulation
 - Agents which Mimic Autonomic Neurotransmitters
- Electrical conduction in the Heart
 - a. Spread of Depolarization in the Atria
 - b. Spread of Depolarization via AV Node
 - c. Spread of Depolarization via the HIS-Purkinje System
- Intrinsic Cardiac Rates
- Reentry as a Cause of Cardiac Arrhythmia's
- The Electrocardiogram (ECG or EKG)
 - a. Measuring Electrical Activity
 - b. Bipolar leads

c. Unipolar Leads

4. Electrocardiography

- The Triaxial Lead System
- Cardiac Vectors
- Vector Loops
- The Mean Electrical Axis of the Heart
- The V Leads
 - a. Axis
- b. Chest Leads
 - The Normal ECG
 - Cardiac Arrhythmia's
 - Ectopic Pacemakers
 - Defects in Electrical Conduction of the His-Purkinje System
 - a. Normal 21 Lead ECG
 - b. Left Ventricular Hypertrophy
 - c. Right Ventricular Hypertrophy
 - d. Left Bundle Branch Block

5. Heart as a pump & cardiac cycle

- Electro-Mechanical Coupling
 - Cardiac Chambers
 - a. Atria
 - b. Ventricles
 - The Ejection Fraction
 - Phases of the Cardiac Cycle
 - a. Ventricular Systole
 - b. Ejection
 - c. Diastole
 - Volume Changes During the Cardiac Cycle
 - Pressure Changes in the Right Heart
 - Summary of Pressures in Cardiac and Major Vessels
 - Normal Oxygen Levels during the Cardiac Cycle
 - Valve Closure and Heart Sounds
 - a. First Sound
 - b. Second sound
 - c. Third Sound
 - d. Fourth Sound
 - e. Other Sounds
 - Heart Rate Alterations and Tension Development
 - Ventricular Distensibility and Stroke Volume
 - The Inotropic State of the Heart; Contractility
 - 1- The Role of the Autonomic Nervous System
 - a. Sympathetic Effects
 - b. Parasympathetic Effects
 - 2- Other Factors Affecting Contractility
- The work of the Heart
 - a. Cardiac Work as Determined by Volume-Pressure Loops
 - b. The Tension-Time Index
 - c. Energy and Cardiac Work
- Valve Pathology
 - a. Aortic Stenosis

- b. Mitral Stenosis
- c. Aortic Insufficiency
- d. Mitral Insufficiency

6. Cardiac output & venous return

- Output of the Heart and its Control
- Indirect Measurement of Cardiac output
- Determinants of Cardiac Output
 - a. Control of Heart Rate
 - b. Control of Stroke Volume
 - 1- Preload and Stroke Volume
 - 2- Afterload and Stroke Volume
- Compliance and Venous Function
- The Return of Blood to the Heart
 - Ventricular and Vascular Function Curves
 - The Effect of Posture on Venous Return and Venous Pressure
 - Aids to Venous Return
 - a. The Skeletal Muscle Pump
 - b. The Abdomino-thoracic Pump
 - c. The Right Ventricle

1. Circulation/Haemodynamics

- The Relationship between Volume Flow and Velocity
- Velocity and Volume of Blood Flow and Cross-Sectional Area
- The Relationship between Pressure and Flow
 - a. Energy and Pressure
 - b. Interconversion of Pressure
- Factors That Determine Flow
 - a. Pressure
 - b. Nature of the Fluid in the System
 - c. Tube Geometry
- The Effect of Resistance Changes on Blood Flow
 - a. Total Peripheral Resistance(TPR)
 - b. Resistance in Series and Parallel
 - c. Laminar Flow and Resistance
 - d. Turbulent Flow and Resistance
 - e. Resistance and Viscosity
 - 1- Hematocrit and Viscosity
 - 2- Velocity of Flow and Viscosity
 - f. Effect of Tube Distensibility on blood Flow
 - 1- Wall Tension and the Law of Laplace

2. Arterial System/Regulation of arterial blood pressure & Heart rate

- Functions of the Arterial System
 - a. Storage of Energy
- Arterial Blood Pressure
 - a. Mean Pressure
 - b. Pulse Pressure
- Determinants of Mean Arterial Pressure
- Changes in Cardiac Output and Total Peripheral Resistance
- Determinants of Arterial Pulse Pressure
 - a. Effect of Stroke Volume on Pulse Pressure
 - b. Changes in Arterial Compliance
 - c. Effect of Heart Rate on Pulse Pressure

- Measurement of Arterial Blood Pressure
- The Pressure Pulse
- Components of Nervous Control of Arterial Blood Pressure
 - a. Effectors
 - b. Sensors
 - c. Other Stretch Receptors
- Reflex Response to Changes in Blood Pressure
- Chemoreceptors and Blood Pressure
- Integration of Blood Pressure Responses
- 3. Blood flow/Tissues & its control**
- Control of Blood Flow in the Peripheral Circulation
- Local Control of Blood Flow
- Circulating Hormones or Humoral Agents
- 4. Microcirculation (capillary exchange)**
- Capillaries and Nutrient Exchange
- Capillary Filtration (Starlings' forces)
- Diffusion of Solute and Water; Osmosis
- The Role of Lymphatic Vessels
- 5. Special circulation's (coronary, pulmonary & cerebral)**
- 6. Muscle blood flow & exercise**
- Skeletal Muscle Circulation
 - a. Factors Which Alter Oxygen Extraction
 - b. Factors Which Alter Blood Supply
- Coronary Blood Flow
 - a. Regulation of Coronary Blood Flow
 - b. Vasodilator Metabolites and Coronary Blood Flow
 - c. Myocardial Oxygen Consumption, Work and Coronary Blood Flow
 - d. Energy Sources for Cardiac Work
- Effect of Ischemia and Direct Application of Heat and Cold on Skin Blood Flow
 - a. Reflex Control of Coetaneous Flow
- The Cerebral Circulation
 - a. Control of Cerebral Blood Flow
 - b. The Effect of Oxygen and Carbon Dioxide on Cerebral Flow
 - c. Cerebrospinal Fluid (CSF)
 - d. The Blood-Brain Barrier
- 7. Circulatory shock & heart failure/Haemodynamics**
- Biochemistry (3 hours)
 1. Biochemical characteristic of cardiac muscle.
 2. Energy utilization including role of Ca. In contraction & relaxation
 3. Enzyme's , isoenzymes, troponin & myoglobin in myocardial infection.
- Microbiology (5 hours)
- Bacterial infections:
 - Strap. Viridian's. Staph. Species. Enterococcus
 - Rickettsia
 - Post streptococcal disease
- Viral infections:
 - Coxsackoie viruses. ECHO viruses

Pathology (16 contact hours)

Circulatory Disturbances

OEDEMA

Definition

Mechanisms (Hydrostatic Pressure Colloid Osmotic Pressure Lymphatics)

Na & H₂O retention

Causes (Clinico pathological settings)

Morphology – skin... Lung, Brain

HYPEREMIA & CONGESTION

Definition

Acute, Chronic passive

Organs: liver, lung...etc

HEMORRHAGE

Definition, types & names

THROMBOSIS

Definition

- Pathogenesis: Endothelial injury

Abnormalities in Blood flow

Hypercoagulability

- Morphology: Arterial, Venous ...etc.
- Disseminated intravascular coagulation (DIC)

EMBOLISM

Definition

Types

Morphology

INFARCTION

Definition

Types & Morphology

SHOCK

Pathogenesis & Types

Morphology

DISEASES OF BLOOD VESSELS

- ATHEROSCLEROSIS

Risk factors

Pathogenesis, morphology

Clinical importance & features

- HYPERTENSION, SYSTEMIC

Definition

Types

Morphology

- VASCULITIS

Giant cell arteritis

Takayasu's Disease

Polyarteritis Nodosa

Kawasaki's syndrome

Hypersensitivity...etc

Wegener's Granulomatosis

Thromboangitis Obliterans

Other disorders

Infectious Arteritis

Raynaud's Phenomenon

ANEURYSMS & DISSECTION

- **VEINS & LYMPHATICS**

Varicose Veins

Vena Cava syndromes

Lymphangitis & Lymphedema

- **TUMOURS**

Benign

Intermediate

Malignant

- **INTERVENTION-THERAPY**

Coronary bypass

Balloon Angioplasty...etc.

THE HEART

- **NORMAL & ABNORMAL**

- **HEART FAILURE**

- **ISCHEMIC HEART DISEASE**

Angina pectoris

Myocardial infarction

Chronic ischemic HD

Sudden Cardiac Death

- **HYPERTENSIVE HEART DISEASE**

Systemic

Pulmonary

- **VALVULAR DISEASE**

Degeneration & calcification

Mitral Prolapse

Rheumatic

Infective Endocarditis

Non-Infected: SLE... etc

Complication of Artificial valves

- **MYOCARDIAL DISEASES**

Myocarditis

Cardiomyopathy (Names & hints)

- **PERICARDIAL DISEASES**

Pericarditis

Effusion

- **CONGENITAL: CYANOTIC (Early, late)**

OBSTRUCTIVE

Cardiovascular Pharmacology (8 hours)

- **Inotropic agents:**

Cardiac glycosides

Catecholamines

Phosphodiesterase inhibitors

-**Antianginal Drugs**

Organic nitrates

Calcium channel blockers

Beta adrenergic blockers

- **Antihypertensive agents:**

Vasodilators

Sympatholytic agents

Angiotensin inhibitors

Antiarrhythmic agents:

- Class I: Sodium channel-blocking drugs
- Class II: Beta adrenoceptor-blocking drugs
- Class III: Drugs prolonging refractory period
- Class IV: Calcium channel-blocking drug

EXAMINATION OF THE CARDIOVASCULAR SYSTEM:

1. General inspection:

- Appearance
- Attitude
- Effort of breathing
- Cyanosis:
 - Central
 - Peripheral

2. Hands:

- Cyanosis
- Clubbing of fingers
- Clod or warm
- Splinter hemnorrhages
- Osler's nodules
- Janeway spots

3. Arterial Pulsations:

a. Palpate the radial artery

- Compare both sides
- Pulse Rate
- Rhythm

b. Carotid artery

- If unable to visualize pulsation's in the internal jugular, look for them in the ext. jugulars.
- Record the vertical distance & the angle at which the patient is lying

c. If C.H.F is suspected, do the hepatojagular reflux

- Press by your hand in the right upper quadrant region of abdomen for 30-50 sec.
- Observe for a rise in the JVP

d. Observe the amplitude & timing of the jugular venous pulsation's in order to time these pulsation, listen to the heart

SI.....a

SI.....S2x dessent

S2..... V

4. Blood Pressure:

- Choice of sphygmomanometer:
- Position of the patient
 - Supine
 - Sitting:
 - Standing:
- Which arm : vs two arms.

Technique:

- Sit of the bag
- Secure the cuff. (Not loose)
- Position of the patient's arm & its support

- Feel brachial artery
- Inflate the bag 30 mmHg above the pressure when pulsations disappear & then deflate = Palpable syst. BP then deflate & listen to changes in sound

5. **The Heart:**

Stand on the right side of the patients

Explain to the patient

Put the patient in a supine position with the upper body some what elevated

Expose the patient down to the waist

Inspection:

Pulsation:

- Apical
- Left parasternal
- Epigastrec, area
- Aortic area
- Pulmonary area
- (Common on S1 in the apical area & S2 in the base)
- (Listen in both phases of respiration)
- Extra sounds in systolic:
 - Ejection sound
 - Systolic clicke
- Extra sounds in diastole:
 - S₃, S₄, O.S
- Listen for systolic murmurs
- Listen of diastolic murmurs
- Ascultate the base of the heart with the diaphragm while the patient is sitting up, leaning forward, breath in complete exhalation.
- Ascultate the apical area using the bell of the stechescope rolling the patient on to his left side
- Ascultate the base of the heart while the patient standing up
- If you hear a murmur: comment:
 - Systolic or diastolic
 - Timing
- Location of maximal intensity
- Radiation
- Intensity- Grades
- Pitch
- Quality: blowing, rumbling, harsh, musical
- Variatin with respiration
- Search for oedema, ascites and hepatomegaly

References :

1. Snell, R.: Clinical Anatomy, 7th edition, 2002
Lippincott, Williams & Wilkins.
2. Guyton & Hall: Textbook of Medical physiology, 10th edition
Saunders, 2002.
3. Kumar, Cotran, Robins: Basic Pathology 7th edition, 2003 Saunders.
4. Craig, CR. & Stitzel, RE: Modern Pharmacology
with clinical applications 6th edition 2004
5. Devlin K: Textbook of Biochemistry with clinical applications 5th edition
Willey liss
6. JAWETZ, Melnick & Adelberg: Medical Microbiology. 5th edition, LANGE

السنة الثالثة – الفصل الأول

الجهاز التنفسي

Respiratory System

(500341)

(4) Credit Hours

Objectives:

By the end of the Respiratory course; the student should be able to :

1. Describe the gross anatomy of organs of the respiratory system including structure, relations, and vascular and nerve supply.
2. Describe the microscopic anatomy of organs of the respiratory system “light microscopic and electron microscopic techniques”.
3. The student should understand the embryonic development of organs of the respiratory system including possible congenital malformations.
4. Mechanics of breathing (lung ventilation), lung compliance, airway resistance, ventilation-perfusion relationship, gas exchange and transport, regulation of ventilation, pulmonary function test and brief clinical application to pathophysiology (lung diseases)
5. List diseases that affect the respiratory system, including: pathogenesis, epidemiology, clinical manifestation, and microscopic histological changes.
6. List causes, mode of transmission, and pathogenesis of respiratory tract infections.
7. Describe methods of specimen collection and diagnosis of respiratory tract infections.
8. Mention drugs used in the treatment of diseases that affect the respiratory system.
9. List Signs and symptoms of the respiratory system: their mechanisms and correlation.
10. Take history and perform general examination including the chest (inspection, palpation, percussion, and auscultation).

Content Summary:

Anatomy	10 lectures	6 practical
Physiology	10 lectures	2 practical
Pathology	10 lectures	2 practical
Microbiology	10 lectures	4 practical
Pharmacology	2 lectures	
Clinical Aspects	8 contact hours	
Clinical Examination	8 contact hours	

Gross Anatomy and Histology/Embryology (10 lectures and 6 practical)

1. Development of Respiratory System: nose, larynx and pharynx, trachea, bronchi, lungs.
2. Nasal cavity, paranasal sinuses, nasopharynx: wall, relations, blood and nerve supply, lymphatic drainage.
3. Pterygopalatine fossa, parapharyngeal space.
4. lab gross anatomy: nasal cavity, paranasal sinuses, nasopharynx, pterygopalatine fossa, parapharyngeal space
5. Larynx: skeleton, joints, muscles, cavity, nerve and blood supply.
6. Larynx: relations, movement
7. lab gross anatomy: larynx
8. Pleura: pulmonary pleura, parietal pleura, pleural cavity, pleural recesses, nerve and blood supply.
9. Lab gross anatomy: pulmonary pleura, parietal pleura, pleural cavity, pleural recesses
10. Lungs: position, topography, lobes, lobules, bronchial tree, bronchopulmonary segments nerve and blood supply.

11. Lab gross anatomy: lungs
12. Histology of upper respiratory passages.
13. Lab histology: upper respiratory passages
14. Histology of lower respiratory passages and pleura.
15. Lab histology: lower respiratory passages and pleura
16. Malformation of Respiratory System

Physiology (10 lectures and two practical)

17. Overview of the Respiratory Physiology: Functional Anatomy of the Lung- Alveolar Ventilation- Respiratory Muscles.
- 18-19. Lung Compliance: Binding between lung and thorax (The Resting Volumes concept)- Elastic properties of the respiratory system- lung and chest compliance curve- Pathological changes in lung compliance (Emphysema & asthma, Fibrosis & RDS)- Surface tension forces- Influence of surfactant- Role of alveolar interdependency
20. Airway Resistance: The non-elastic resistance- the importance of the radius- distribution of resistance in the respiratory tract- positive and negative pressure breathing Intra-alveolar pressure during inspiration & expiration- Intra-pleural pressure during inspiration & expiration.
21. Ventilation-Perfusion Ratio: normal difference in ventilation & perfusion between the apex & base of the lungs- the PO₂-PCO₂, V/Q diagram- Hypoxemia resulting from ventilation-perfusion
22. Gas Exchange: the concept of partial pressure- Partial pressures of gases in inspired, alveolar, expired, arterial, interstitial fluid and mixed venous blood- Changes in alveolar composition with hyper- and hypoventilation- Respiratory gas exchange ratio (respiratory quotient)- Diffusion capacity of the lung.
23. Biochemical aspects of hemoglobin structure and function (Biochemistry).
24. Gas Transport: Oxygen transport- Oxygen carrying capacity- Oxygen-Hemoglobin dissociation curve- Dissolved Oxygen Carboxyhemoglobin- Carbon Dioxide Transport
- 25-26. Control Of Breathing: The respiratory “controller”- Respiratory centers and accessory centers- Medullary dorsal and ventral respiratory groups- Spinal cord integration- Pulmonary receptors- Stretch receptors- Irritant receptors- Other peripheral input- Proprioceptors- Baroreceptors- Peripheral and central chemoreceptors- Ventilatory responses to altered PO₂, PCO₂, and pH- Ventilation during exercise- Ventilation at high altitude.
27. Pulmonary Function Tests (PFT) And Its Application To Respiratory Physiology- What are the major categories of PFT (e.g. ventilatory & gas analysis)- PFT in Obstructive Pattern and Restrictive Pattern
28. Spirometer and vitalogram (Lung volumes and capacities).
Textbook of medical physiology, by A.C. Guyton and John E, Hall The latest edition “Tenth edition, 2000”.

Pathology (10 lectures and 2 practical)

29. Obstructive lung diseases: Chronic Bronchitis and Emphysema
30. Atelectasis (collapse) and Asthma
31. Restrictive lung diseases: Acute restrictive lung diseases ARSD Chronic Restrictive lung diseases- Sarcoidosis- Hypersensitivity Pneumonitis.
32. Pneumoconiosis: Asbestosis- Anthracosis- Silicosis- Siderosis
33. Vascular lung diseases: Pulmonary thromboembolism- Pulmonary- Hemorrhage- Pulmonary Infarction- Pulmonary Hypertension & Vascular sclerosis- Diffuse pulmonary hemorrhage syndromes
- 34-35. Pulmonary infections- Bronchiectasis- Pneumonia's- Acute bacterial

- Pneumonias- Primary atypical pneumonias- Tuberculosis- Fungal Infections... Opportunistic infections ...Lung abscess
- 36-37. Lung tumors: Bronchogenic carcinoma.Metastatic.. Carcinoma- Carcinoid
38. Pleural lesions: Mesothelioma- Pleural effusion- Pneumothorax- Hemothorax- Chylothorax
- 39-40. Practical

Microbiology (10 lectures and 4 practical)

- 41-44. Bacterial infections: Strep. Group A. Strep pneumonia. Haemophilus Influenza. Mycoplasma pneumonia. Chlamydia pneumonia. Chlamydia psittaci. Mycobacterium tuberculosis. Klebsiella pneumonia. Legionella. Nocardia. Staph. Aureus. Pseudomonas Bacillus.
- 45-49 Viral infections: Rhinovirus. Adenovirus. Herpes viruses. Small pox virus. Enteroviruses. Measles virus. Influenza virus. Respiratory syncycial virus. Reoviruses. Corona virus. Parainfluenza virus. Cytomegalovirus.
- 50-51 Fungal infections: Histoplasma. Blastomyces. Paracoccidioides. Coccidioides. Cryptococcus Aspergillus. Candida. Pneumocystis carinii.
52. Parasitic infection: Amoebae. Echinococcus. Toxocara. Paragonium westermani. Taenia solium.
- 53-54. Practical

Respiratory Pharmacology (2 lectures)

- 55-56. Mucolytic agents...Cough suppressants...Bronchodilators.
The student should be able to describe the various mechanisms involved in the action of bronchodilators, the use of steroids and mast cells stabilizers in the treatment of bronchial asthma, and describe the action and uses of cough suppressants and mucolytic agents.

Clinical Aspects (8 Contact hours including the lectures, practicals and Seminars)

Clinical Examination (8 contact hours)

57-58 History Taking

59. Physical Examination Of The Respiratory System: Upper respiratory tract Examination: Nasal discharge, redness, patency of each nostril, inspection of nasal mucosa by the speculum bilaterally, examination of para-nasal sinuses for tenderness, examination of the lips teeth, gums, tongue & palate with proper light, examination of tonsils (size, color, petechia) pharynx, palate movement & gag reflex, post nasal drip
60. Inspection of the thorax
Inspection of the anterior chest wall while the patient lying flat for pattern of respiratory movement: rate & rhythm of respiration, abdominal movement with deep inspiration, shape of the thoracic cage, deformity, slopes of ribs, abnormal bulge during expiration, abnormal retraction of the inter-costal spaces during inspiration.
61. Palpation of the inferior thorax:
Examine the trachea for normal position, centralization or deviation using the tip of Rt. Index finger, Identify the location of the apex beat, Palpate the chest wall for any area of tenderness, Assess the chest expansion anteriorly, Check the tactile vocal fremitue using the palm of the hand comparing symmetrical areas bilaterally starting from the lung apices, Palpation of the lateral chest wall bilaterally for TVF.
62. Percussion of the anterior chest wall
Starts percussing both clavicles properly, then move to infraclavicular area down-wards, 5cm apart down to lower costal margin along the mid-clavicular line, Identifying hepatic, & cardiac dullness then resonance of gastric gases, Percuss the lateral chest wall bilaterally from 4th to 7th inter

costal spaces.

63. Auscultation of the anterior chest wall starting from apex down-ward comparing symmetrical areas bilaterally asking the patient to breathe through mouth more deeply, Check for tactile vocal resonance symmetrically over the lungs while he listens to chest wall telling the patient to say (44 in Arabic), Listen to quality & intensity of normal breath sound, Listen to the lateral chest wall symmetrically & bilaterally from above down-wards.

64. Examination of the post. Chest wall

While the patient is sitting with arms crossing comfortably over the Chest, Start inspection of the post. Chest wall as mentioned before, Then palpate the post. Chest wall from supra-clavicular areas down-wards for tenderness, Estimation of chest expansion posteriorly, Quantitative measurement of chest expansion using measuring tap at the level of the nipples, Palpate for the tactile vocal fremitus from supra-clavicular areas down wards symmetrically & bilaterally comparing both sides...Check for the level of diaphragm using the side of the palm for TVF. From up-ward down-ward...Then start percussing the supra-clavicular areas bilaterally comparing symmetrical areas (5 cm interval) down-ward to Diaphragmatic dullness (from below spine of the scapula to the 11th rib), Check for tidal percussion (Diaphragmatic excursion) in full expiration & inspiration, Listen to the chest wall post. From supra -clavicular areas down ward comparing symmetrical areas while patient breathing deeply from mouth, Perform tactile vocal resonance posteriorly comparing symmetrical areas bilaterally.

Recommended books

- 1) Sherris. Medical Microbiology: An Introduction to infectious Diseases 4th Edition (or latest edition). Appleton and Lange
- 2) BASIC PATHOLOGY Robin's (latest edition)
- 3) Clinical Anatomy by Richard Snell: Last edition, 2003
- 4) Grants Atlas of Anatomy by Agur:10th edition
- 5) Basic Histology: Textbook and Atlas by Junqueira et al: 10th edition
- 6) Langman's Medical Embryology: 8th edition 2000
- 7) MODERN PHARMACOLOGY with clinical application. By Craig and Stitzel (The latest Edition)
- 8) Principles of Internal Medicine - Author : Harisson
- 9) Principle of Surgery - Author : Sabiston

السنة الثالثة - الفصل الأول

الجهاز اللمفاوي والدم

Blood and Lymphoreticular Tissues

(4 credit hours)

(500371)

SUBJECT	Lectures	Practical
Anatomy and Histology	6	4
Physiology	11	3
Biochemistry	9	
Pathology	10	3
Immunology	2	
Microbiology	2	
Pharmacology	2	
Community Medicine	2	
Clinical	4	
TOTAL	48	10

Schedule for theory lectures:

No.	lecture title	Lecturer	date
I.	ANATOMY AND HISTOLOGY (6 hours)		
1, 2	Blood (Plasma, RBCs, WBCs: Basophils, Neutrophils, Lymphocytes, Monocytes, Megakaryocytes, ...)	Dr H Ramadan	
3	Bone Marrow (Haemopoiesis: Erythropoiesis & granulo-monpoiesis)	Dr H Ramadan	
4-6	Lymphoid organs (lymph nodes, spleen, thymus, tonsils & gut associated lymph, lymph vessels,....)	Dr H Ramadan	
II.	PHYSIOLOGY (11 hours)		
	Body Fluids:		
7	Body fluid compartments Intracellular fluid composition Extracellular fluid composition Interstitial fluid composition	Dr S Khraisha	
8	Plasma, volume composition & function	Dr S Khraisha	
9	Lymph, origin, circulation & function	Dr S Khraisha	
10	Fluid movements across membranes	Dr S Khraisha	
	Blood:		
11	Composition of formed elements & volume	Dr S Khraisha	
12	Erythropoiesis, RBCs production & control	Dr S Khraisha	
13	RBCs count & function	Dr S Khraisha	
14	WBCs origin & count	Dr S Khraisha	
15	White blood cell types & function	Dr S Khraisha	
16	Platelets, origin, count & function	Dr S Khraisha	

17	Hemostasis, extrinsic & intrinsic pathways, fibrinolysis & kinin system	Dr S Khraisha
III.	BIOCHEMISTRY (9 Hours)	
18	Heme synthesis (structure, synthesis & control)	Dr N Karadsheh
19	The synthesis of globin (DNA to RNA to protein, gene structure, regulation of globin synthesis)	Dr N Karadsheh
20	Structure of Hb (embryonic chains of Hbs, Post-translation & modification of Hb, 3° & 4° structure)	Dr N Karadsheh
21	Abnormal Hb (altered solubility, altered O ₂ affinity, Concepts of molecular disease, examples: fetal Hb, HbC, HbS & thalassemias)	Dr N Karadsheh
22	Degradation of Hb (heme to bilirubin, sources of bilirubin, excretion of bilirubin)	Dr N Karadsheh
23	Plasma proteins (structure and function)	Dr N Karadsheh
24	Iron metabolism	Dr N Karadsheh
25	Clotting and Coagulation Proteins	Dr N Karadsheh
26	Other metabolic Pathways in RBCs	Dr N Karadsheh
IV.	IMMUNOLOGY (2 Hours)	
27	Tumor Immunology	Dr H Abu Ragheb
28	Autoimmunity, in anemias & ITP	Dr H Abu Ragheb
V.	MICROBIOLOGY (2 Hours)	
29	Bacteremia & Septicemia	Dr A Shehabi
30	Viral Hemorrhagic Diseases	Dr A Mahafza
VI.	PATHOLOGY (11 Hours)	
31-33	RBCs disorders:	Dr M Tarawneh
	A. Hemolytic anemias: (Hereditary spherocytosis, Sickle cell anemia, Thalassemia, G6PD Deficiency, Paroxysmal nocturnal Hemoglobinuria, Immuno-hemolytic anemias, Hemolytic anemias from mechanical trauma)	
	B. Anemias of diminished erythropoiesis: (Iron deficiency, Anemia of chronic disease, Megaloblastic anemias, Folate deficiency, Vitamin B ₁₂ deficiency, Pernicious Anemia, Aplastic anemia, Myelophthisic anemia, Laboratory diagnosis of anemias)	
34	Polycythemia	Dr M Tarawneh
35	Non-neoplastic disorders of WBCs (Leukopenia, Neutropenia / Agranulocytosis, reactive leukocytosis, reactive lymphadenitis, acute nonspecific lymphadenitis, Chronic nonspecific lymphadenitis)	Dr M Tarawneh
36	Leukemias & myeloproliferative diseases	Dr M Tarawneh

- (Acute lymphoblastic lymphoma , Acute myeloblastic leukemia, Biphenotypic leukemias, Myelodysplastic syndromes
Chronic myeloid leukemia, Chronic lymphocytic Leukemia, Hairy cell leukemia, Etiology and pathogenesis of leukemias & lymphomas
Myeloproliferative disorders, Polycythemia vera
Myeloid metaplasia with myelofibrosis
Plasma cell dyscrasias and related disorders
Histiocytoses, Langerhan's cell histiocytosis)
- 37 Neoplastic proliferations of white cells
Malignant lymphomas Dr M Tarawneh
(Small lymphocytic lymphoma, Follicular lymphomas, Mantle cell lymphomas, Diffuse large cell lymphomas, Lymphoblastic lymphoma
Small nucleated (Burkitt's)
- 38 Miscellaneous: Dr M Tarawneh
Non-Hodgkin's Lymphoma
Hodgkin's Lymphomas
- 39 Bleeding disorders: Dr M Tarawneh
Disseminated intravascular coagulation
Thrombocytopenia
(Idiopathic thrombocytopenic purpura, Thrombotic microangiopathies, Thrombocytopenic purpura & hemolytic-uremic syndrome)
- 40 Coagulation disorders Dr M Tarawneh
(Von willebrand disease, Factor VIII deficiency hemophilia A classic hemophilia, Factor IX deficiency, Hemophilia B, Christmas Disease)
- 41 Disorders that affect the spleen & thymus Dr M Tarawneh
(Splenomegaly, Disorders of the thymus Hyperplasia, Thymoma)
- VII. PHARMACOLOGY (2 Hours)**
- 42 Unwanted coagulation Dr M Gharaibeh
(Oral anticoagulants, Injectable anticoagulants, Heparin, Antiplatelet agents)
- 43 Fibrinolysis (thrombolysis) Dr M Gharaibeh
(Fibrinolytic agents, Antifibrinolytic & homeostatic agents, Therapeutic uses of anticoagulants, Antiplatelet agents & fibrinolytic agents)
- VIII. COMMUNITY MEDICINE (2 Hours)**
- 44 Etiology, Incidence and prevention of, iron deficiency anemia, sickle cell anemia & thalassemia
- 45 Etiology, Incidence and prevention of leukemias & lymphomas
- IX. CLINICAL ASPECTS (3 Hours)**

46	Clinical approaches to anemia & polycythemia	Dr A Abbadi
47	Clinical approaches to bleeding & thrombosis disorders	Dr A Abbadi
48	Clinical approaches to hematological malignancies	Dr A Abbadi

Schedule for Practical Sissions:

<u>No.</u>	<u>Practical</u>	<u>hrs</u>	<u>lab.</u>
I.	ANATOMY AND HISTOLOGY (4 labs)		
1	Blood Cells	2 hrs	Histology
2	Bone Marrow	2 hrs	Histology
3	Lymoid Tissue 1	2 hrs	Histology
4	Lymphoid Tissue 2	2 hrs	Histology
II.	PHYSIOLOGY (3 labs)		
5	Blood cell counts (RBC & WBC)	2 hrs	Physiology
6	Blood clotting (Coagulation & bleeding time)	2 hrs	Physiology
7	Hb measurment & Fragility test	2 hrs	Physiology
V.	PATHOLOGY (3 labs)		
8	Examples of anemia	2 hrs	Pathology
9	Examples of leukemia	2 hrs	Pathology
10	Examples of lymphoma	2 hrs	Pathology

السنة الثالثة – الفصل الأول
والوبائيات والإحصاء الحيوي
Epidemiology and Biostatistics
(3 Credit hours)
0505301

I- Course Description

This course has two components the theoretical part constitutes 3 credit hours and covers an introduction to descriptive and analytical epidemiology, the epidemiology of infectious and chronic diseases , transmission of infectious diseases, descriptive statistics, the theory of probability levels of significance , hypothesis testing, regression and correlation and the use of statistics in epidemiology . The practical part runs over one credit hour (2 practical hours) where students will be exposed to practical application in the field of Epidemiology and Biostatistics

II. Course Outline

a. The following topics will be covered in the theoretical part to the course:

- | | |
|--|------------|
| 1- Epidemiology of orientation and concepts | 2 lectures |
| 2- Measurement of Morbidity and Mortality and Risk | 2 lectures |
| 3- Sources of Data on Community Health and selected indices of Health | 2 lectures |
| 4- Epidemiological studies | 2 lectures |
| 5- Epidemiological studies | 2 lectures |
| 6- Epidemiological of Maternal Child Health | 2 lectures |
| 7- Epidemiological of Nutritional disease | 2 lectures |
| 8- Epidemiological of Chronic disease | 2 lectures |
| 9- Epidemiological of Infectious disease | 2 lectures |
| 10- Epidemiological of Endemic disease | 2 lectures |
| 11- Descriptive Statistics : Data Presentation | 2 lectures |
| 12- Descriptive Statistics: Summarizing Data | 2 lectures |
| 13- Probability , Population and Samples | 2 lectures |
| 14- Statistical Inference : Estimation and Confidence Intervals in the One Sample Situation. | 2 lectures |
| 15- Hypothesis Testing : Comparison of Two or More Groups. | 2 lectures |
| 16- Regression and Correlation | 2 lectures |

b. Practical applications

32 hours

السنة الثالثة – الفصل الثاني

الجهاز العصبي والحواس

Neurosciences and Special Senses

(0500311)

(8) Credit Hours

In some years this is divided into: Neurosciences and Special Senses-1 (0500311)

(4) Credit Hours and Neurosciences and Special Senses-2 (0500312) (4) Credit Hours

Objectives:

By the end of this course, the student should be able to:

1. describe and identify the gross morphology and microanatomy of the central and peripheral nervous system.
2. identify the organs of the special senses and describe their anatomical features and histology.
3. describe the functions of the central and peripheral, and relate structure to function.
4. describe the functions of the organs of the special senses and relate structure to function.
5. list molecules involved in the normal functioning of the central and peripheral nervous systems, their characteristics and regulation.
6. list the pathologic disorders that affect the central and peripheral nervous systems, their pathogenesis and manifestations.
7. Mention infections of the CNS, including their etiologic agents, pathogenesis, manifestations and diagnosis.
8. list most important drugs used in the treatment of disorders that affect the central and nervous systems including their pharmacologic properties, indications, doses and side effects.
9. describe the epidemiology of diseases that affect the nervous system.
10. take comprehensive history and perform a proper physical examination of the central and peripheral nervous system.

Content Summary:

- Anatomy and histology	(36)	hours
Theory (22)		
Practical (14)		
- Physiology	(24)	hours
- Biochemistry	(4)	hours
- Pathology	(12)	hours
- Microbiology	(8)	hours
- Pharmacology	(20)	hours
- Epidemiology	(4)	hours
- Clinical aspects	(12)	hours
<hr/>		
Total	120	hours

Anatomy:

36 hours

Theoretical Anatomy of the Central Nervous System:

1- Introduction and Nomenclature of the CNS (1 lecture)

Note on the evolution of the CNS, comparative anatomy.

Need for the CNS and its elaboration beyond the action and reaction response in man.

Nomenclature: spinal cord, brainstem, cortex

- 2- Classification of nerve fibers** (1 lecture)
The different sizes of axons, their classification and the meaning of their diversity (e.g. muscle spindle).
- 3- Spinal Cord**
Factors of lamination, cytoarchitecturing, lamination of the cord.
Differences among the regions of the cord. (1 lecture)
- 4- Brainstem:**
Transformation of the cord into brainstem.
Organization of the dorsal column. Longitudinal and transverse organization of the brainstem. (2 lectures)
Tractology (in short) Somaesthetic (anterolateral, medial lemniscal, Spinocervical pathways.
Proprioceptive anterior, posterior, rostral and Cuneocerebellar tracts. (2 lectures)
Corona radiata, internal capsules, cerebral peduncle
Pyramidal tract and gamma loop. (1 lecture)
Trigeminal system, Auditory pathway, vestibular system, facial nerve, Ambiguous system and hypoglossal nerve ocular innervation, Visual pathway, (6 lectures)
Thalamus, lamina quadrigemina, and basal ganglia. (2 lectures)
- 5- Cerebellum**
subdivision, deep cerebellar nuclei, cerebellar peduncles, architecture and connection, proprioception (1 lecture)
- 6- Cerebral cortex**
neocortex (motor cortex, sensory cortex primary, secondary and association cortices, different representation maps). (1 lecture)
archicortex (limbic system and olfactory pathway) (1 lecture)
ventricular system (lateral ventricle, third ventricle, fourth ventricle, the central canal and the subarachnoidal space) (1 lecture)
The basal ganglia and the extra-pyramidal tracts (1 lecture)
- 7- Meninges and blood supply of the brain**
pachymeninx, leptomeninx, dural sinuses, spaces, innervation, blood supply (anterior circulation, posterior circulation, circle of Willis) (1 lecture)

PRACTICAL ANATOMY OF THE CENTRAL NERVOUS SYSTEM

- 1) General identification of brain specimens One practical Session (2hr.)
- 2) General identification of spinal cord on specimens (anterior root, posterior root, spinal ganglion, cauda equine, enlargements of the corde, blood supply of the cord). One practical Session (2hr)
- 3) Topography of the spinal cord
Spinal cord- vertebral column relationship, gross- and Micro-anatomy of the spinal cord, identification of the Various regions of the cord (histology slides).One practical Session (2hr)
- 4) The brainstem
Closed medulla (Motor decussation one section
Sensory decussation one section)
Open medulla (One section) Two practical Session (4hr.)
Pons (Three section: caudal- mid
Pontine and isthmus pontis)Two practical Session (4hr.)
Midbrain (two section: superior collicular Level and inferior collicular level) One practical Session (2hr)

- Mesencephalic-Diencephalic junction (one section) One practical Session (2hr)
- 5) Cerebellum and cerebell. Peduncles
(Gross-and micro-anatomy) One practical Session (2hr.)
- 6) Cerebral cortex
Cyto- architecturing
Identification gyri, sulci and regions
Coronal sections of prosencephalon
Sagittal and parasagittal of the prosencephalon
horizontal sections of the prosencephalon
ventricular system (Lateral ventricle, third ventricle,
fourth ventricle)
The central canal and the subarachnoid space. Two practical Sessions (4hr)
- 7) Meninges and blood supply of the brain
Pachymeninx, leptomeninges, dural sinuses,
Spaces, innervation, blood supply
(anterior circulation, posterior circulation, circle of Willis)
Revision Two practical Session (4hr)

PHYSIOLOGY

(24) CONTACT HOURS:

- CNS ORGANIZATION 1 lecture
 - I. Nervous System,
 - A. Functions of the Nervous System.
 - B. Comparison with Endocrine System.
 - II. Organization of the Nervous System
 - A. Sensory system and its components.
 - B. Motor System and its components
 - C. Integration Center and its components.
- SYNAPTIC FUNCTION: 2 lectures
 - I. Functional Parts of Neurons
 - A. Input Component of a Neuron
 - B. Integrative Component and Trigger Zone of a Neuron
 - C. Conductile Component of a Neuron
 - D. Output Component of a Neuron
 - II. The Resting Membrane Potential
 - A. Important Factors Contributing to the RMP
 - B. Generation and Maintenance of the RMP
 - C. Effects of Electrolytes on the RMP
 - 1. Effects of Na Ions on the RMP
 - 2. Effects of K Ions on the RMP
 - 3. Effects of Ca Ions on the RMP
 - III. Initiation and Conduction of the Action Potential
 - A. Generation of the Action Potential at the Trigger Zone
 - B. Control of the Pattern of Neuronal Firing
 - 1. Interaction of Inhibitory and Excitatory Synaptic Potentials
 - 2. Refractory Periods
 - 3. Hyperpolarizing Afterpotentials due to Calcium-gated K⁺ Channels
 - C. Spread of the Action Potential to the Axon
 - D. Conduction in Axon
 - 1. The Conduction Cycle:

Conduction of the Action Potential in the Axons

- 2. The Importance of Myelination
- 3. Saltatory Conduction in a Myelinated Axon
- E. Conduction Failure in Demyelinating Diseases
- IV. Synaptic Potentials and Neurotransmitters
 - A. Fast, Conductance-Increase Synaptic Potentials (EPSPs and IPSPs)
Produced by Iontropic Synaptic Action (Small Molecules Rapidly Acting Neurotransmitters)
 - B. Slow Synaptic Potentials Produced by Metabotropic Synaptic Action (Large Molecules Slowly Acting Neurotransmitters)
 - 1. Regulation of Intracellular Second Messengers by G Proteins
 - 2. Common Second Messengers
 - C. Neurotransmitters
- VI. Determinants of Synaptic Action
 - A. The Sign of Synaptic Action
 - B. Amplitude of Synaptic Potentials
 - 1. Presynaptic Inhibition

- **SENSORY RECEPTORS, FUNCTION AND NEURONAL MECHANISMS** 2 lectures

Somatic Sensibility

- I. Basic Features of Neuronal Connections and Operations
 - A. Divergence and Convergence
 - B. Synapticity
 - C. Signals and Noise in the Brain
 - D. Mechanisms for Changing Firing Rate
- II. Submodalities of Somatic Sensibility , Adequate Stimulus.
- III. Sensory Transduction
 - A. At Mechanoreceptors
 - B. At Nociceptors
- IV. Receptors and Afferent Fibers
 - A. Types of Primary Afferent Fibers
 - B. Touch, Pressure, and Vibration
 - 1. Receptors
 - 2. Rate of Adaptation
 - 3. Receptive Fields
 - 4. Properties of Mechanoreceptors
 - C. Proprioception (Limb/Joint Position)
 - 1. Properties of Proprioceptors

- **SOMATIC SENSATION, TACTILE AND POSITION** 2 lectures

V. The Dorsal Column - Medial Lemiscal (DC-ML) System and Its Trigeminal Analogues

- A. Anatomical Components of the DC-ML System
- B. Trigeminal Analogues of the DC-ML System
- C. Primary Somatic Sensory (SI) Cortex
 - 1. Somatotopic Organization of the SI Cortex
 - 2. Multiple Maps of the Body in the SI Cortex
 - 3. Columnar Organization of the SI Cortex
 - 4. Efferent Projections from the SI Cortex
- D. Secondary Somatic Sensory (SII) Cortex
- E. Somatic Sensory Association Cortex

F. Functional Properties of the DC-ML System

1. Specialized Receptors & Medium- and Large-diameter Afferent Fibers
2. Young Phylogenetic Age
3. Precise Somatotopic Organization of the DC-ML System
4. Small Receptive Fields of DC-ML System Neurons
5. High Fidelity System
6. Afferent Surround Inhibition in the DC-ML System
7. Efferent Control of Somatosensory Input
8. Spatial Discrimination by the DC-ML System

G. Clinical Features of DC-ML System Lesions

1. Sensory Deficits
2. Importance of the Pattern of Sensory Loss
3. Importance of Somatic Sensory Association Cortex

- SOMATIC SENSATION, PAIN AND THERMAL 1 lecture

VI. Receptors of Pain And Temperature

A. Nociception (Pain)

B. Thermoception (Hot and Cold)

1. Properties of Thermoceptors
2. Responses of Thermoceptive Afferents

VII. The Spinothalamic (Anterolateral) System and its Trigeminal Analogues

A. Features of the Pain Experience

B. Anatomical Components of the Spinothalamic System

C. Trigeminal Analogues of the Spinothalamic System

D. Functional Properties of the Spinothalamic System

1. Unspecialized Receptors and Small Afferent Fibers
 2. Old Phylogenetic Age
 3. Coarse Somatotopic Organization of the Spinothalamic System
 4. Large, Multimodal Receptive Fields in the Spinothalamic System
 5. Cortical Contribution to Pain Perception by the Spinothalamic System
 6. Plasticity of the Pain Experience
- E. Control of Nociceptive Inputs by the CNS
1. Gate Control Theory of Melzack & Wall
 2. Efferent Control
 3. Enkephalins and Endorphins
- F. Clinical Features of Lesions of the Spinothalamic System
- G. Important Forms of Pain

- VISION 3 lectures

*** Sight

I. Optical Characteristics of the Eye

A. Light: The Adequate Stimulus for Vision

B. The Eye as an Optical Instrument

C. Refraction

D. The Pupil

E. Optical Defects

1. Myopia (Nearsightedness)
 2. Hyperopia (Farsightedness)
 3. Presbyopia
 4. Spherical and Chromatic Abberation
- II. The Retina

- A. Features of Rod and Cone Systems
- B. Phototransduction in Rods
 - 1. The Photopigment, Rhodopsin
 - 2. Activation of Transducin
 - 3. Activation of Phosphodiesterase
 - 4. Hydrolysis of cGMP to 5' GMP Causes Hyperpolarization
- C. Phototransduction in Cones
- D. Electrical Responses of Photoreceptors
- E. Dark and Light Adaptation of Rods and Cones
- F. Visual Afterimages
- G. High Visual Acuity of Foveal Vision
- V. Retinal Processing of Visual Input
 - A. Retinal Ganglion Cells
 - B. Receptive Fields (RFs) of Retinal Ganglion Cells
 - C. Two Basic Retinal Circuits
 - D. Synaptic Operations in the Retina
 - E. Generation of an On-center, Off-surround Receptive Field
 - 1. Stimulation of the Receptive Field Center
 - 2. Stimulation of the Receptive Field Surround
 - F. Two Types of Bipolar Cells
 - G. Functions of Antagonistic Center-Surround Receptive Fields
 - H. Receptive Field Size
 - I. Color Coding by Ganglion Cells
- III. Image Processing in the Lateral Geniculate Nucleus
- IV. Cortical Processing of Visual Input
 - A. Primary Visual (VI) Cortex
 - 1. Retinotopic Organization
 - 2. Receptive Fields
 - a. Simple and Complex Cells
 - b. Color Coding by Cortical Cells
 - c. Ocular Dominance
 - d. Stereopsis (Depth Perception)
 - 3. Cortical Columns
- B. Other Cortical Areas Important for Sight

-. HEARING

2 lectures

*** Hearing

- I. The Auditory System
 - A. Peripheral Component
 - 1. Ear
 - 2. Middle Ear
 - 3. Inner Ear
 - B. Central Components
- II. The Adequate Stimulus
 - A. Sound Intensity and Frequency
 - B. Transmission of Sound Energy Within the Ear
- III. The Cochlea and the Organ of Corti
 - A. Physical Properties of the Basilar Membrane
 - B. Excitation of Hair Cells
 - C. Electrical Potentials of the Cochlea
- IV. Neural Processing
 - A. The Audibility Curve

- B. Receptive Fields of Auditory Neurons
- C. Neural Codes
- D. Efferent Control of Auditory Input
 1. Efferent Fibers in the Olivocochlear Bundle
 2. The Acoustic Reflex
- V. Clinical Features of Lesions in the Auditory System
 - A. Conduction and Sensorineural Deafness
 - B. Lesions of Central Pathways

- TASTE AND SMELL

1 lecture

*** Chemical Senses

- I. Taste
 - A. Taste Buds: The Taste Receptors
 - B. Receptor Physiology
 1. Basic Taste Modalities
 2. Receptor Potentials in the Taste System
 3. Discrimination of Flavors
 4. Threshold and Intensity Discrimination of Taste Responses
 - C. Central Pathways of Taste
 - D. Theories of Taste Perception
 - E. The Biological Value of Taste
- II. Olfaction
 - A. Flow of Olfactory Information
 - B. Olfactory Pathways and Receptors
 - C. The Physiology of Olfaction
 1. Olfactory Thresholds and Discrimination
 2. Signal Transduction in the Olfactory System
 3. Odorant Binding Proteins
 4. Odor Receptors
 5. Sniffing and Adaptation of Olfactory Receptors
 - D. Olfactory Interaction with other Limbic System Functions

- MOTOR SYSTEM, SPINAL CORD

2 lectures

** Spinal Reflexes

- I. Spinal Reflexes
 - A. Features of Reflexes
 1. The Reflex ARC
 - II. Muscle Receptors
 - A. Muscle Spindles
 1. Afferent Fibers of Muscle Spindles
 2. Adequate Stimulus for Muscle Spindles
 3. Motor Innervation of Muscle Spindles
 - B. Golgi Tendon Organs
 1. Innervation of Golgi Tendon Organs
 2. Adequate Stimulus for Golgi Tendon Organs
 - C. Responses of Group I Afferent Fibers to Muscle Stretch and Contraction
 - D. Responses of Free Nerve Endings to Muscle Stretch and Contraction
 - E. The Stretch (myotatic, DTR) Reflex
 1. Adequate Stimulus for the Stretch Reflex
 2. Stretch Reflex Circuitry
 3. The Stretch Reflex: An Animated Summary
 4. Stretch Reflex Action

5. Functional Roles of the Stretch Reflex
6. Supraspinal Regulation of the Stretch Reflex
- F. The Tendon reflex
 1. Adequate Stimulus for the Tendon reflex Reflex
 2. Golgi Tendon Organ Receptor
 3. Tendon reflex Circuitry
 4. Tendon reflex Action
 5. Functional Roles of the Tendon reflex
 6. Supraspinal Control of the Tendon reflex
- G. The Flexion (Withdrawal) Reflex
 1. Adequate Stimulus for the Flexion Reflex
 2. Flexion Reflex Circuitry
 3. Neuronal Operations of the Flexion Reflex
 4. Flexion Reflex Action
 5. Functional Roles of the Flexion Reflex
 6. Supraspinal Control of the Flexion Reflex
- H. Clinical Importance of Reflexes

- **BRAIN STEM**

1 lecture

*** Balance and Equilibrium

- I. Functional Roles of the Vestibular System
- II. The Vestibular Apparatus
 - A. Semicircular Canals
 1. Orientation
 2. Receptors
 - a. Morphologic Polarization
 - b. Continuous Release of Neurotransmitter
 - c. Adequate Stimulus
 3. Central Connections
 - B. Maculae of the Utricles and Sacculles
 1. Receptors
 - a. Morphologic Polarization
 - b. Continuous Release of Neurotransmitter
 - c. Adequate Stimulus
 2. Central Connections
- III. Effect of Rotation on Equilibrium and Eye and Body Muscles
 - A. Getting Oriented
 - B. At the Beginning of Rotation
 1. Endolymph Flow
 2. Effects on Eye Movements
 3. Effects on Other Muscles and on Equilibrium
 4. Duration of Nystagmus
 5. Optokinetic Nystagmus
 - C. At the Cessation of Rotation
 1. Endolymph Flow (Animation)
 2. Effects on Eye Movements
 3. Effects on Trunk and Limb Muscles
 4. Effects on Equilibrium
 5. Summary: Effects of Suddenly Stopping Rotation to the Right

*** Motor Systems

- I. The Nature of Motor Control

- II. Upper Motor Neurons (UMNs)
 - A. Three UMN Pathways
 - B. UMN Actions
 - C. UMN Termination in the Spinal Cord
 - D. Signs of UMN Damage
- III. Features of Motor Pathways
 - A. Medial Brainstem Motor Pathway
 - B. Lateral Brainstem Motor Pathway
 - C. Corticospinal Motor Pathway
- IV. Examples of UMN Problems
 - A. Decerebrate Rigidity
 - B. UMN Disease
 - C. Spinal Cord Transection

- CEREBELLUM

2 lectures

- I. The Cerebellum:
 - A. Functional Subdivisions of the Cerebellum
 - 1. The Vestibulocerebellum
 - 2. The Spinocerebellum
 - 3. The Cerebrocerebellum
 - B. Unique Features of the Cerebellum
 - C. Neuronal Processing in the Cerebellum
 - 1. The Functional Circuit
 - 2. Most Important Neuronal Connections
 - 3. Mossy Fiber Excite a Strip of Purkinje Cells
 - 4. Inhibitory Shaping of Nuclear Cell Discharge
 - 5. Climbing Fibers
 - D. Function of the Cerebellum
 - E. Clinical Signs of Cerebellar Dysfunction

- BASAL GANGLIA

1 lecture

- I. The Basal Ganglia
 - A. Basic Circuitry of the Basal Ganglia
 - B. Neurotransmitters
 - C. Two Circuits Out of the Basal Ganglia – Direct and Indirect Pathways.
 - D. Parkinsonism

- MOTOR CORTEX

1 lecture

- I. The Motor Cortex (MI) and Corticospinal Tract
 - A. Fallacy of the Pyramidal Syndrome
 - B. Primary Motor (MI) Cortex
 - 1. Topographic Organization of MI Cortex
 - 2. Afferent Inputs to the MI Cortex
 - 3. Columnar Organization of the MI Cortex
 - 4. Neuron Discharge/ with Voluntary Movement

- CEREBRAL CORTEX, INTELLECTUAL FUNCTIONS

1 lecture

- ***Speech and Higher Cortical Function
 - I. The Prefrontal Association Areas
 - A. Frontal Granular Cortex
 - B. The Orbitofrontal Cortex
 - C. Prefrontal Leucotomy in Humans

- D. The Prefrontal Cortex in Schizophrenia
- II. Posterior Association Areas Parietal/Occipital/Temporal Cortex
 - A. Speech Functions
 - 1. Posterior Speech Cortex
 - 2. Anterior Speech Cortex
 - 3. The Arcuate Fasciculus
 - 4. Motor Writing Center
 - 5. Angular and Supramarginal Gyri
 - 6. Regional Blood Flow and Speech
 - 7. Connections Between the Speech-Sensitive Areas
 - 8. Gender Differences in Speech Integration
 - B. Non-Dominant Side Parietal Association Cortex]
- III. The Two Cerebral Hemispheres are Asymmetrical
 - A. Anatomical Hemispheric Asymmetry
 - B. Functional Hemispheric Asymmetry

***** Learning and Memory

1 lecture

- I. Memory Dysfunction
 - A. The Amnesic-Confabulatory Syndrome: Wernicke-Korsakoff Encephalopathy
 - B. Amnesia Following Anterior-Medial Temporal Lobe Lesions
 - C. Progressive Dementia (Treatable Causes of Dementia)
- II. The Stages of Memory Consolidation
 - A. Measuring Immediate Memory
 - B. Measuring Recent Memory
 - C. Measuring Long-Term Memory
- III. Long-Term Memories are More Durable than Recent Memories
- IV. Mechanisms of Memory
 - A. Mechanisms of Immediate Memory
 - 1. Immediate Memory is Associated With Reverberation in Wide Spread Regions
 - 2. Immediate Memory is Supported by the Prefrontal Lobes
 - B. The Anatomy of Recent Memory
 - 1. Medial Temporal Lobe Amnesia
 - . Long Term Potentials in Hippocampus
 - 3. The Hippocampus and Amygdala Interface the Sensory Environment and Autonomic Responses
 - 4. Infero-temporal Cortex
 - 5. The Mammillary Bodies
 - 6. The Periaqueductal Gray Matter
 - 7. The Dorsomedial Thalamus
 - C. Mechanisms of Long-Term Memory
 - 3. Protein Synthesis and New Synapses
- V. Neurotransmitters and Memory
 - A. Acetylcholine and Memory
 - B. Norepinephrine and Memory
 - C. Serotonin and Memory

-. RETICULAR ACTIVATING SYSTEM AND SLEEP

1 lecture

- *** Attention, Alertness, EEG,
- III. The Ascending Reticular Arousal System (ARAS)
 - A. The Brainstem Component of the ARAS

*** Sleep

- I. Classification of the Stages of Sleep
 - A. The Electrographic Measurement of Sleep
 - B. Mental and Electrographic Correlates of Slow Wave Sleep
 - C. Mental and Electrographic Correlates of REM Sleep
 - 1. Mental
 - 2. Electrographic
 - 3. Other Physiologic
 - B. Progression of Sleep Stages During a Typical Night
 - C. The Effects of Aging upon the Stages of Sleep
- II. Mechanisms of Sleep
 - A. Overview of Anatomical & Physiological Mechanisms of Sleep
 - B. Circadian Rhythms
 - C. Mechanisms of Slow Wave Sleep
 - D. Mechanisms of Rapid Eye Movement Sleep
 - E. Endogenous Sleep Factors
- III. Clinical Correlates of Sleep Staging
 - A. The Effects of Sleep Loss
 - B. The Effects of Drugs on Sleep

Acetylcholine

Chemistry, synthesis, storage and release

Acetylcholine esterase and termination of Acetylcholine action

Nicotinic and muscarinic receptors

Catecholamines and other neurotransmitters

Synthesis, storage and release

Receptors

Serotonin histamine GABA, glycine

Neuropeptides

Signal transduction in photoreception

Molecular and metabolic basis of some neurological disorders

Parkinson's disease

Alzheimer's

Chemistry

(4 contact hours)

Acetylcholine

Chemistry, synthesis, storage and release

Acetylcholine esterase and termination of Acetylcholine action

Nicotinic and muscarinic receptors

Catecholamines and other neurotransmitters

Synthesis, storage and release

Receptors

Serotonin histamine GABA, glycine

Neuropeptides

Signal transduction in photoreception

Molecular and metabolic basis of some neurological disorders

Parkinson's disease

Alzheimer's

Pathology

12 lectures:

1.

- General concepts: cerebral edema, raised intracranial pressure, herniation and hydrocephalus.

- Trauma to the CNS : skull fractures, parenchymal injuries (concussion, contusion, laceration, diffuse axonal injury), traumatic vascular injury (epidural, subdural hematoma).

2.

- Malformations and developmental abnormalities: neural tube defects, forebrain anomalies, posterior fossa anomalies, syringomyelia, perinatal brain injury.

- Phacomatosis.

3.

- Cerebrovascular diseases:-

Concept of autoregulation

Classification

Global hypoxia – ischemia encephalopathy

Infarcts (introduction, transient ischemic attack, middle cerebral artery, internal carotid artery, vertebro- basilar artery).

Intraparenchymal hemorrhage

Subarachnoid hemorrhage

Vascular malformations

4.

- infection:-

Routes of infection.

Epidural and subdural infections

Meningitis (acute suppurative, acute aseptic, chronic meningitis).

Parenchymal infections (encephalitis, brain abscesses).

Prion diseases

5. and 6.

- Degenerative disease:-

Cerebral cortex (Alzheimer disease, picks disease)

Basal ganglion and brain stem (Parkinson disease,

Huntington disease).

Spinocerebellar(Friedreich ataxia, Ataxia- Telangectasia)

Motor neurons (amyotrophic lateral sclerosis)

7.

- Demyelination disorders (leukodystrophies, multiple sclerosis)

8.

- Tumors of the CNS

Primary vs. secondary

Primary CNS tumors

Astrocytoma (fibrillary and pilocytic)

Oligodendroglioma

Ependymoma

PNET, medulloblastoma

Neural tumors

Lymphoma

Meningioma

Metastatic tumors

9.

- Peripheral nerve:

Inflammatory neuropathies

Acquired metabolic and toxic neuropathies

Traumatic neuropathies
Tumors of peripheral nerves
10.

- Disease of skeletal Muscles:
Denervation atrophy (infantile motor neuron disease)
Muscle dystrophies (X- linked; DMD, BMD, myotonic dystrophy)
Inflammatory myopathies
Diseases of the neuromuscular junction.

Practical Session:

Two practical sessions each consists of 2 contact hours

Week one:-

Gross and microscopic examples of herniation, hydrocephalus, malformations, infarcts and infections are discussed.

Week Two:-

Gross and microscopic features of common brain tumors are discussed.
Examples of myopathies and neuropathies are covered.

Microbiology

(6 hours)

Infections:

Bacterial:

Neisseria meningitidis
Haemophilus influenzae
Listeria, E. coli, Mycobacteria
Clostridium tetani and botulinum
Spirochaetes, staph, Strep. Group B, Leptospira
Chlamydia trachomatis, Rickettsia, Pseudomonas

Viral:

Polio virus
Herpes viruses. Enteroviruses. Measles. Mumps. Rubella.
Rabies virus
Togaviruses and Flaviviruses. Bunyaviruses. Coxsaki viruses
Slow viruses and prions. ECHO viruses

Parasites and fungi:

Amoebae, trypanosoma, Toxoplasma
Onchocerca, Taenia solium
Cryptococcus, candida

Pharmacology of Nervous System

(20 hours)

- 1- Autonomic nervous system
 - Receptors and neurotransmitter of ANS (one lecture)
 - Adrenomimetic drugs (one lecture)
 - Adrenalytic drugs (one lecture)
 - Cholinomimetic drugs and antagonists (two lecture)
 - Ganglionic blocking drugs and ergot alkaloids (one lecture)
 - Local anaesthetics (one lecture)
- 2- Neuromuscular blocking agents:
 - Depolarizing blocker (one lecture)
 - Nondepolarizing blockers (one lecture)
- 3- Central Nervous System:
 - Receptors and neurotransmitters of CNS (one lecture)
 - General anaesthetics (two lectures)
- Opioid and nonopioid analgesics (two lectures)

- Sedative – hypnotics (one lecture)
- Antidepressants (one lecture)
- Antipsychotics (one lecture)
- Anticonvulsants (one lecture)
- Antiparkinsonian drugs (one lecture)
- CNS stimulants (one lecture)
- CNS drug abuse (one lecture)

Clinical Aspects:

- Lecture 1 Cognitive functions
- Lecture 2 Cranial nerves
- Lecture 3 Motor system
- Lecture 4 Sensory system and cerebellar function
- Lecture 5 Approach to pediatric neurology patient
- Lecture 6 Paroxysmal neurology disorders
- Lecture 7 Static and regressive neurological disorders
- Lecture 8 Neuro surgery 1
- Lecture 9 Neuro surgery 2
- Lecture 10 Neuro anesthesia

References:

1. Snell, R.: Clinical Anatomy, 7th edition, 2002
Lippincott, Williams & Wilkins.
2. Guyton & Hall: Textbook of Medical physiology, 10th edition
Saunders, 2002.
3. Kumar, Cotran, Robins: Basic Pathology 7th edition, 2003 Saunders.
4. Craig, CR. & Stitzel, RE: Modern Pharmacology
with clinical applications 6th edition 2004
5. Devlin K: Textbook of Biochemistry with clinical applications 5th edition
Wiley liss
6. JAWETZ, Melnick & Adelberg: Medical Microbiology. 5th edition, LANGE

السنة الثالثة – الفصل الثاني
الجهاز البولي التناسلي
Genitourinary System
(500361)
(6) Credit Hours

Objectives:

By the end of this course, the student should be able to:

- 1- identify the external and internal gross anatomical and micro-anatomical features of each organ of the urinary system
- 2- describe the arterial supply, venous drainage, lymphatic drainage and nerve supply of each organ
- 3- identify the external and internal gross anatomical features of each organ of the Male and female Reproductive Systems and their blood and nerve supply.
- 4- describe the functional anatomy of the kidney. Role of the renal system in homeostasis.
- 5- Describe Glomerular filtration and its relations in term of (rate, compositions, dynamics, control, and measurements etc.
- 6- Define tubular reabsorption and secretion (The concept of clearance by the kidney and its interpretations). Understand tubular reabsorption and secretion for Na^+ , K^+ , and H^+ .
- 7- describe how germ cells (Spermatozoa and Oocyte) are formed and the regulation of their production.
- 8- mention variation in sex hormones formation(at different age periods), regulation, metabolism and specific function of each one.
- 9- describe menstrual cyclic and its disorders.
- 10- mention the optimum period of fertility, early pregnancy and implantation
- 11- explain the concept of positive and negative feedback mechanism and hypothalamic pituitary gonadal axis.
- 12- describe the hormonal changes of pregnancy with emphasis on early stage.
- 13- describe breast development, milk production and secretion
- 14- describe Puberty, menopause / andropause, meaning of terms and endocrinology of these stages.
- 15- mention the pathologic basis and clinical manifestations of diseases affecting the female and male genital tracts and mammary glands.**
- 16- describe the pathologic basis and clinical manifestations of renal diseases and collecting system.
- 17- describe the major causative agents, transmission and antimicrobial treatment of urinary tract infection and sexually transmitted diseases in males and females.
- 18- mention laboratory methods used in isolation and identification of causative agents leading to urinary
- 19- list risk factors of sexually transmitted diseases, their prevalence, control and prevention.
- 20- describe the pathogenesis and manifestations of the immunological diseases affecting the urogenital system of the males and females.**
- 21- list drugs used for the treatment of urinary and genital tract disorders, their pharmacological actions, their mechanism of action, their clinical uses, their major side effects and drug-drug interactions.
- 22- mention major clinical manifestations of urological, renal and genital diseases
- 23- take proper history and conduct comprehensive physical examination of the urogenital system in mal

Content Summary:

Topic

Hours

Anatomy and histology	22
Physiology	14
Pathology	28
Microbiology	10
Pharmacology	7
Epidemiology	2
Clinical Aspects	5
Total	94

1. Anatomy and Histology of the genitourinary system (22 hours)

A- Gross Anatomy of the Urinary System (6 hours; 4 Lectures and 2 Practical)

Lectures:

1. Kidneys
2. Ureters
3. Urinary bladder
4. Urinary bladder

Practical:

5. Kidneys and Ureters
6. Urinary bladder

B- Gross Anatomy of Reproductive System (6 hours; 4 Lectures and 2 Practical)

1- Male Reproductive System (3 hours; 2 Lectures and 1 Practical)

Lectures:

7. Testis, Epididymis, Vas deferens and Spermatic Cord
8. Seminal Vesicles, Prostate and Penis

Practical:

9. Male Reproductive System

2- Female Reproductive System (3 hours; 2 Lectures and 1 Practical)

Lectures:

10. Uterus, Uterine tubes
11. Ovaries, Vagina and Mammary glands

Practical:

12. Uterus, Uterine tubes, Ovaries, Vagina and Mammary gland

Lectures:

13. Kidney
14. Ureter, Urinary bladder

Practical:

15. Urinary System

D- Histology of Male Reproductive System (4 hours; 3 Lectures and 1 Practical)

Lectures:

16. Testis, spermatogenesis, Epididymis and Vas deferens
17. Prostate, Penis and Seminal Vesicle

Practical:

18. Male Reproductive System

E- Histology of Female Reproductive System (4 hours; 3 Lectures and 1 Practical)

Lectures:

19. Uterus, Uterine tubes
20. Ovaries, Vagina
21. Mammary glands

Practical:

22. Female Reproductive System

2. Physiology of the genitourinary system (19 hours):

A. Renal Physiology (10 lectures and one practical)

Lectures:

23. General physiological concepts and overview of the kidney. Functional Anatomy of the Kidney (Gross Anatomy:Internal anatomy: Innervation of the Kidney:Blood supply). Types of nephron. Renal Plasma Flow (RPF) and Renal Blood Flow (RBF).
24. Assessment of renal function. Glomerular filtration Rate (Tubular load: Measurements:Dynamics: Control). Regulation of Renal Blood Flow.
25. Tubular function I: General concepts: The micropuncture technique. Different forms of transport. Clearance (definition, usages & interpretations).
26. Tubular function II. Reabsorption and secretion. Absorptive capabilities of different tubule segments (Transport maximum (T_m) and Glucose Titration curve).
25. Tubular function III. Reabsorption and secretion of Na⁺, K⁺ & H⁺
- 27-28. Concentration and dilution of urine. The Countercurrent Mechanism. The minimum obligatory urine output. Why we need to make diluted or concentrated urine. Understand and describe the renal handling of urea. Specific Gravity versus osmolality. The diuretics and their mechanism of action.
29. Acid base balance I. Acidosis. Alkalosis. Defense Against Changes in hydrogen ion concentration [H⁺]. (buffers: Lungs: Kidneys). Volatile acid and non-volatile acid. Henderson-Hasselbalch Equation.
30. Acid base balance II. Renal Control of Acid-Base Balance
The three major goals of the kidney in Acid-Base Balance.
31. Acid-Base Imbalance III. Acidosis Vs Alkalosis. Metabolic Vs Respiratory. Compensation.
32. **Practical.**

B. Physiology of the reproductive system. (8 hours)

Lectures:

33. Spermatogenesis: Hormonal factors regulating initiation, maintenance of spermatogenesis.
Function of sex organs.
34. Androgens. Regulation of secretion. Mechanism of action, metabolism.
Chronological pattern of secretion.
35. Oogenesis, Follicular recruitment and development. Monthly follicular and hormonal changes and subsequent endometrial changes.
36. Ovulation, fertility period, Corpus luteum (CL) formation, life span endocrine function, regression and consequences. Changes in the female following ovulation.
CL of pregnancy Extended function of CL.
37. Female hormones, regulation of secretion and different functions.
Hypothalamic pituitary gonadal(testis and ovaries) regulation.
Positive and negative feedback.
38. Early stage of embryo development and implantation in the maternal endometrium. Pregnancy hormones (hCG, Somatomammotropin) secretion and importance of such hormones). Materno-feto-placental hormone secretion. Other hormones as prolactin.
39. Breast development. Hormonal interaction. Milk synthesis and secretion.
Milk letdown reflex
40. Puberty (male and female), menopause, andropause physiological changes.
Physiological aspect of infertility.

3- Pathology of the genitourinary system (29 hours)

Lectures

FEMALE GENITAL SYSTEM AND BREAST

Vulva

41. Vulvitis
 - Non -neoplastic epithelial disorders
 - (Vulvar dystrophies)**
 - Lichen sclerosus
 - squamous hyperplasia
42. Tumors
 - Condylomas
 - Carcinoma of the vulva
 - Intraepithelial neoplasia
 - Extramammary paget's disease
 - Melanoma of the vulva

Vagina

- Vaginitis
- Vaginal intraepithelial neoplasia and squamous cell carcinoma
- Sarcoma Botryoides

Cervix

43. Cervicitis
 - Tumors of the cervix
 - Endocervical polyp
44.
 - cervical intraepithelial neoplasia and squamous cell carcinoma
 - cervical intraepithelial neoplasia (IN), squamous intraepithelial lesion (SIL)
 - Invasive carcinoma of the cervix

Body of uterus and endometrium

45. Endometritis
 - Adenomyosis
 - Endometriosis
 - Dysfunctional uterine bleeding
 - Endometrial hyperplasia
46. Tumors of the endometrium and myometrium
 - Endometrial polyps
 - Leiomyoma and leiomyosarcoma
 - Endometrial carcinoma

47. Fallopian tubes disorders

Ovaries

follicle and luteal cysts

polycystic ovaries

tumors of the ovary

48. Surface epithelio-stromal tumors
 - Serous tumors
 - Mucinous tumors
 - Endometrioid tumors
 - Cystadenofibroma
 - Benner tumor

Other Ovarian Tumors

49. Diseases of pregnancy

Placental inflammations and infections

Ectopic pregnancy

- 50. Gestational trophoblastic disease
 - Hydatidiform mole: Complete and partial
 - Invasive mole
 - Chorioarcoma
 - Preeclampsia/ eclampsia (toxemia of pregnancy)**

51-52. **Breast diseases**

THE KIDNEY AND ITS COLLECTING SYSTEM

- 53. Clinical manifestations of renal diseases
 - Glomerular disease
 - Pathogenesis of glomerular diseases
 - Circulating immune complex nephritis
 - Immune complex nephritis in situ, cell mediated immune glomerulonephritis
 - Mediators of immune injury
 - Other mechanisms of glomerular injury
- 54. Glomerular syndromes and disorders
 - The nephrotic syndromes and disorders
 - Minimal change disease
 - Focal segmental glomerulosclerosis
 - Membranoproliferative glomerulonephritis
- 55. The nephritic syndrome
 - Acute proliferative glomerulonephritis
 - Rapidly progressive glomerulonephritis (Crescentic)
 - IgA nephropathy (Berger's disease)
- 56. Hereditary nephritis
 - Chronic glomerulonephritis

Diseases affecting tubules and interstitium

- 57. Tubulointerstitial nephritis
 - Acute pyelonephritis
 - Chronic pyelonephritis and reflux nephropathy
- 58. Drug - induced interstitial nephritis
 - Acute tubular necrosis

Diseases involving blood vessels

- 59. Benign nephrosclerosis
 - Malignant hypertension and malignant nephrosclerosis
 - Thrombotic microangiopathies

Cystic diseases of the kidney

- 60. Simple cysts
 - Autosomal dominant (adult) polycystic kidney disease
 - Autosomal recessive (Childhood) polycystic kidney disease

Urinary outflow obstruction

- 61. Renal stones
 - Hydronephrosis

Tumors

- 62. Renal cell carcinoma
 - Wilms' tumor
- 63. Tumors of the urinary bladder and collecting system

THE MALE GENITAL SYSTEM

Penis

- 64. -Malformations
 - Inflammatory lesions
 - Neoplasms

Scrotum, testis, and epididymis

- 65. -Cryptorchidism and testicular atrophy
 - Inflammatory lesions
- 66. -Testicular Neoplasms

Prostate

- 67. -Prostatitis
 - Nodular hyperplasia of the prostate
- 68. -Carcinoma of the prostate

Sexually transmitted diseases

- 69. -Syphilis
 - Gonorrhoea
 - Gonococcal Urethritis and Cervicitis
 - Chancroid (soft chancre)
 - Granuloma inguinale
 - Lymphogranuloma venereum
 - Trichomoniasis
 - Genital herpes simplex
 - Human papillomavirus infection

4. Microbiology and Immunology of the genitourinary system (11 hours):

Microbiology (6 hours)

Lectures:

- 70. Enterobacteriaceae, Pseudomonas, Enterococcus, Staphylococcus species, Strep. Group B
- 71. N. gonorrhoea, Mycoplasma, Ureaplasma, Chlamydia
- 72. Mycobacteria, Treponema species, Haemophilus ducreyi
- 73. Candida, Trichomonas, Schistosomiasis,
- 74. Herpes viruses, Papilloma viruses, HIV.
- 75. Hepatitis, Mumps virus

Immunology:

Lectures:

- 76. Mucosal immunity
- 77. Placental immunology
- 78. Immunity in pregnancy, immunology of infertility and abortion
- 79-80. Immune renal diseases

5. Community Medicine of the genitourinary system (2 hours)

Lectures:

- 81-82. Epidemiology of sexually transmitted diseases

6. Pharmacology of the genitourinary system (7 hours)

A- Renal pharmacology:

Lectures:

- 83-84. Diuretics
- 85. Antidiuretic hormone

B- Pharmacology of the reproductive system

Lectures:

- 86. Drugs acting on the uterus
- 87. Pharmacology of GnRH, LH, FSH in males and females
- 88. Pharmacology of androgens and antiandrogens
- 89. Pharmacology of estrogens, progestins and oral contraceptive pills

7- Clinical aspects of the genitourinary system (5 hours)

Urology (2 hours)

90-91. Introduction to history, physical examination and clinical manifestations of urological disorders.

Nephrology (2 hours)

92-93. Introduction to history, physical examination and clinical manifestations of renal disorders

Gynecology (1 hour)

94. Introduction to history, physical examination and clinical manifestations of gynecological disorders

Recommended textbooks:

1. Snell, R.: Clinical Anatomy, 7th edition, 2002
Lippincott, Williams & Wilkins.
2. Guyton & Hall: Textbook of Medical physiology, 10th edition
Saunders, 2002.
3. Kumar, Cotran, Robins: Basic Pathology 7th edition, 2003 Saunders.
4. Craig, CR. & Stitzel, RE: Modern Pharmacology
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5. Devlin K: Textbook of Biochemistry with clinical applications 5th edition
Wiley liss
6. JAWETZ, Melnick & Adelberg: Medical Microbiology. 5th edition, LANGE

السنة الثالثة – الفصل الثاني
علوم سلوكية
Behavioral Sciences
(508301)
(3) Credit Hours

Objectives

By the end of the course, the student should be able to:

- 1- Recall and use basic ideas and criteria of the theories of behaviour, stress, emotion, illness, and mental health .
- 2- use these knowledge as a frame of reference for understanding the origins and interactions of thoughts, feeling and behaviors at health and disease.
- 3- describe the influence of personality, family and background on the physician, particularly in interactions with patients.
- 4- list the clinical syndromes related to behaviour as sleeping disorder, anxiety, eating problem, obesity etc..

Course contents

- 1- Theories behavior:
 - Psychodynamic theory
 - Learning theory (behaviorism)
 - Cognitive theory
 - Psychosocial theory
 - Biomedical theory
- 2- Concepts of prevention and behaviour change / model of intervention:
 - Going to the doctor
 - The experience of symptoms
 - Illness behaviour
 - Importance of illness behaviour for the doctor
 - Illness behaviour and the medical model
- 1- Stress, emotion and illness:
 - The physiology of stress
 - Stress and Illness
- 2- Life cycle
 - Definition of terms
 - Infancy to toddler hood
 - Childhood
 - Adolescence
 - Adulthood
 - Later adult hood and old age
 - Death and dying
- 3- Personality :
 - Personality differences in response to illness and treatment
 - The assessment of personality
 - Approaches to personality
- 4- Family influences on health and disease .
- 5 - Mental Health
 - Disorders of cognition
 - Delirium

- Dementia
- Amnesic disorder
- Mood and psychotic disorder
- Violence and suicide

1- Human Sexuality :

How does human sexuality impact health / examples from reproductive health .

7- Physician patient relationship

- Definition and components of the physician patient relationship
- Models of the physician patient relationship
- The physician patient relationship under stress

8- Clinical Syndrome:

- Anxiety disorders
- Dissociation disorders
 - Eating disorders and obesity:
 - Sleep disorders
 - Somatoform disorders.

Tests & Evaluation:

Mid term course exam	40%
Quiz	10%
Final Exam	50%

Text Books:

1-Sociology as applied to medicine

David Armstrong

2- The behavioral sciences in psychiatry

National medical services for independent study

Jerry M. Wiener

Nancy A. Breslin

3- Child Surveillance

Second edition

David Hall

Peter Hill

David Elliman