جامعة اليرموك
Yarmouk University
اسم الكلية
Faculty

Document Approval Date	Course Syllabus	Document Code
		AP01-PR05

Department:	Official Stamp:

Course Identification	
Course Name: Musculoskeletal and Integumentary Systems	**Course Code and Number: M322**
Number of Credit Hours: 6 credits	**Semester:** Fall
Course Status: face to face	**Teaching Language: English**
Pre-requisite: --	**Course Coordinator: Dr. Ayman Alzubi** **Email:** ayman.alzubi@yu.edu.jo

General Information	
Teaching Method	☒ **Face-to-Face** ☐ **Online** ☐ **Blended**
Course Description	This is Interdisciplinary integrated module of musculoskeletal system. Basic sciences of anatomy, biochemistry microbiology, pathology, pharmacology, and physiology of the musculoskeletal system are correlated with clinical disorder of this system. The goal of this integrated course is to provide the medical student with comprehensive knowledge about bones, joints muscles, tendons, ligaments, skin and associated soft tissues related to clinical manifestations of diseases. The teaching methods include lecture labs as well as seminars and small group discussions of clinical oriented problems to enhance self-directed learning.
Course Objectives	At the end of this coarse students are expected to: 1) Identify and describe bones, muscles and joints of the upper, lower limbs and the vertebral column and give nerve supply and actions of the muscles associated with them. 2) Describe normal development and congenital abnormalities of limbs and vertebral column. 3) Understand the metabolism and the biochemical and molecular basis of disease affecting muscles and bones. 4) Describe the mechanism of muscle contraction. 5) Describe and understand the mechanism of action, pharmacokenetics and therapeutic use and adverse effects of drugs that affect the musculo-skeletal system and the skin.

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	6) Understand the pathogenesis and pathological features of infections and diseases that affect bones, joints, muscles, soft tissue and the skin. 7) Understand the epidemiology and control of the common injuries that may affect the human musculo-skeletal and skin. 8) Describe the macroscopic and microscopic features of the skin and subcutaneous tissues. 9) Understand the biochemical processes of normal skin and subcutaneous tissues. 10) Describe the commensals and pathogenic microbes affecting the skin, subcutaneous tissue and musculoskeletal system. 11) Understand the pathological changes that occur in the skin, and the etiology, pathogenesis and pathologic features of selected major diseases of the skin.
Course Learning Outcomes (CLOs)	**Knowledge and Understanding** **CLOs1:** Describe the normal structure and function of the musculoskeletal & integumentary systems. **CLOs2:** Relate the normal structure and function of the musculoskeletal system with common musculoskeletal injuries. **CLOs3:** Relate the microscopic anatomy of muscles, bones, cartilage with clinical problems affecting these tissues. **CLOs4:** Relate the normal structure and function of the musculoskeletal & integumentary systems with pathophysiology of common diseases. **CLOs5:** Relate the development of musculoskeletal system with common congenital abnormalities of limbs. **CLOs6:** Describe the epidemiological, environmental and genetic factors and biochemical processes of the cell with pathophysiology of common diseases of the musculoskeletal and integumentary system. **CLOs7:** Discuss the mechanism of action, important adverse effects and pharmacological basis of drugs used in the management of common musculoskeletal and integumentary conditions. **CLOs8:** Describe the clinical features, diagnostic criteria and management of musculoskeletal and integumentary disorders.

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Skills

CLOs9: Identify the muscles, bones, and cartilage on cadaveric dissections, plastinated specimens, and 3D plastic models.

CLOs10: Ability to identify major components of musculoskeletal components on radiological images.

CLOs11: Examine the range of motion of different joints.

CLOs12: Use a microscope to differentiate between normal versus abnormal the histological features of musculoskeletal tissues.

CLOs13: Apply theoretical knowledge in how to approach a patient presenting with common musculoskeletal and integumentary symptoms such as joint pain, joint deformity, rash, muscle pain, bone pain and fractures.

Mapping Course Learning Outcomes CLOs to Program Learning Outcomes PLOs							
	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7
CLO1							
CLO2							
CLO3							
CLO4							
CLO5							
CLO6							
CLO7							

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Assessment Methods					
Assessment Type		Date and Time	Assessment Method	Mark (%)	CLOs
Midterm Exam					
Activities*	Activity (1)				
	Activity (2)				
	Activity (3)				
	Activity (4)				
	Activity (5)				
Final Exam					

*The instructor must choose at least three activities from the following: quizzes, assignments, projects, videos, discussions, etc.

Course Contents, Schedule, and Instruction Methods			
Week	Day	Course Content	Instruction Method**
Week 1	Sun	Lec. 1: Introduction to the MSS Lec. 2: Axial skeleton I (Anatomy) Lec. 3: Axial skeleton II (Anatomy)	Face-to-face class
	Mon	Lec. 4: Muscle Physiology (I) (Physiology) Lec. 5: Muscle Physiology (II) (Physiology) Lec. 6: Appendicular skeleton I (Anatomy)	Face-to-face class
	Tus	Lec. 7: Muscle Relaxants (Pharmacology) Lec. 8: Muscle Physiology (III) (Physiology) Lec. 9: Appendicular skeleton II (Anatomy)	Face-to-face class
	Wed	Lec. 9: Shoulder joint (Anatomy) Lec. 10: Biochemistry of the bone and connective tissue (Biochemistry) Lec. 11: Elbow and wrist joint (Anatomy)	Face-to-face class
	Thu	Lec. 12: Hip and Knee joints (Anatomy) Lec. 13: Metabolic disorders of muscle and bone (Biochemistry) Lec. 14: Ankle and foot (Anatomy)	Face-to-face class
Week 2	Sun	Lec. 15: Muscles of the head (Anatomy) Lec. 16: Acquired bone diseases I (Pathology) Lec. 17: Muscles of neck (Anatomy) Lab: Anatomy 1	Face-to-face class
	Mon	Lec. 18: Muscles of the shoulder I (Anatomy) Lec. 19: Osteomyelitis and bone tumors (Pathology)	Face-to-face class

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Course Contents, Schedule, and Instruction Methods			
Week	**Day**	**Course Content**	**Instruction Method****
		Lec. 20: Muscles of the shoulder II (Anatomy) Lab: Anatomy1	
	Tus	Lec. 21: Muscles of arm (Anatomy) Lec. 22: Muscles of foream I (Anatomy) Lec. 23: Muscles of the forearm II (Anatomy) Lab: Anatomy 2	Face-to-face class
	Wed	Lec. 24: Diseases of joints (Pathology) Lec. 25: Antirheumatoid Drugs I (Pharmacology) Lec. 26: Antirheumatoid Drugs II (Pharmacology) Lab: Anatomy 2	Face-to-face class
	Thu	Lec. 27: Muscles of the hand (Anatomy) Lec. 28: Fungal infection of the skin (Microbiology) Lec. 29: Gluteal region (Anatomy)	Face-to-face class
Week 3	Sun	Lec. 30: Thigh muscle I (Anatomy) Lec. 31: Epidemiology of skeletal system injuries (Public Health) Lec. 32: Thigh muscles II (Anatomy) Lab: Anatomy 3 Lab: Patho 1	Face-to-face class
	Mon	Lec. 33: Acquired bone diseases II (Pathology) Lec. 34: Muscles of Leg (Anatomy) Lec. 35: Muscles of Foot (Anatomy) Lab: Anatomy 3 Lab: Patho 1	Face-to-face class
	Tus	Lec. 36: Osteoporosis RX (Pharmacology) Lec. 37: Anaerobes, gas gangrene and Trichenella (Microbiology) Lec. 38: Bullovesicular skin diseases and skin tumors (Pathology) Lab: Anatomy 4 Lab: Patho 1	Face-to-face class
	Wed	Lec. 39: Acute and chronic inflammatory dermatosis (pathology)	Face-to-face class

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Course Contents, Schedule, and Instruction Methods			
Week	**Day**	**Course Content**	**Instruction Method****
		Lec. 40: Treatment of Gout and hyperuricemia (Pharmacology) **Lec. 41: Development of the skeletal system (Anatomy)** **Lab: Anatomy 4** **Lab: Patho 1**	
	Thu	**Lec. 42: Viral infection (I) (Microbiology)** **Lec. 43: Soft tissue tumors and diseases of skeletal muscles (Pathology)** **Lec. 44: Dermatitis Rx (Pharmacology)** **Lab: Patho 2**	**Face-to-face class**
Week 4	**Sun**	**Lec. 45: Development of Muscular system(Anatomy)** **Lec. 46: Viral infection (II) (Microbiology)** **Lec. 47: Histology of skin (Anatomy)** **Lab: Microbiology 1**	**Face-to-face class**
	Mon	**Lec. 48: Skin Development (Anatomy)** **Lec. 49: Parasitic infection of the skin (Microbiology** **Lec. 50: Bacterial infection of the skin (Microbiology)** **Lab: Microbiology 1**	**Face-to-face class**
	Tus	**Lec. 51: antimicrobial drugs (Pharmacology)** **Lec. 52: Topical antimicrobial drugs(Pharmacology)** **Lec. 53:** **Lab: Patho 2**	**Face-to-face class**
	Wed	**Lab: Microbiology 2** **SGD: Case 1**	**Face-to-face class**
	Thu	**Lab: Microbiology 2** **SGD: Case 2**	**Face-to-face class**
Week 5		**Final Exam Week**	

**Instruction method is as follows:

- **Face-to-Face course**: Face-to-face class
- **Online course**: Interactive synchronous or asynchronous
- **Blended course**: Face-to-face or Online (synchronous or asynchronous)

Summary of teaching activities in the MSS module

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Department	No. of Lectures	No. of Labs	No. of Discussions
Anatomy	25	4	2
Physiology	4	0	0
Biochemistry	2	0	0
Pathology	7	2	2
Microbiology	6	2	0
Pharmacology	7	0	0
Public Health	1	0	0
Multidisciplinary (Introductory)	1	0	0
Total	53	8	2

Main Textbook and References	
Main Textbook	**Anatomy:** • Clinical Anatomy for Medical Students. By R.S. Snell, 4th edition (or latest) OR essential clinical anatomy by Moore and Agur. • Clinical Anatomy by Systems by Richard S. Snell, Lippincott Williams & Wilkins, 2007 • Langman's Medical Embryology, 13th Ed. by T.W. Sadler, Wolters Kluwer, 2014 • Junkeira's Basic Histology: Text & Atlas, 13th Ed. by Anthony L. Meschner, McGraw Hill, 2014. • Grants Atlas of Anatomy. • Basic Histology 9th edition by Junqueira. • Before we are born. By K.L. Moore and T.V.N. Persaud, 6th edition 2003. (or latest). **Physiology:** • Textbook of Medical Physiology. By Guyton & Hall, 13th edition. **Biochemistry:** • Harper's Biochemistry. By Robert K. Murray and Co., 1999. • Supplementary Departmental Handouts. **Pharmacology:**

	• Lippincott's Illustrated Reviews Pharmacology by Richard Harvey and Pamela Champe, 5Th Edition, 2014 • Pharmacotherapy Handbook, Dipiro et al., 9th edition 2015 • Basis and Clinical Pharmacology B.G. Katzung 13th Edition 2015. **Pathology:** • Basic Pathology. By Kumar, Cotran & Robbins, last edition. **Microbiology:** • Medical Microbiology. An Introduction to Infectious Diseases. By Sheries, latest edition. **Public Health:** • Supplementary Departmental handouts.
Other References	**Handouts**
Clinical Cases for small group discussions	**Case 1: Carpal tunnel syndrome** A 40-years-old woman visited her physician complaining of severe burning pain "pins and needles" in the hand and lateral fingers. The condition was becoming progressively worse and was more severe at night. She said she had experienced difficulty in buttoning up her clothes when dressing. On physical examination, the patient pointed to the thumb, index, middle, and lateral half of the ring fingers as the area where she felt the discomfort. No objective impairment of sensation could be detected over the thea ner muscle; however, the sensation was mildly decreased in the lateral three and half finger. The muscles of the thenar eminence appeared to have some wasting with less power compared to the other muscle of the hand manifested by weakness of resisted thumb abduction. Questions: Q1: What anatomic structure was diseased in this patient? Q2: Explain the altered sensation felt in the skin over the palmer aspect of the lateral three and half finger. Q3: Explain the absence of paresthesia over the palmer aspect of theaner eminence. Q4: Explain the difficulty she experience in buttoning up her clothes. **Case 2: Rheumatoid Arthritis**

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	A female patient complained of deformity of the small joints of the hand. One year later she suffered from painful swelling of the knee joints. Biopsy examination showed perivascular inflammatory infiltrate composed of plasma cells and lymphocytes with formation of lymphoid follicles. Questions: Q1: what is the most likely diagnosis? Q2: What are the risk factors of the disease? Q3: Mention the systemic manifestation of this disease? Q4: What are investigations used for diagnosis? Q5: Enumerate other causes of chronic arthritis?

Policies and Instructions***	
Attendance	**حسب تعليمات جامعة اليرموك لمنح شهادة بكالوريوس في الطب المادة (7) على الطالب:** • المواظبة في حضور المحاضرات النظرية والمناقشات والتدريب العملي والسريري والزيارات الميدانية المقررة لكل مساق في الخطة الدراسية، ويقوم مدرس المساق بتسجيل الحضور والغياب وذلك على كشوفات خاصة. • لا يسمح للطالب بالتغيب عن أكثر من (15%) من مجموع الساعات لكل مساق. • إذا غاب الطالب أكثر من (15%) من مجموع الساعات المقررة دون عذر قهري أو عذر مرضي يقبل به مدرس المساق، فعلى مدرس المساق أن يحرم الطالب من التقدم لجميع الامتحانات اللاحقة لذلك المساق، ويوضع له الحد الأدنى لعالمة المساق وهو (35%) محروم بسبب الغياب"، وتدخل هذه النتيجة في حساب معدالة تلك السنة . • إذا غاب الطالب أكثر من (15%) من مجموع الساعات المقررة لمساق ما وكان هذا الغياب بعذر قهري يقبله عميد الكلية، أو بعذر مرضي فيسمح العميد للطالب الاستمرار في المساق، ولا يجوز أن يتجاوز الغياب بمجموعه (30%) من الساعات، وفي الحالة التي يتجاوز فيها غياب الطالب بعذر قهري أو مرضي نسبة (30%) من السنة الدراسية، وذلك قبل بداية الامتحانات النهائية في الفصل، ويبلغ عميد الكلية فلمجلس الكلية اعتباره منسحباً بذلك لدراسته تلك السنة (باستثناء الفصل الأول أو الكترونيًا دائرة القبول والتسجيل خطيًا) ويعتبر بذلك مؤجل لقبوله، ويستثنى من ذلك مساقات متطلبات الجامعة حيث تطبق عليها التعليمات العامة فيما يخص الانسحاب من المساقات. • يشترط في العذر المرضي أن يكون بتقرير طبي صادر من المرجع الطبي المعتمد في جامعة اليرموك، وإذا تعذر ذلك فلعميد الكلية أن يعتمد التقرير المقدم أو يرفضه، وعلى الطالب أن يقدم التقرير الطبي المطلوب إلى العميد خلل أسبوع من تاريخ زوال العذر ويقوم العميد بإبلاغ مدرسي المواد التي يدرسها الطالب بقراره.
Activities	
Late Submission	
Exams	**حسب تعليمات جامعة اليرموك لمنح شهادة بكالوريوس في الطب المادة(8) :** • تحسب العلامة النهائية لكل مساق من (١٠٠) ولأقرب رقم صحيح. 1) العلامة النهائية لكل مساق هي مجموع علامات الامتحان النهائي وعلامات الأعمال الفصلية .

	• يقوم مجلس القسم الذي يطرح المساق ببيان كيفية توزيع العالمات التي توضع للمساقات العملية قبل بداية الفصل الدراسي. 11) يحدد عميد الكلية بالتنسيق مع دائرة القبول والتسجيل مواعيد الامتحانات النهائية في مطلع كل عام دراسي . 12) تقوم مجالس الأقسام بتحديد أسلوب تقييم أي مساق ذي طبيعة خاصة أو بحثية، وتحديد أعداد ونوعية الممتحنين الخارجيين، وبيان كيفية توزيع العالمات التي توضع لهذه المواد على أن يعتمد هذا التوزيع من مجلس الكلية في بداية كل فصل أو عام دراسي
Cheating and Plagiarism	**تعليمات الإجراءات التأديبية للطلبة في جامعة اليرموك رقم (٨) :** • يعاقب بالتنبيه، أو بالإنذار الأول، أو بالإنذار النهائي، "ما لم يرد نص خاص "كل طالب يقوم بـ: ١- الامتناع المدبر عن حضور المحاضرات، والدروس، والأنشطة الجامعية التي تقضي الأنظمة بالمواظبة عليها، أو التحريض على ذلك .2-الإخلال بالقواعد المتبعة أثناء المحاضرات وعقد الامتحانات، ولمدرس المساق أن يخرجه من القاعة واستدعاء الأمن الجامعي عند الضرورة لإخراجه، وله أن يعلم العميد أو المدير المختص بذلك المساق الاتخاذ الإجراءات المناسبة بحقه .٤- استخدام أجهزة الهواتف النقالة، وسائر الأجهزة الإلكترونية داخل القاعات أو خارجها بشكل يؤثر على سير العملية التدريسية. • يعاقب بالفصل المؤقت من الجامعة من فصلين إلى ثالثة فصول دراسية كل طالب يقوم بـ :الاتفاق مع طالب آخر، أو شخص آخر على الدخول لتأدية امتحان أو اختبار ودخل لتأديته نيابة عنه وتشمل العقوبة في هذه الحالة الطالب الذي دخل الامتحان والطالب الذي أدى الامتحان نيابة عنه، و إذا كان الشخص الذي دخل الامتحان من غير طلبة الجامعة فيحال إلى الجهات المختصة . استخدام أجهزة الهواتف النقالة او الأجهزة الإلكترونية الغير مصرح باستخدامها داخل قاعة الامتحان

***For more information, please see the student handbook.

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Department: Basic Medical Sciences	Official Stamp:

Course Identification	
Course Name: Nervous System 1	**Course Code and Number:** MED 323
Number of Credit Hours: 4	**Semester:** Second (2022/2023)
Course Status:	**Teaching Language:** English
Pre-requisite:	**Course Coordinator:** Dr. Fatimah Almahasneh

General Information	
Teaching Method	☒ **Face-to-Face** ☐ **Online** ☐ **Blended**
Course Description	The Nervous System 1 module is the first of two courses covering the basic sciences of the nervous system. This course integrates the basic sciences into a study of the nervous system in both health and disease states. Each of the basic science topics is incorporated into an integrated body of knowledge covering neuroanatomy, biochemistry, neurophysiology, neurological correlation, neuropathology, microbiology and neuropharmacology. This goal will be achieved via selected lectures, relevant laboratory sessions and self-directed learning methods. The overall goal of the Nervous System 1 course is to provide basic knowledge and understanding of the structure and function of the nervous system, biochemical basis of human behavior, as well as the pathological basis of neurological and mental disorders. Fundamental principles of anatomy, physiology, pharmacology, pathology and microbiology will be applied to pathological situations to distinguish the clinical basis for nervous system disorders.
Course Objectives	At the end of the course, students will be able to: 1- Describe the structure and function of the CNS. 2- Understand the role of the nervous system in maintaining homeostasis and health. 3- Explain the pathophysiology, epidemiology, clinical presentation, laboratory testing, and the pharmacologic management of the disorders of the nervous system covered in this system.

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Course Learning Outcomes (CLOs)	**CLO1:** Describe the structure and organization of the central nervous system (CNS). **CLO2:** Define the anatomical and physiological properties of sensory and motor pathways, arousal mechanisms, limbic system and higher cortical functions. **CLO3:** Indicate the biochemical properties of neurotransmitters and the biochemical basis of selected neurological diseases. **CLO4:** Discuss the pathogenesis, morphological changes and complications of the diseases affecting the CNS. **CLO5:** Describe common infections affecting the CNS. **CLO6:** Indicate the pharmacokinetic and therapeutic properties and the adverse effects of drugs used for selected neurologic and psychiatric disorders. **CLO7:** Evaluate the signs, symptoms and investigations related to CNS disorders. **CLO8:** Recommend a therapeutic plan for the treatment of clinical cases involving CNS diseases.

Mapping Course Learning Outcomes CLOs to Program Learning Outcomes PLOs

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12	PLO13	PLO14
CLO1	×													
CLO2	×													
CLO3	×													
CLO4	×													
CLO5	×													
CLO6	×													
CLO7		×												
CLO8				×										

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Assessment Methods					
Assessment Type		Date and Time	Assessment Method	Mark (%)	CLOs
Midterm Exam		TBD	Exam	50	
Activities*	Activity (1)	-	-	-	-
	Activity (2)	-	-	-	-
Final Exam		TBD	Exam	50	

*The instructor must choose at least three activities from the following: quizzes, assignments, projects, videos, discussions, etc.

Course Contents, Schedule**, and Instruction Methods		
Week	Course Content	Instruction Method***
Week 1 (26/2-2/3/2023)	Anatomy (lectures 1-8)	Face-to-Face
	Biochemistry (lectures 1-2)	
	Physiology (lectures 1-2)	
	Pathology (lecture 1-3)	
	Anatomy LAB (1)	
Week 2 (5-9/3/2023)	Clinical lecture (1)	Face-to-Face
	Pathology (lecture 4-5)	
	Pharmacology (lecture 1-2)	
	Anatomy (lectures 9-13)	
	Physiology (lectures 3-5)	
	Microbiology (lecture 1)	
	Anatomy LAB (2-3)	
Week 3 (12-16/3/2023)	Pharmacology (lectures 4-7)	Face-to-Face
	Anatomy (lectures 14-16)	
	Physiology (lectures 6-8)	
	Microbiology (lectures 2-3)	
	Pathology LAB (1-2)	
Week 4	MID-TERM EXAM	
Week 5	FINAL EXAM	

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**Please refer to the attached timetable for detailed contents and schedule.
***Instruction method is as follows:

- **Face-to-Face course**: Face-to-face class
- **Online course**: Interactive synchronous or asynchronous
- **Blended course**: Face-to-face or Online (synchronous or asynchronous)

Main Textbook and References	
Main textbooks and additional references	**Anatomy:** - Clinical Neuroanatomy. R.S. Snell, latest edition - Clinical Anatomy for Medical Students. R.S. Snell, Latest edition. - Grant's Atlas of Anatomy or any other reasonable colored atlas of human anatomy. - Basic Histology. C. Junqueira, latest edition. - Before we are born. K.L. Moore and T.V.N. Persaud, Latest edition. **Physiology:** - Berne & Levy Physiology. Koeppen and Stanton, Latest edition. - Costanzo, L.S. 2018, Physiology. Sixth edn, Elsevier. - Review of Medical Physiology. William F. Ganong, Latest edition. **Pathology:** - Essential Pathology. Emanuel Rubin, Latest edition. - Basic Pathology. Kumar, Cotran and Robbins, Latest edition. **Pharmacology:** - Lippincott's Illustrated Reviews: Pharmacology, Latest edition. - Katzung's & Trevor's Basic and Clinical Pharmacology. Katzung, B. G., Kruidering-Hall, M., & Trevor, A. J. (2019) **Microbiology** - Medical Microbiology. By John C Sherris. Third edition
Other References	–

Policies and Instructions*	
Attendance	University regulations will apply
Activities	–
Late Submission	–
Exams	University regulations will apply
Cheating and Plagiarism	

*For more information, please see the student handbook.

Course Specific Learning Objectives	
Title	**Objectives**
Introduction and basic structural organization of the CNS (Anatomy 1)	1. Describe the organization of the NS. 2. Overview of the main parts of the CNS. 3. Identify the main parts of the brain in CT scan and MRI. 4. Describe the surface anatomy of the brain. 5. Explain the concept of nuclei, fasciculi, lemnisci, tracts, laminae, white and gray matter inputs (afferent) and outputs (efferent)
Gross morphology of the brain (Anatomy 2)	1. Demarcate the major lobes, gyri and sulci of the cerebral hemisphere. 2. Describe the organization of the cerebral hemisphere into cerebral cortex, white matter and nuclei. 3. Describe the types of fibers in the white matter of the cerebral hemisphere: projection (internal capsule), commissural and association fibers. 4. Identify the basal ganglia nuclei. 5. Identify main parts of the diencephalons and name the main functions of each part. 6. Define parts of the brainstem and briefly describe its internal structure. 7. Identify the superficial attachments of the cranial nerves. 8. Briefly describe the brain ventricles and meninges.

Cerebral hemisphere (Anatomy 3)	1. Describe the organization of the cerebral cortex (layers and columnar organization). 2. Locate the motor, sensory and other cortical areas. 3. Describe the cortical areas related to the written and spoken language. 4. Identify the structures in coronal, sagittal and horizontal sections of brain. 5. Describe the types of fibers in the internal capsule.
Basal ganglia and limbic system (Anatomy 4)	1. Understand the anatomical and functional definition of the basal ganglia. 2. Identify the different components of the basal ganglia. 3. Describe the connections of the different components of the basal ganglia and the indirect pathways from the basal ganglia to the lower motor neurons. 4. Describe signs and symptoms of lesions which affect different components of the basal ganglia.
Brain meninges, ventricles and CSF (Anatomy 5)	1. Describe the arrangement of the meninges and their relationship to brain and spinal cord. 2. Explain the occurrence of epidural, subdural and subarachnoid spaces. 3. Locate the principal subarachnoid cisterns, and arachnoid granulations. 4. Describe the ventricles of brain and importance of their choroids plexus. 5. Summarize the pathway of cerebrospinal fluid (CSF) circulation 6. Locate the safe sites for the lumbar puncture. 7. Identify brain ventricles in CT scan, MRI and ventriculograms.
Diencephalon (Anatomy 6)	1. Identify the major parts diencephalon. 2. Describe the position and relations of the major parts diencephalon. 3. Identify the thalamic nuclei and their connections. 4. Describes the functions of hypothalamic nuclei.
Gross morphology of the spinal cord (Anatomy 7)	1. Describe the gross anatomical features of the spinal cord. 2. Describe the level of the different spinal segments comparing to the level of their respective vertebrae. 3. Identify important gross features of spinal cord, nerve roots, and spinal ganglia. 4. Describe the internal features of spinal cord (gray matter and white matter) in the different regions. 5. Summarize the location, origin, course and termination of the important ascending and descending tracts of spinal cord.

General sensory pathways of the trunk and limbs (Anatomy 8)	1. Describe gracile and cuneate tracts and pathways for conscious proprioception, touch, pressure and vibration from the limbs and trunk. 2. Describe dorsal and ventral spinocerebellar tracts and pathways for unconscious proprioception from the limbs and trunk. 3. Describe lateral spinothalamic tract and pathways for pain and temperature from the limbs and trunk. 4. Describe ventral spinothalamic tract and pathways for simple touch from the limbs and trunk.
Motor pathways (Anatomy 9)	1. Define the terms upper and lower motor neurons with examples. 2. Describe the corticospinal (pyramidal) tract and the direct motor pathways from the cortex to the trunk and limbs. 3. Briefly describe the indirect motor pathways from the cortex to the trunk and limbs through extrapyramidal tracts such as rubrospinal and reticulospinal tracts. 4. Describe motor pathways to the face muscles. 5. Compare the signs and symptoms of the upper and lower motor neuron lesions.
Brainstem (Medulla, Pons and midbrain) (Anatomy 10-12)	1. Identify the gross features of the brainstem. 2. Briefly describe the internal structure of the brainstems (ascending and descending pathways, sensory and motor cranial nuclei, substantia nigra, red nucleus, olivary nucleus and reticular formation). 3. Describe the main connections of the sensory cranial nuclei. 4. Describe the main connections of the motor cranial nuclei. 5. Review the blood supply of the brainstem. 6. Describe lesions in the brainstem such as medial medullary syndrome and lateral medullary syndrome. 7. Describe the main connections of the substantia nigra and the red nucleus. 8. Describe the main connections of RF and correlate these connections with its main functions.

Cerebellum (Anatomy 13)	1. Identify the major lobes and regions of cerebellum. 2. Summarize the structure of the cerebellar cortex; identify the deep cerebellar nuclei and their connections. 3. Summarize the afferent and efferent connections of the cerebellum and their arrangement in cerebellar peduncles. 4. Describe the major functions of the cerebellum and how each side of the cerebellum controls the ipsilateral side of the body. 5. Explain the effects of lesions of cerebellum and motor disorder associated with cerebellar lesions.
Blood supply of the CNS – Part 1 and 2 (Anatomy 14, 15)	1. Describe the four arteries supplying the CNS. 2. Follow up each artery to its destination. 3. Describe the circle of Willis and its branches. 4. Discuss the principle of end artery type of circulation. 5. Describe venous drainage of the brain.
Development of the CNS (Anatomy 16)	1. Describe the formation of neural tube and neural crest. 2. Describe the development of brain and spinal cord. 3. Describe the positional changes of spinal cord. 4. Describe the development of the spinal nerves and their spinal ganglia. 5. Describe the development of meninges. 6. Describe the development of brain vesicles from the neural tube. 7. Describe the development of the different parts of brain. 8. Describe the development of brain ventricles and choroid plexuses 9. Describe the development of pituitary gland 10. Describe the development of the cranial nerves and their ganglia. 11. Describe the congenital anomalies of brain and spinal cord.
Metabolism of neurotransmitters (Biochemistry 1)	1. Discuss the synthesis and degradation of gamma-amino-butyric acid (GABA). 2. Discuss the synthesis and degradation of dopamine, epinephrine and norepinephrine. 3. Discuss the formation and catabolism of serotonin. 4. Discuss the glutamate metabolism. 5. Understand the brain peptides as neurotransmitters.

The biochemical basis of selected neurological disorders (Biochemistry 2)	1. Discuss the sphingolipids metabolism and their disorders (shingolipidoses). 2. Understand the biochemical bases of Huntington disease. 3. Understand the biochemical bases of Alzheimer disease. 4. Understand the role of biochemical mechanisms in brain damage due to stroke.
An overview of synaptic transmission in the CNS (Physiology 1)	1. Review the physiology of synaptic transmission and the electrical properties of synaptic potentials. 2. List the criteria for accepting a chemical as a neurotransmitter. 3. Describe the mechanisms by which drugs cause presynaptic and postsynaptic modulation of synaptic transmission. 4. List the major excitatory neurotransmitters. 5. List the major inhibitory central neurotransmitters. 6. Identify the major receptor subtypes of CNS neurotransmitters and their functional role. 7. Indicate the involvement of neurotransmitters in the pathophysiology of diseases.
CSF, brain circulation and BBB (Physiology 2)	1. Describe the cerebral blood flow mechanism and the controlling factors. 2. Explain the significance of cerebral perfusion pressure and the mechanism of its control. 3. Describe the pressure-volume correlation and the mechanisms of its control. 4. Discuss the autoregulation mechanisms of cerebral blood flow in health and disease states. 5. Describe formation, composition and circulation of the CSF.

Intellectual functions of the brain (Physiology 3)	1. Describe the language function of the neocortex. 2. Name and locate the large association areas in the cerebral cortex and describe their functions. 3. Define the terms categorical hemisphere and representational hemisphere, and summarize the differences between the hemispheres and their relationship to handedness. 4. Review the function of the limbic and frontal and frontal association areas. 5. Define and explain agnosia, unilateral neglect, dyslexia, and prosopagnosia. 6. List the common types of aphasia. 7. Discuss the neural basis of learning and memory. and list parts of the brain that appear to be involved in memory.
Limbic system (Physiology 4)	1. Summarize the components of the limbic system. 2. Describe the location, structure and the main connections of the hippocampal formation, amygdala and septal nuclei. 3. Describe olfactory pathway 4. Describe the neural circuits involved in emotional responses and stereotyped behaviors. These include sexual and maternal behavior, fear, rage, and motivation 5. Discuss the brain regions involved in sexual behavior in both sexes. 6. Describe the parts of the brain involved in producing the balance between rage and placidity.
Arousal mechanisms and sleep / brain waves (Physiology 5)	1. Describe the functions of the reticular formation and discuss the nonspecific sensory system in the reticular formation. 2. Describe the genesis and electrophysiological basis of EEG. 3. Describe the primary types of rhythms that make up the EEG and the behavioral states that correlate with each. 4. Define and explain synchronization and alpha block. 5. Summarize the behavioral and electroencephalographic characteristics of each of the stages of slow-wave sleep. 6. Summarize the electroencephalographic and other characteristics of rapid eye movement (REM) sleep, and describe the mechanisms responsible for its production. 7. Describe the pattern of normal nighttime sleep in adults and the variations in this pattern from birth to old age.

Viral and fungal meningitis (Microbiology 3)	1. Describe the morphology, physical properties, pathogenesis, laboratory diagnosis and treatment of polio virus, coxaki, enteroviruses, echo, arbovirus and rabies virus. 2. Describe *Cryptococcus neoformans*, its morphology, cultural characteristics, pathogenesis, laboratory diagnosis, treatment its importance.
Sedative-hypnotics (Pharmacology 1)	1. Identify the major chemical classes of sedative-hypnotics. 2. Describe the sequence of CNS effects of a typical sedative-hypnotic over the entire dose range. 3. Describe the pharmacodynamics of benzodiazepines, including interactions with neuronal membrane receptors. 4. Compare the pharmacokinetics of commonly used benzodiazepines and barbiturates and discuss how differences among them affect clinical use. 5. Describe the clinical uses of sedative-hypotics. 6. Describe the common adverse effects and drug interaction of sedative- hynotics 7. Understand tolerance and dependence induced by sedative-hypnotics. 8. Understand the therapeutic indications and adverse effects of benzodiazepines antagonists.
Antidepressants – Part 1 and 2 (Pharmacology 2, 3)	1. Describe the monoamine theory of depression. 2. Describe the classification of antidepressants. 3. Describe the probable mechanisms and the major pharmacodynamic properties of tricyclic antidepressants. 4. List the toxic effects that occur during chronic therapy and after an overdose of tricyclic antidepressants. 5. Describe the therapeutic use and toxic effects of MAO inhibitors. 6. Identify the second and third generation antidepressants and their distinctive properties. 7. Identify the prototype selective serotonin reuptake inhibitor and list its major characteristics. 8. Identify the major drug interactions associated with the use of antidepressant drugs.

Antipsychotic drugs – Part 1 and 2 (Pharmacology 4, 5)	1. Outline the anatomy of the serotonergic, noradrenergic (norepinephrine) and dopaminergic pathways, and summarize their known and suspected functions. 2. Describe the major symptoms and signs of schizophrenia. 3. Describe the dopamine hypothesis of schizophrenia. 4. List the major receptors blocked by antipsychotic drugs. 5. Describe the classifications of antipsychotic drugs. 6. Describe the pharmacodynamics of antipsychotic drugs and correlate it to their clinical uses. 7. List the adverse effects and the behavior effects of the major antipsychotic drugs. 8. Describe the pharmacokinetics and pharmacodynamics of lithium.
Opioids analgesics – Part 1 and 2 (Pharmacology 6,7)	1. Describe the neural mechanisms of pain sensation and its control. 2. List the receptors affected by opioid analgesics and the endogenous opioid peptides. 3. List of major opioid agonists and rank them in analgesic efficacy. 4. Describe the main pharmacodynamic and pharmacockinetic properties of agonist opioid analgesics and list their clinical uses. 5. List the main adverse effects of acute and chronic use of opioid analgesics. 6. Identify opioid receptor antagonists and mixed agonist-antagonist.
Anxiety and depression (Clinical lecture)	

Summary of lectures and labs in the NS 1 system 2022/2023

Discipline	Lectures and Labs	Marks out of 100
Anatomy	16	35
Physiology	7	15
Pharmacology	7	15
Pathology	5	11
Microbiology	3	7
Biochemistry	2	4
Clinical lectures	1	2
Anatomy LAB	3	8
Pathology LAB	1	3
Total lectures	**41**	**89**
Total labs	**4**	**11**

Number of teaching days = 14 (from 26/2 to 15/3/2023)

جامعة اليرموك
Yarmouk University
اسم الكلية
Faculty

Document Approval Date	Course Syllabus	Document Code
		AP01-PR05

Department: Basic Medical Sciences	Official Stamp:

Course Identification	
Course Name: Nervous System II	**Course Code and Number:** MED 324
Number of Credit Hours: 4	**Semester:** Second (2021/2022)
Course Status:	**Teaching Language:** English
Pre-requisite:	**Course Coordinator:** Dr. Fatimah Almahasneh

General Information	
Teaching Method	☒ **Face-to-Face** ☐ **Online** ☐ **Blended**
Course Description	This is an integrated system based course that emphasizes anatomy, physiology, pharmacology, microbiology and pathology of the peripheral nervous system (PNS). The course provides integrated knowledge covering the PNS including peripheral nerves, nerve plexuses and peripheral nerve branches, cranial nerves and special senses. The objectives of this course are achieved via selected lectures and relevant laboratory sessions. To enhance integration of basic and clinical sciences, as well as self-directed learning, common clinical disorders related to this system are also explored using case-based small group discussions and seminars.
Course Objectives	At the end of the course, students will be able to: 1- Describe the structure and function of the PNS. 2- Understand the role of the PNS in maintaining homeostasis and health. **3-** Explain the pathophysiology, epidemiology, clinical presentation, laboratory testing, and the pharmacologic management of the disorders of the PNS.
Course Learning Outcomes (CLOs)	**CLO1:** Describe the structures conveying information to and from the central nervous system. **CLO2:** Illustrate the mechanisms of sensing the various environmental stimuli. **CLO3:** Indicate the biochemical events taking place within the PNS. **CLO4:** Discuss the pathogenesis, morphological changes and complications of diseases affecting the PNS. **CLO5:** Describe common infections affecting this system.

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	CLO6: Indicate the drugs affecting the PNS and / or used for the treatment of PNS disorders. **CLO7:** Evaluate the signs, symptoms and investigations related to PNS disorders. **CLO8:** Recommend a therapeutic plan for the treatment of clinical cases involving PNS diseases.

Mapping Course Learning Outcomes CLOs to Program Learning Outcomes PLOs

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12	PLO13	PLO14
CLO1	×													
CLO2	×													
CLO3	×													
CLO4	×													
CLO5	×													
CLO6	×													
CLO7		×												
CLO8				×										

Assessment Methods

Assessment Type		Date and Time	Assessment Method	Mark (%)	CLOs
Midterm Exam		21/4/2022	Exam	50	
Activities*	Activity (1)	-	-	-	
	Activity (2)	-	-	-	
	Activity (3)	-	-	-	
	Activity (4)	-	-	-	
	Activity (5)	-	-	-	
Final Exam		TBD	Exam	50	

*The instructor must choose at least three activities from the following: quizzes, assignments, projects, videos, discussions, etc.

Document Approval Date	Course Syllabus	Document Code
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Course Contents, Schedule**, and Instruction Methods		
Week	**Course Content**	**Instruction Method*** **
Week 1 (27-31/3/2022)	Anatomy (lectures 1-7)	**Face–to–Face**
	Microbiology (lectures 1-2)	
	Physiology (lectures 1-3)	
	Pathology (lecture 1-2)	
	Anatomy LAB (1)	
Week 2 (3-7/4/2022)	Pathology (lecture 3-4)	**Face–to–Face**
	Pharmacology (lecture 1-4)	
	Anatomy (lectures 8-12)	
	Physiology (lectures 4-5)	
	Microbiology (lecture 3)	
	Pathology LAB (1)	
	Anatomy LAB (2)	
Week 3 (10-14/4/2022)	Pharmacology (lectures 5-7)	**Face–to–Face**
	Anatomy (lectures 13-18)	
	Physiology (lecture 6)	
	Microbiology (lectures 4-5)	
	Case discussion (1)	
	Anatomy LAB (3)	
	Pathology LAB (2)	
Week 4 (21/4/2022)	MID-TERM EXAM	**Face–to–Face**
Week 16	**Final Exam Week**	

**Please refer to the attached timetable for detailed contents and schedule.

***Instruction method is as follows:

- **Face-to-Face course**: Face-to-face class
- **Online course**: Interactive synchronous or asynchronous
- **Blended course**: Face-to-face or Online (synchronous or asynchronous)

Main Textbook and References	
Main textbooks and additional references	**Anatomy:** - Clinical Neuroanatomy. R.S. Snell, latest edition - Clinical Anatomy for Medical Students. R.S. Snell, Latest edition. - Basic Histology. C. Junqueira, latest edition.

	- Before we are born. K.L. Moore and T.V.N. Persaud, Latest edition. **Physiology:** - Costanzo, L.S. 2018, Physiology. Sixth edn, Elsevier. - Berne & Levy Physiology. Koeppen and Stanton, Latest edition. -Review of Medical Physiology. William F. Ganong, Latest edition. **Pathology:** - Essential Pathology. Emanuel Rubin, Latest edition. - Basic Pathology. Kumar, Cotran and Robbins, Latest edition. **Pharmacology:** - Katzung's & Trevor's Basic and Clinical Pharmacology. Katzung, B. G., Kruidering-Hall, M., & Trevor, A. J. (2019) - Lippincott's Illustrated Reviews: Pharmacology, Latest edition. - Pharmacotherapy. Principles and Practice. Chisholm-Burns et al. 5th edition, 2019. **Microbiology** - Medical Microbiology. By John C Sherris. Third edition
Other References	–

Policies and Instructions*	
Attendance	University regulations will apply
Activities	–
Late Submission	–
Exams	University regulations will apply
Cheating and Plagiarism	

*For more information, please see the student handbook.

Course Specific Learning Objectives	
Title	**Objectives**
The orbit, orbital contents and cranial nerves III, IV and VI (Part I and II) (Anatomy)	1. Describe the location of the orbit. 2. Make a list of structures making the orbit starting from the orbital margin. 3. Define each component. 4. Describe openings into orbital cavity. 5. Define the orbital fascia. 6. Describe muscles of the orbit, their cone arrangement, origin, insertion, nerve supply and their function. 7. Describe the nerves of the orbit, their courses, important relations and their targets 8. Describe blood supply and lymph drainage of the orbit.
Eye and cranial nerve II (Anatomy)	1. Imagine the gross features of the eyeball 2. Describe the arrangement of the three layers of eyeball 3. Explain the functional anatomy of different components of eyeball 4. Recognize the gross features and course of optic nerve
Trigeminal nerve (Part I and II) (Anatomy)	1. Review the general anatomical features of the face and scalp. 2. Discuss briefly how the face is developed. 3. Follow up the course of trigeminal nerve from its point of central connections, exit and down to its target areas. 4. Describe briefly important cranial reflexes involving the face and trigeminal nerve
Facial nerve (Anatomy)	1. Follow up the course of facial nerve from its point of central connections, exit and down to its target areas. 2. Describe in details important relation along its course. 3. Discuss the various modalities of its fibers. 4. Review your knowledge of its target organs.

Ear and cranial nerve VIII (Anatomy)	1. Make a list of parts making the internal ear. 2. Define each part and make sure to use keywords. 3. Note how structures fit each other. 4. Describe the bony labyrinth. 5. Explain how the membranous labyrinth fits the bony one. 6. Describe the hearing receptors. 7. Describe the balancing receptors. 8. Follow the course of the VIII nerve down to its point of entry to the brain. 9. Follow up the central connections of the VIII nerve. – Review the list of structures making the different parts of the ear.
Auditory and vestibular pathways (Anatomy)	1. Explain the pathway of hearing 2. Understand the different components of vestibular apparatus 3. Identify the higher center for hearing 4. Interpret the anatomical basis for hearing disturbances
Glossopharyngeal nerve and vagal nerve (Anatomy)	1. Follow up its course from its central connections, exit from the brain and down to its target organs. 2. Make a list of types of nerve modalities conveyed by this nerve. 3. Review the structure of the pharynx tongue and mouth as the target organs. 4. Follow up its course from its central connections; exit from the brain and down to its target organs. 5. Make a list of types of nerve modalities it conveys 6. Review your knowledge of its target organs. 7. Make note of plexuses it creates in the thorax and abdomen.

Accessory and hypoglossal nerve (Anatomy)	1. Recognize the central nuclei of accessory nerve 2. Identify the two roots of accessory nerve 3. Understand the distribution of accessory nerve 4. Recognize the nucleus of origin of hypoglossal nerve 5. Describe the course and distribution of hypoglossal nerve 6. Explain the effects of lesion of hypoglossal nerve
Smell and taste pathways (Anatomy)	1. Recognize the site of smell receptors 2. Understand the pathway of smell 3. Explain the role of olfactory bulb in sense of smell 4. Identify the nerves carrying taste sensation from tongue and palate to its nucleus in brain stem 5. Trace the pathway of taste up to its higher center in cerebral cortex
Autonomic nervous system (ANS) (Anatomy)	1. Review the subdivisions of the nervous system. 2. Review the general arrangement and compare the sympathetic and parasympathetic parts. 3. Describe the following plans: Paravertebral ganglia. Prevertebral ganglia. Parasympathetic ganglia. Splanchnic nerves. Autonomic plexuses. 4. Map out the various plexuses in the head and neck, thorax, abdomen and pelvis. 5. Make a list of the components of the ANS. 6. Review the basic structure of the sympathetic trunk. 7. Describe the source of the sympathetic system in the neck and make a list of target organs. 8. Describe the paravertebral sympathetic ganglia in the abdomen, their locations and target organs. 9. Discuss the relation of this system to the adrenal medulla. 10. Discuss the sympathetic innervation of blood vessels. 11. Make a list of cranial nerves having parasympathetic activity. 12. Describe the parasympathetic ganglia in the head and neck, their locations and target organs. 13. Describe the sacral parasympathetic outflow. 14. Make a list of its target organs.

Spinal nerves, cervical plexus and nerves of the neck (Anatomy)	1. Identify the number and mode of origin of spinal nerves 2. Explain the structure of spinal nerve 3. Understand the formation of nerve plexuses 4. Describe the roots and branches of cervical plexus 5. Recognize the areas of distribution of branches of cervical plexus 6. Explain the origin, course and distribution of phrenic nerve
Brachial plexus & nerves of the upper limb (Anatomy)	1. Make a list of contributing spinal nerves. 2. Discuss the general arrangement of this plexus. 3. Locate the plexus in the axilla and note important relations to blood vessels. 4. Make a list of local branches with short notes on its target organs. 5. Make a list of the terminal main branches of brachial plexus. 6. Follow up each branch down to its target organs (myotomes and dermatomes).
Lumbosacral plexus and nerves of the lower limb (part I, II and III) (Anatomy)	1. Make a list of contributing spinal nerves to the lumbar plexus. 2. Discuss the arrangement of the plexus. 3. Describe the location of this plexus and its relation to the psoas muscle. 4. List the terminal branches and follow up each branch to its final destination. 5. Make a list of contributing spinal nerves to the sacral plexus. 6. Discuss the arrangement of this plexus. 7. Describe the location of this plexus. 8. List its terminal branches and follow up each branch to its target organs. 9. Make a list of nerves of the lower limb including the Gluteal region. 10. Follow up each nerve down to its target organs (myotomes and dermatomes).
Autonomic nervous system (ANS) (Physiology)	1. Define autonomic nervous system (ANS). 2. Describe the organization of the ANS. 3. List the neurotransmitters of the ANS and their properties. 4. List the types of receptors in the ANS, and their locations and effects. 5. Describe the effects of the ANS on various organ systems. 6. Understand the roles of autonomic centers in the brain stem and hypothalamus

Vision (Part I and II) (Physiology)	1. Describe the optics of vision and the refractive errors. 2. Learn the specific physiological functions of eye components, including pigment epithelial cells, receptor cells, bipolar cells, and ganglion cells. 3. Know the optic pathways and related lesions. 4. Describe the steps of photoreception in the rods. 5. Understand receptive visual fields of the ganglion cells and lateral geniculate cells, as well as the receptive fields of the visual cortex.
Audition (Physiology)	1. Understand the structure of the ear and the specific physiological functions of each of the ear components. 2. Describe the steps in auditory transduction by the organ of Corti. 3. Understand how the sound is encoded. 4. Describe the central auditory pathways. 5. Know the structure of vestibular organ. 6. Explain the steps in vestibular transduction. 7. List the vestibular-ocular reflexes.
Olfaction and taste (Physiology)	1. Understand the olfactory pathway and its components (receptor cells, CN 1, mitral cells of the olfactory bulb). 2. List the steps in transduction in the olfactory receptor neurons). 3. Describe the taste pathways. 4. Know the steps of taste transduction.
Thermal regulation (Physiology)	1. Know the normal body core temperature. 2. List the mechanisms of heat production and heat loss in the body. 3. Understand the regulation of sweating by autonomic nervous system. 4. Define the hypothalamic set point for body temperature. 5. Understand the role of hypothalamus in the regulation of body temperature.
Tumors of the nervous system (Part I) (Pathology)	1. Classify tumors and describe the general features of primary brain tumors in comparison to other tumors in the body. 2. Know the pathology and prognosis of the various types of brain tumors. 3. Describe tumors of the peripheral nerves. 4. Know the common types of metastatic tumors and their pathologic characteristics.

Tumors of the nervous system (Part II) (Pathology)	1. Classify tumors and describe the general features of primary brain tumors in comparison to other tumors in the body. 2. Know the pathology and prognosis of the various types of brain tumors. 3. Describe tumors of the peripheral nerves. 4. Know the common types of metastatic tumors and their pathologic characteristics.
Degenerative diseases (Pathology)	1. Know the general features of degenerative diseases & dementias, with special emphasis on Alzheimer's disease, its clinical & morphological findings. 2. Know briefly about Parkinson's Disease, Huntington's disease, and amyotrophic lateral sclerosis.
Demyelinating diseases (Pathology)	1. Know the various causes and types of peripheral neuropathies 2. Know about various axonal degeneration and injuries 3. Know the general features of demyelinating diseases, with special emphasis on multiple sclerosis, its clinical & morphological characteristics.
Local anesthetics (Pharmacology)	1. Describe the classification of the local anesthetic 2. Indicate the pharmacological characteristics of their chemical structures 3. Describe the mechanism of the blockade of the impulse by local anesthetics. 4. Discuss the relation between pH, pKa, and the speed of onset of local anesthesia. 5. List the factors that determine the susceptibility of nerve fibers to blockade by local anesthetics. 6. List the major toxic effects of the local anesthetics. 7. Explain the use of dependent blockade by local anesthetics.
Cholinergic agonists (Pharmacology)	1. Review the steps involved in the synthesis, storage, release and the termination of action of acetylcholine. 2. Mention examples on inhibitors of acetylcholine synthesis, storage and release. 3. List the locations and types of acetylcholine receptors in various organ systems. 4. Describe the effects of acetylcholine on major organ systems. 5. Correlate the pharmacokinetic properties of various choline esters and cholinomimetic alkaloids with their chemical properties. 6. List the major clinical indications and adverse effects of cholinomimetics.

Cholinergic antagonists (Pharmacology)	1. Describe the effects of cholinergic antagonists on various organ systems. 2. List the major clinical indications of muscarinic antagonists. 3. List the major adverse effects of antimuscarinic agents. 4. Describe the signs, symptoms and treatment of atropine poising.
Adrenergic agonists (Part I and II)	1. Review the steps involved in the synthesis, storage, release and the termination of action of epinephrine and norepinephrine. 2. List examples on the inhibitors of norepinephrine synthesis, storage, release and re-uptake. 3. List tissues that contain significant numbers of β adrenergic receptors. 4. Describe the major systemic effects of a pure alpha agonist. 5. Indicate the major clinical applications and major adverse effect of β- receptor agonists. 6. List tissues that contain significant numbers of β receptors. 7. Describe the major organ system effects of a pure beta agonist, and a mixed 8. alpha and beta agonist. 9. List the major clinical applications and adverse effects of β-receptor agonists.
Adrenergic antagonists (Pharmacology)	1. Compare the pharmacokinetics of various adrenergic receptor antagonists. 2. Describe the main indications and major adverse effects of adrenergic receptor antagonists. 3. Describe the main drug-drug interactions of α and β receptors antagonists.
Treatment of Parkinson disease and Alzheimer disease (Pharmacology)	1. Learn the classes of agents used in the treatment of Parkinson disease (PD) and Alzheimer disease (AD) and their indications and adverse effects. 2. List the guidelines for the treatment of PD and AD, the desired outcomes and the required monitoring.
Group B streptococci, Listeria & Mycobacterium leprae. Clostridium tetani & Clostridium Botulism. (Microbiology)	1. Understand the characteristics, laboratory diagnosis and management of Mycobacterium leprae, group B streptococcus and listeria. 2. Understand the bacteriological aspects, laboratory diagnosis, management, and prevention of Clostridium tetani and botulism.

Rabies and, arboviruses (Microbiology)	1. Describe the classification, basic structural, morphological and physical properties, epidemiology, pathogenesis, clinical presentation, laboratory diagnosis, treatment, and prevention of Rabies and Arboviruses.
Ticks (Microbiology)	List: 1. Definition of Ticks 2. Morphology. 3. Life cycle. 4. Pathogenesis and clinical disease. 5. Clinical manifestations.
Enteroviruses (Microbiology)	1. Describe the basic structural, morphological and physical properties, epidemiology, pathogenesis, clinical presentation, laboratory diagnosis, treatment, and prevention of enteroviruses (Polio viruses, coxsackie viruses, echo viruses).
Prions and viroids (Microbiology)	1. Learn the definition of viroids and prions. 2. Learn the classification, diseases, cellular damage, and treatment of viroids and prions.

Small group discussion

Case scenario

A 57-year-old woman was seen in the neurology clinic of this hospital because of long time numbness and weakness in her feet and legs. When she was in her early 30s, numbness developed over the anterior surfaces of her shins and ankles. In her early to mid-40s, she became unsteady when using the stairs or walking in the dark. She noticed weakness in her feet. She had no dorsiflexion of her toes, and they tended to catch on carpets or on thresholds. Her feet occasionally ached, and she believed that her arches had become higher. Dysesthetic sensations developed in her feet, which she said felt "cold and wet." The father of the patient had high-arched feet, and poor balance. The patient had five siblings; two brothers had polyneuropathy, one of whom had high-arched feet and hammertoes. The patient had three children.

The patient had hammer toes but not high-arched feet. No hypertrophic nerves were palpable. On neurological examination she was alert and cooperative. She had a head tremor. She walked with forearm crutches. She was unable to walk on her toes or heels. Romberg's sign was present. Strength in her arms and proximal legs was normal. Strength in the dorsiflexor, invertor, and evertor muscles in the feet was 2/5 bilaterally. Plantar flexor strength was 4/5. Deep- tendon reflexes were absent except for triceps jerks. Sensory examination revealed reduced sensation to light touch in the feet up to the proximal legs and to pinprick to the middle of the legs. Position sense and vibration sensation were absent at the toes and reduced at the ankles. Coordination was normal.

Laboratory studies at that time, including routine blood chemical studies, a complete blood count, liver-function tests, a lipid profile, serum protein electrophoresis, antinuclear antibody and rapid plasma reagin tests, erythrocyte sedimentation rate, and levels of vitamin B12, folate, and thyrotropin were normal. The creatine kinase level was reported to be slightly high.

Electromyography at that time showed absent sural and superficial peroneal sensory responses. Median, ulnar, and radial sensory potentials were slightly small with mildly prolonged latencies.

Peroneal and tibial motor responses were very small, and conduction velocities were slowed. Median and ulnar motor responses were of normal amplitude, but conduction velocities were mildly slow. Needle examination showed fibrillation potentials in the left extensor hallucis longus and medial gastrocnemius. No fibrillation potentials were seen in the tibialis anterior, vastus, lateralis, or muscles in the arms.

Questions

1. What is peripheral neuropathy?
2. How are the peripheral neuropathies classified?
3. What are the symptoms of peripheral nerve damage? What causes peripheral neuropathy?
4. How is peripheral neuropathy diagnosed? What treatments are available?
5. What research is being done? Where can I get more information?

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Department: Basic medical sciences | **Official Stamp:**

Course Identification	
Course Name: Urogenital system	**Course Code and Number:** MED325
Number of Credit Hours: 6	**Semester:** Second (2021/2022)
Course Status:	**Teaching Language:** English
Pre-requisite:	**Course Coordinator:** Dr. Fatimah Almahasneh

General Information	
Teaching Method	☐ **Face-to-Face** ☐ **Online** ☒ **Blended**
Course Description	This course is a multidisciplinary integrated course deals with the gross morphology, vasculature, lymphatic drainage and innervation of different organs forming urinary and reproductive system. Various functions, normal development and congenital anomalies of this system will be covered. In addition, normal and pathological microscopic appearance of different components of the system will be discussed. Biochemical and genetic aspects, microorganismsthatinfectthesystemaswellasdrugsthataffectthissystemwillbe conferred. Teaching methods including lectures, practical, seminars and small group discussions of clinical oriented problems to enhance self-directed learning, willbe followed.
Course Objectives	This course aims at : 1- Describe the structure and function of Urogenital organs. **2-** Explain the pathophysiology, epidemiology, clinical presentation, laboratory testing, and the pharmacologic management of the disorders of the Urogenital system.
Course Learning Outcomes (CLOs)	**CLO1:** Describe the anatomical and histological structure, development, and function of the different organs of the urogenital system. **CLO2:** Understand various functions of the Urinary and Reproductive System. **CLO3:** Discuss the pathogenesis, morphological changes and complications of diseases affecting the urogenital system. **CLO4:** Assess the impact of urogenital diseases on public health.

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	CLO5: Indicate the drugs used for the diagnosis and treatment of urogenital disorders. **CLO6:** Evaluate the signs, symptoms and investigations related to Urogenital disorders. **CLO7:** Recommend a therapeutic plan for the treatment of clinical cases involving the urogenital diseases.

Mapping Course Learning Outcomes CLOs to Program Learning Outcomes PLOs

	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12	PLO13	PLO14
CLO1	×													
CLO2		×												
CLO3	×													
CLO4														×
CLO5	×													
CLO6		×												
CLO7				×										

Assessment Methods

Assessment Type		Date and Time	Assessment Method	Mark (%)	CLOs
Midterm Exam		TBD	Exam	50	
Activities*	Activity (1)				
	Activity (2)				
	Activity (3)				
	Activity (4)				
	Activity (5)				
Final Exam		TBD	Exam	50	

*The instructor must choose at least three activities from the following: quizzes, assignments, projects, videos, discussions, etc.

Course Contents, Schedule, and Instruction Methods**

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Week	Course Content	Instruction Method***
Week 1		Face-to-Face
	Anatomy	
	Biochemistry	
	Physiology	
	Pathology	
	Anatomy LAB	
Week 2	Physiology	Face-to-Face
	Pathology	
	Anatomy	
	Microbiology	
	pharmacology	
	Pathology LAB, anatomy lab (1)	
	Small group discussion (case 1)	
Week 3	Physiology	Face-to-Face
	Pathology	
	Anatomy	
	Microbiology	
	Microbiology lab	
	Pathology LAB, anatomy lab (1)	
Week 4	Physiology	
	Pathology	
	Pharmacology	
	Pathology lab	
Week 5	Anatomy	
	Biochemistry	
	Physiology	
	Pathology	
	Public health	
	Microbiology	
	Pathology LAB, anatomy lab (1)	

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Course Contents, Schedule**, and Instruction Methods		
Week	**Course Content**	**Instruction Method*** **
	Small group discussion (case 1)	
Week 6	MID-TERM EXAM ()	**Face-to-Face**
Week 16	**Final Exam Week**	

** Please refer to the attached timetable for detailed contents and schedule.

***Instruction method is as follows:

- **Face-to-Face course**: Face-to-face class
- **Online course**: Interactive synchronous or asynchronous
- **Blended course**: Face-to-face or Online (synchronous or asynchronous)

Main Textbook and References	
Main Textbook	**Anatomy:** - Clinical Anatomy for Medical Students: By R.S. Snell, latest edition. - Basic Histology,ByL.Carlos Junqueira, latestedition. - Before we are born. ByK.L.MorreandT.V.N. Persaud, latest edition. - Grant Atlas of Anatomy, latest edition. **Biochemistry:** - Harper's Biochemistry. Robert K. Murray and Co., Latest edition. - Supplementary Departmental Handouts. **Physiology:** - Textbook of Medical Physiology. Guyton and Hall, Latest edition. - Berne & Levy Physiology. Koeppen and Stanton, Latest edition. -Review of Medical Physiology. William F. Ganong, Latest edition. **Pathology:** - Essential Pathology. Emanuel Rubin, Latest edition. - Basic Pathology. Kumar, Cotran and Robbins, Latest edition. **Pharmacology:** - Goodman and Gilman's. The pharmacological basis of therapeutics. Latest

	edition. - Lippincott's Illustrated Reviews: Pharmacology, Latest edition. **Community Medicine:** - Supplementary Departmental handouts.
Other References	–

Policies and Instructions*	
Attendance	University regulations will apply
Activities	–
Late Submission	–
Exams	University regulations will apply
Cheating and Plagiarism	

*For more information, please see the student handbook.

Small group discussion

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Case Presentation-1

Acute renalfailure

Apreviouslywell32-year-oldmanisbroughttotheemergency departmenthaving beeninvolvedinamotor vehicleaccident.Thecircumstancesoftheaccidentareinitially unclear.However,theambulanceofficerswho attendedtheaccidentnotedthathewastrappedinthevehiclefor three hoursbefore beingfreed.

At this time he washypotensive with a systolic blood pressure of80 mmHg, andhadsignificantinjuriestohislowerlimbs with probablefractureofbothfemora.Hewasinitially treatedwithcolloidandsubsequently crystalloidfluid resuscitation, andhissystolic bloodpressure stabilized at 100 mmHg. At thetimeofadmissiontothe emergency department,abdominal,thoracic,andcerebral injurieswere excluded and his injurieswere assessed asbeingconfinedtohislowerlimbs.Hewastachycardicand hisblood pressurewas100/60 mmHg, and his jugularvenouspressure wasnotvisibleeventhoughhewaslyingflat.Inpreparationforsurgicalstabilizationof hislowerlimbs,hehadaurinarycatheterinsertedand50mlofdark urine,whichtestedstrongly positivefor blood on urinalysis, wasdrained, afterwhich minimalurine outputwasdocumented.

Initial laboratoryinvestigationsrevealed thefollowing results:
Hemoglobin 79 g/L
Sodium140 mmol/L Potassium7.8 mmol/L Chloride 98 mmol/L Bicarbonate 11 mmol/L Urea 13 mmol/L Creatinine 0.19 mmol/L

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Goals andObjectives:

1. Brieflysummarize thecaseto the students.
2. Listthesignsand symptoms thatthispatienthad and explain them.
3. Define the Acute RenalFailure.
4. Discussthe causesofacuterenalfailure.
5. Whatare the factorsinvolved inthedevelopmentof thisman'sacute renalfailure?
6. Explain theinitiallaboratoryfindingsandwhatadditionalbiochemicalabnormalitiesare likelyto be present?
7. Discusshowto evaluaterenalfunction with the emphasison blood ureanitrogenand serumcreatinine.
8. Describein generalterms the expected course andprognosisofthisrenalfailure.
9. Discussthe complicationsofacuterenalfailure.
10. Describethebasic principles inthetreatmentofacute renalfailure

Case Presentation-2

Infertility

A25 year-old married nurse had an emergencycaesarean section performed for fetaldistressassociatedwitha placentalabruptionat38weeksgestation.Thebabywasdeliveredsafely,butthepostnatalrecoverywas complicatedby puerperalpyrexiaandafoul-smelling vaginaldischarge.Shewasnext seen 3 years later in the gynaecologyoutpatientcliniccomplainingofinfertility.Shehadstartedtryingforasecondchild6 months afterhercaesareansection,havingreliedonthesheathforcontraceptionduringthistime.Shewass till married to the same husband, had remained in good health and menstruated regularlyfor4 daysoutofevery28 days. Nothinguntoward was found on examinationandapostcoitaltestonthe12thdayofhercycleshowedplentiful activelymotilespermatozoainacopiousclearmucus.Serumprolactinwas258mu/L,FSH4.6U/L,LH6.0 U/Landthyroidfunctionwasnormal. HerTemperaturechartwasclearlybiphasicandday21serum progesterone suggestive ofovulation (> 40 nmol/L). Diagnosticlaparoscopywasthereforeperformedandrevealeda normaluterus,righttubeandovary.Theleft tube,however,wasbounddownby adhesionstotheback ofthebroadligamentandtherewasevidenceof chronicsepsisandadhesionsinthepouchofDouglas. Theleftovary couldnotbeseen.Methylenebluedye was injected through the cervix and passed easilythrough the right tube butnot the left.

Objectives:

1) Brieflysummarize the case to the students.
2) List the signsand symptoms that thispatienthad and explain them.
3) Define and classifyinfertility.
4) List the causesof infertility(male and female).
5) What investigations should be performed before embarkingon the treatmentof infertility?

6) Howsignificant is the findingofunilateral tubalblockage in thisparticularcase?
7) If the tubalblockage is responsible forthislady'ssecondaryinfertility,whatcanbedoneinthe wayof treatment?
8) Describe