كلية الطب البشري
Faculty of Medicine

The Hashemite University

Course Syllabus

Musculoskeletal and Skin Module

1	Course title	Musculoskeletal and Skin Module
2	Course number	111501303
3	Credit hours (theory, practical)	6 hours
	Contact hours (theory, practical)	Theory: 59 Practical: 18
4	Course meeting time	Theory Lectures: Sun – Tue 8:00-11:30
	Course location	Faculty of Medicine Theater Practical Sessions: Variable
5	Program title	Doctor of Medicine
7	Awarding institution	The Hashemite University
8	Faculty	Faculty of Medicine
9	Department	Basic Medical Sciences
10	Level of course	Third year medical students
11	Year of study and semester(s)	2018/2019 First semester
12	Final Qualification	MD degree
13	Other department(s) involved	None
14	Language of Instruction	English
15	Date of production/revision	01/2019

Course Coordinator:

Dr. Raith Al-Saffar, MD, Phd
Office number: 3016
Office hours: Sun 11:00-1:00, Wed 11:00-1:00

Other instructors:

Anatomy	Dr. Raith Al-Saffar Dr. Darweesh Badran Dr. Sharief Ramzi
Physiology	Dr. Mohammed Shaaban
Pathology	Dr. Mohammed Al-Wiswasy
Pharmacology	Dr. Ahmed Shaaban
Microbiology	Dr. Samir Naji
Biochemistry	Dr. Thanaa Hamid
Community Medicine	Dr. Eman Al-Kamil

Course Description:

The goal of this integrated course is to provide the medical student with basic sciences' information about bones, joints muscles, tendons, ligaments, skin and associated soft tissues related to clinical manifestations of diseases of the musculo-skeletal system and skin.

Topic Outline and Schedule:

Anatomy

No.	Lecture Title	Lecture Objectives
1	Skeletal & Muscular System Introduction	1.List the bones of axial & appendicular skeleton 2. Describe the gross types of bones 3. Describe the gross parts of bones, and the bone surface marking 4. Describe types of joints; structure and types of synovial joints 5. Describe the gross part and nerve supply of skeletal muscle; types and nomenclature of muscles
2	Axial Skeleton The Skull	1. Describe the general features of skull 2. Describe the feature of Norma Frontalis (anterior view) of skull 3. Describe the features of Norma Verticalis (superior view) of skull 4. Describe the features of Norma Lateralis (lateral view) of Skull
3	Axial Skeleton The Skull	1. Describe the features of Norma Occipitalis (posterior view) of skull 2. Describe the features of Norma Basalis (inferior view) of skull 3. Describe the features of cranial cavity (interior) of skull 4. Describe the internal features of cranial cap 5. Describe the features of the skull of new born baby
4	Axial Skeleton Mandible, Hyoid Bone, Cervical Vertebrae	1. Describe the features of mandible 2. Describe the features of hyoid bone 3. Describe the general features of vertebral column

		4. Describe the features of cervical vertebrae
5	The Scalp & Face	1. Describe the extension, structure, muscles, blood and nerve supply, and lymph drainage of scalp 2. Describe the muscles of facial expression; motor and sensory nerve supply; blood supply and lymph drainage of the face
6	The Muscles of Mastication, Temporal, Infratemporal & pterygopalatine Fossae	1. Describe the muscles of mastication (attachment, nerve supply and action) 2. Describe the extension and content of temporal fossa 3. the extension, connections and content of infratemporal fossa 4. Illustrate the course, parts and branches of maxillary artery 5. Describe the location, connections and content of pterygopalatine fossa
7	The Cervical Fascia & Muscular Triangles of the Neck	1. Describe the four types of cervical fascia (investing, carotid, pretracheal & prevertebral) 2. Describe the boundaries, contents of posterior triangle of neck 3. Describe the anterior triangle, boundaries and contents of its sub-triangles
8	The Pre-Vertebral Muscles of the Neck	1. Illustrate the anterior group of prevertebral muscles 2. Illustrate the lateral group of prevertebral muscles 3. Illustrate the muscles of the back of neck 4. Illustrate the boundaries and the content of sub-occipital Triangle
9	The muscles of Vertebral Column & Joints of the Neck	1. Describe the layers of the muscles of vertebral column 2. Describe the cervical vertebra joints (atlanto-occipital, atlantoaxial, intervertebral) 3. Describe the temporomandibular joint 4. Describe the blood supply of vertebral column and its Muscles
10	Pharyngeal Apparatus	1. Describe the development, structure and components of pharyngeal arches 2. Describe the derivatives of pharyngeal arches 3. List the congenital anomalies of pharyngeal arches
11	The Skin	1. Describe the histology of epidermis & dermis 2. List the cellular layers of epidermis 3. Describe the glands and skin appendages of the skin
12	Bones of the Upper Limb	Explain the principal distinguishing features of the: 1. Scapula 2. Clavicle 3. Humerus 4. Radius 5. Ulna 6. Carpus 7. Phalanges
13	Scapular muscles, Arm muscles & Shoulder Joint:	1. List ther muscles that are attached to the scapula 2. Describe the attachments, action, nerve and blood supply of scapular muscles 3. Illustrate the intermuscular spaces related to the scapula and their contents

		4. Describe the rotator cuff muscles and discus their clinical significance 5. Describe the muscles of the arm, their actions, nerve and blood supply 6. Describe the shoulder joint
14 &15	Axilla, Cubital Fossa and Muscles of the forearm	1. Define the axilla 2. Describe the boundaries and contents of the axilla 3. Explain the importance of the axilla 4. Describe the cubital fossa and list its contents 5. Illustrate the clinical importance of the cubital fossa 6. Describe the muscles in the anterior and posteriorcompartments of the forearm 7. Describe the elbow joint
16	Hand	1. Describe the wrist joint and its components 2. List the muscles acting on the wrist joint and the movement they perform 3. Describe the carpal tunnel, flexor and extensor retinacula, and the structures in relation to them 4. Describe the anatomical snuffbox 5. Describe the movements of thumb and fingers 6. List the muscles acting on the thumb and fingers
17	Bones of the lower limb	Explain the distinguishing features of the: 1. Hip bone 2. Femur 3. Tibia 4. Fibula 5. Tarsal bones 6. Phalanges
18	Inguinal Region, Hip & Knee joints	1. Describe the inguinal ligament and inguinal canal 2. Describe the femoral sheath and femoral triangle and their contents 3. Describe the adductor canal and adductor hiatus 4. List the types of Hernia
19	Muscles of the lower limb	1. List the muscles of the thigh 2. List the muscles of the leg 3. Describe the attachments of the thigh and leg muscles, their actions, and their nerve and blood supply 4. Describe the popliteal fossa and its contents
20	Muscles of the lower limb	1. List the muscles in the gluteal region 2. Describe the attachments, action and nerve supply of the gluteal muscles 3. Describe the greater and lesser sciatic foramina and structures passing through them
21	Ankle, Foot & Ankle Joint	1. Describe the components and movements of the ankle joint 2. List the muscles acting on the ankle joint and the movements they perform 3. List the muscles acting on the toes

		4. Describe the movements of toes 5. Describe the retinacula which are related to the foot and the structures in relation to the retinacula 6. List the muscles in the four layers of the sole of the foot 7. Describe the arches of foot
22	Hip & Knee Joints	1. Describe the components of the hip joint 2. List the ligaments associated with the hip joint and their attachments 3. Describe the muscles acting on the hip joint according to the type and movement they perform 4. Describe the stability and mobility of the shoulder joint. 5. Describe the components of the knee joint 6. List the ligaments associated with the knee joint and their attachment 7. List the muscles acting on the knee joint according to the type and movement they perform 8. Describe the bursae in relation to the knee joint 9. List the blood and nerve supply of the knee joint

Physiology

No	Title of Lecture	Objectives
1.	Skeletal Muscle Structure and Mechanism of Contraction	Define the sarcomere and its structure Illustrate structure of myosin molecule and its subunits Describe the function of the subunits. Illustrate structure of the thick and thin myofilaments and label the constituent proteins. Relationship of the myosin-thick filament bare zone to the shape of the active length:force relationship. Chemical and mechanical steps in the cross-bridge cycle, and explain how the cross-bridge cycle results in shortening of the muscle.
2.	Control of Skeletal Muscle Contraction	Excitation-Contraction. Coupling and Neuromuscular Transmission, Steps in excitation-contraction coupling in skeletal muscle, and describe the roles of the sarcolemma, transverse tubules, sarcoplasmic reticulum, thin filaments, and calcium ions. The roles of ATP in skeletal muscle contraction and relaxation. Structure of the neuromuscular junction. Sequence the steps involved in neuromuscular transmission in skeletal muscle and point out the location of each step on a diagram of the neuromuscular junction. Endplate potential Vs. action potential in skeletal muscle. Possible sites for blocking neuromuscular transmission in skeletal muscle and provide an example of an agent that could cause blockage at each site.
3.	Mechanics and energetics of skeletal muscle contraction	Relationship of preload, afterload and total load in the time course of an isotonic contraction. Isometric and isotonic contraction. Distinguish between a twitch and a tetanus in skeletal muscle and explain why a twitch is smaller in amplitude than a tetanus. Length versus force diagram for muscle showing passive

		(resting), active, and total force. Describe the molecular origin of these forces. Interaction of the length:force and the force:velocity relationships. Force versus velocity relationships for two skeletal muscles of equal maximum force generating capacity but of different maximum velocities of shortening.
4.	Energy sources of muscle contraction	Energy sources of muscle contraction with respect to their relative speed and capacity to supply ATP for contraction. Muscular fatigue. Some intracellular factors that can cause fatigue. Structural, enzymatic, and functional features of fast-glycolytic and slow-oxidative fiber types from skeletal muscle. Describe the role of the myosin crossbridges acting in parallel to determine active force and the rate of crossbridge recycling to determine muscle speed of shortening and rate of ATP utilization during contraction. Define a motor unit and describe the order of recruitment of motor units during skeletal muscle contraction of varying strengths.

Pathology

Lecture Number, Subject, & Title	Lectures Objectives
1st Pathology Lecture. Diseases of bones	★Describe the Etiology, Pathogenesis, Pathologic & Clinical features, Complications, & Diagnosis of: (1) Acute, Chronic, & Tuberculous osteomyelitis (2) Paget Disease (Osteitis Deformans). Classify bone tumors & comment on their general principles. ★ Describe the Pathological & Radiological Features & Complications of: (1) Osteomas, Osteoid Osteomas, & Osteoblastomas (2) Osteochondroma, single & multiple chondromas (Ollier disease & Maffucci syndrome)
2nd Pathology Lecture. Diseases of bones	★ Describe the Etiology, Pathogenesis, Gross & Microscopic & Radiological Features, Diagnosis & Rotes Of Spread of: (1) Osteogenic sarcoma, (2) Chondrosarcoma, (3) Ewing's sarcoma, &(4) Giant-Cell Tumor (GCT) of Bone (osteoclastoma) ★ Describe The Pathological & Radiological Features & Complications Of: (1) Fibrous Cortical Defects, (2) Nonossifying Fibromas, & (3) Fibrous Dysplasia. ★ Describe the Common Sites Of Cancer Primaries, Bones Involved, Types & Effects Of Metastatic Malignant Secondaries In Bone
3rd Pathology Lecture. Diseases of joints	★ Describe the Types, Pathogenesis, Pathologic & Clinical Features Of Osteoarthritis (OA) & Compare Between The Morphologic Features Of OA & Rheumatoid Arthritis. ★ Describe the Types, Pathogenesis, Pathological features & Clinical Stages of gout. Define pseudogout (chondrocalcinosis) ★Describe the Etiology, Pathogenesis, Pathologic Features of Suppurative & Lyme Arthritis ★ Describe the Pathogenesis, Pathologic & Clinical Features of:

	(1) Ganglion, (2) Pigmented villonodular synovitis , & (3) Giant-cell tumor (GCT) of tendon sheath
4th Pathology Lecture. Diseases of skeletal muscle	Enumerate the Causes of muscle atrophy. ★ Describe the Pathogenesis, Pathologic & Clinical Features of: (1) X-Linked muscular dystrophy (Duchenne & Becker Muscular Dystrophy) (2) Autosomal muscular dystrophies. (3) Myotonic dystrophy, (4) Myopathies, congenital & toxic (5) Myasthenia Gravis (6) Lambert-Eaton Myasthenic Syndrome (7) Rhabdomyosarcoma.
5th Pathology Lecture. Soft tissue tumors	Classify Soft tissue Tumors & comment on their general principles. ★ Describe the Types, & Pathological Features Of Lipoma & Liposarcoma ★ Describe Reactive Fibrous Proliferations: Nodular Fasciitis, Myositis Ossificans, Superficial & Deep Fibromatoses. ★ Describe the Pathogenesis, Types, & Pathological Features Of: (1) Fibrosarcoma (2) Benign & malignant fibrohistiocytic tumors, (3) Leiomyoma & Leiomyosarcoma (4) Synovial Sarcoma
6th Pathology Lecture. dermatoses	Define the dermatologic macroscopic & microscopic Terms. ★ Describe the Etiology, Pathogenesis, Gross, Microscopic & Clinical Features of the: Acute inflammatory dermatoses: Urticaria, Acute Eczematous Dermatitis, Contact dermatitis, &Erythema Multiforme. Chronic inflammatory dermatoses: Psoriasis, Lichen Planus, & Lichen Simplex Chronicus.
7th Pathology Lecture.	★ Describe the Etiology, Pathogenesis, Gross, Microscopic & Clinical Features Of The Infectious Dermatoses: Bacterial, Fungal Infection, & viral infections [Verrucae (Warts)] ★ Describe the Etiology, Pathogenesis, Gross, Microscopic (including the direct immunofluorescence findings) features of the Blistering (Bullous) skin disorders: Pemphigus (Vulgaris & Foliaceus), Bullous Pemphigoid, & Dermatitis Herpetiformis.
8th Pathology Lecture. Skin disorders Tumors of the skin	★ Describe the Pathogenesis, Gross, & Microscopic Features Of: Seborrheic Keratosis (Basal cell papilloma) Sebaceous Adenoma Actinic Keratosis Squamous Cell Carcinoma Basal Cell Carcinoma Dysplastic Nevus Melanocytic nevi Melanoma

Microbiology

No.	Lecture Title	Objectives
1	Anaerobes and clostridium perfrenges and Gas gangrene Trichenella Spiralis	• Describe the morphological, bacteroides and trichinella features, pathogenesis and virulent factors, laboratory diagnosis, treatment and prevention of clostridium perfrengens which is the main cause of gas gangrene. • Describe the role of cl. Perfringens and Bacteroides in gas gangrene and the role of Trichinella in muscle infection. Explain their laboratory diagnosis, pathogenesis and treatment. • Describe the morphological features, pathogenesis and virulent factors, laboratory diagnosis treatment and prevention of clostrium perfrengens • Describe the role of aerobes in the formation of deep wound infection and abscess. • Describe the role of Trichenella in muscle infection and explain their laboratory diagnosis, pathogenesis and treatment. • Describe the role of bacteria in the pathogenesis of osteoarthritis, arthritis, specimen collection identification and treatment.
2	Bacterial infections of the skin.	• Pathogenesis of skin commensals and pathogens • Describe the antibiotic sensitivity of each organism (Diphtheroids ,Staphylococci , Streptococci, Propionobacterium acnes , Mycobacteria) • Explain types, pathogens of would infection methods of specimen collection for proper dignosis of types Bacteria and laboratory diagnosis.
3	Viral infections of the skin.	• Explain morphology and pathogenesis as well as diagnostic procedures of viruses infecting skin.
4	Viral infection of the skin.	• Describe the Herpe's and childhood exanthens.
5	Parasitic infections of the skin.	• Discuss the parasites that infest the skin (Scabes Leishmania and Onchocerca). Briefly describe the life cycle, treatment and prevention of each parasite. • Describe parasites that infest the skin, their life cycle, treatment and prevention. (Scabes, Leishmania, Oncocerca fleas, loaloa, and cutaneous larva migrans)
6	Fungal infections of the skin	• Describe the fungi that infect the skin and subcutaneous tissue, their identification and treatment (Dermatophytes , Candida and Mycetoma agents) • Describe the fungi that infect the skin, their clinical classification, their identification and treatment (cutaneous, subcutaneous and opportunistic)

Pharmacology

No.	Title of Lecture	Objectives
1	Muscle relaxants	• Review the transmission process at the neuromuscular endplate and the points at which drugs can modify this process. • Compare the pharmacodynamics and pharmacokinetics of nondepolarizing and the depolarizing neuromuscular blockers. • Describe the main indications, major adverse effects and drug interaction of nondepolarizing and depolarizing neuromuscular blockers.
2	Antirheumatoid drug	• List the indications to use antirheumatoid drugs in the treatment of rheumatoid arthritis. • Describe the concept of disease-modifying agents. • Describe the mechanism of action, toxic effect and contraindications of drugs used in the treatment of rheumatoid arthritis.
3	Topical antimicrobial drugs	• Describe antibacterial agents, antifungal agents, antiviral agents and ectoparasitic ones
4	Drugs of noninfective skin conditions	• Describe anti-inflammatory, topical corticosteroid, tar compounds and keratolytic.
5	Drugs of noninflammative skin conditions	• Describe drugs employed in the treatment of acene, psoriasis affecting pigmentation. • Acne preparations. Drugs for psoriasis. Antipruritic agents. Trichogenic agents. • Antiseborrhea agents.

Community Medicine

No.	Lecture Title	Objectives
1 & 2	Epidemiology of MSS injuries.	• Define: Epidemiology of accidents, hazards and injuries. • Distinguish between risk and hazard. • Identify the human, situational and environmental factors of accidents. • Identify risk factors, risk groups and incidence rate of MSS injuries • Explain the factors that influence risk perception and risk acceptance of MSS injuries.

Biochemistry

No.	Lecture title	Objectives
1	Biochemistry of Muscles, Bones and connective tissue.	Understand the role of alkaline phosphatase, calcium and phosphate and vitamin D in bone formation and remodelling.
2	Metabolic disorders	Clinical biochemistry of muscle and bone.
3	Bone markers	Discuss the markers for bone formation and resorption and their clinical use in diagnosis.

Practical

No.	Topic	Objectives
1	Anatomy Lab 1 The Bones of Head & Neck	1. Name the bones of cranium and facial skeleton 2. Understand the external features of skull (Norma frontalis, Norma verticalis, Norma lateralis, Norma occipitalis, Norma basalis) 3. Study the features of the interior of skull 4. Study the foramens, fissures ofskull & the main structures passing through 5. Describe the features of mandible 6. Describe the features of cervical vertebrae
2	Anatomy Lab 2 The Scalp, Face	1. Study the structure, layers, muscles, blood supply, nerves & lymph drainage of scalp 2. Study the muscles, blood vessels, motor and sensory nerve supply, & lymph drainage of the face 3. Understand the cervical deep fascia (types & extension), and the superficial nerves & veins of the neck 4. Describe the attachment, nerve supply and action of sternomastoid muscle
3	Anatomy Lab 3 The Neck	1. Study the boundaries, parts and contents of posterior triangle and its subdivisions 2. Study the boundaries of anterior triangle 3. Describe the boundaries & contents of subdivisions of anterior triangle 4. describe the anterior & lateral pre-vertebral muscles 5. Study the muscles of the back of neck 6. Study the blood vessels and nerves of the back of neck 7. Describe the boundaries and content of sub-occipital triangle
4	Anatomy Lab 4 Bones and joints of the upper and lower limbs	1. Identify the different parts of the bones of the upper and lower limbs. 2.Identify the components of the joints of the upper and lower limbs
5	Anatomy Lab 5 Muscles of the upper limb	1. Identify the muscles of the shoulder, arm, forearm and hand in the upper limb
6	Anatomy Lab 6 Muscles of the lower limb	1. Identify the muscles of the glutea region and the anterior, medial, and posterior compartments of the thigh. 2. Identify the muscles in the anterior, lateral, and posterior compartments of the leg. 3. Identify the muscles of the foot

7 & 8	Pathology Lab 1 &2 After reviewing and discussing the colored photographs of the: (1) gross specimens and of the (2) histopatholoical sections given in lectures as a power point presentations during the practical hours:	★ The student should be able to identify, describe and diagnose the common and the important pathological lesions of bones, joints, soft tissues, muscle and skin disorders given in the module.
9	Microbiology Lab Wound Culture	Describe specimen collection methods Lists the most common aerobic and anaerobic organisms causing the infection and their laboratory identification.

Teaching Methods and Assignments:

Development of ILOs is promoted through the following teaching and learning methods:

- 1 Histology lecture / week
- 1 Molecular Biology lecture / week
- 1 Histology Lab session / week

Evaluation Methods and Course Requirements:

Opportunities to demonstrate achievement of the ILOs are provided through the following assessment methods and requirements:

Grading Policy:

Grades can be based on the following:

- First in-course exam (Theory) = 40%.
- Second in-course exam (Practical) = 20%.
- Final end-course exam (Theory) = 40%.
- Total Points 100

- All exams are in integrated form.

Course Policies:

A- Attendance policies:

If a student is absent for a teaching session, then he/she must discuss this with the course instructor. Appropriate measure will be taken if a student exceeds the permitted number of absences.

B- Absences from exams and handing in assignments on time:

If a student misses an examination then he/she has the opportunity to do a make-up examination, according to the University Regulations. A student is not allowed to have a makeup exam unless he/she presents a valid excuse within 72 hours of the scheduled exam or when the excuse is lifted. The excuses

are presented to the Excuse Committee which has the right to accept or refuse the excuse. Only a student with an accepted excuse will be able to take the make-up exam. (The time and date of the makeup exams will be announced at the appropriate times).

C- Health and safety procedures:

College members and students must at all times, conform to Health and Safety rules and procedures.

D- Honesty policy regarding cheating, plagiarism, misbehavior:

Cheating, in any form, is forbidden. Any student caught cheating will be reported to the Dean of Medicine and further action taken as necessary.

E- Grading policy:

According to university laws.

F- Available university services that support achievement in the course:

Various facilities.

References:

ANATOMY:

- Principles of Human Anatomy. By G.J. Tortora, Latest edition.
- Clinical Anatomy for Medical Students. 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
- Review of Medical Physiology, by William F. Ganong.

PATHOLOGY:

- Essential Pathology, by Emanuel Rubin.
- Basic Pathology, by Kumar, Cotran and Robbin.

MICROBIOLOGY:

- Medical Microbiology. By John C Sherris.

PHARMACOLOGY:

- Lipincott's Illustrated Reviews: Pharmacology.
- Goodman and Gilman's: The pharmacological basis of therapeutics.
- Basic and clinical pharmacology, Bertram and Katzung.
- Clinical Pharmacology.D.R. Laurence, P.N. Bennet, and M.J. Brown.Churchill Livingstone.

Additional information:

Summary of Musculo-skeletal & Skin Module Teaching:

Anatomy: 22 Lectures + 6 Practical Sessions
Physiology: 6 Lectures
Biochemistry: 2 Lectures
Pathology: 9 Lectures + 2 Practical Sessions
Microbiology: 6 Lectures + 1 Practical Session
Pharmacology: 6 Lectures
Community Medicine: 2 Lectures

- There are a total of 53 Lectures (one hour each) and 9 Practicals (2 hours each) in the module