Syllabus: Endocrine module (1815011301)

First Semester 2024 /2025

COURSE INFORMATION	
• **Course Name:** Endocrine module • **Semester:** First **Department:** Pharmacology, Public Health and Clinical Skills • **Faculty:** Medicine	• **Course Code: 1815011301** • **Section:** Preclinical Modules • **Core Curriculum**: MD program
• **Day(s) and Time(s):** • A module type on a daily basis from (9 am - 4 pm) five weeks, in College of Medicine. • ***Theoretical lectures:*** Faculty of Medicine Main Lecture Hall, Biomedical Science main lecture hall, ***Practical sessions:*** labs of anatomy, pathology, and biochemistry.	• **Credit Hours: 4hrs (theory and practical)** • **Prerequisites: NA**

COURSE DESCRIPTION

The endocrine module is a four-credit hour course with around 44 lectures and 6 practical labs included. This course integrates all basic science disciplines in one system-based course to discuss endocrine system-related topics. Each of the basic science departments is incorporated into an integrated body of knowledge covering anatomy, physiology, biochemistry, pharmacology, pathology, and community medicine. The goals of this course will be achieved via lectures and relevant laboratory practical sessions. In this course discussing the structure of endocrine glands as well as the development of different endocrine glands. The course also focuses on the role of the endocrine system in maintaining homeostasis as well as the physiological effects of different hormones. In addition, this course describes in detail the biosynthesis of hormones, regulation of hormonal secretion and the mechanism of action of different

hormones. It also discusses the drug affecting the endocrine system. In addition, it explains different diseases affecting the endocrine glands and the possibility of pharmacological treatment of each.

DELIVERY METHODS

The course will be delivered through a combination of active learning strategies. These will include:

- PowerPoint lectures and active classroom-based discussion
- Collaborative learning through integrated case studies
- Relevant papers and reading materials
- E-learning resources: e-reading assignments and practice quizzes through Microsoft Team

ACULTY INFORMATION

Name	Ola Ebbeni(coordinator)
Academic Title:	Assistant Professor of pharmacology
Office Location:	Pharmacology and Public Health department, office number:
Email Address:	olaebbeni@hu.edu.jo
Office Hours:	Sunday (11 am-1 pm) Tuesday (11 am-1 pm) all students are welcomed at any time or by arranging via TEAMS or email.

***Faculty members involved in the teaching and learning activities of the endocrine module:**

Name of faculty member	Subject	Academic title	Email Address	Office number	Office hours
Zuhier Hasan	Physiology	Professor	**zuheirakh@hu.edu.jo** **Zuheirakh@staff.hu edu.jo**	3017	Sun :10-12 am Tue :10 -12 am Or by appointment
Gehan el wakeel	Physiology	Associate Professot	Gehan@hu.edu.jo	كلية طب الاسنان	Mon : 10-12 Wed: 10-12
Nebras Bani Melhem	Biochemistry	Assistant Lecturer	Nebras@hu.edu.jo	1049	Sun: 10-12 Tue.: 10-12
Lara M. Al-Natour	Community Medicine	Assistant Lecturer	laram@hu.edu.jo Laram@staff.hu.edu.jo	1012	Sun: 10-12 Tue.: 10-12
Ola Abu Al Karsaneh	Pathology	Assistant professor	olaa@hu.edu.Jo Olaa@staff.hu.edu.Jo	1017	Sun::10-12 Tue: 10-12
Mohamed Fathi elrefai	Anatomy	Assistant professor	mohamed@hu.edu.jo mohamed@staff.hu.edu.jo	3014	Sunday: 11-1 Tuesday 11-1

REFERENCES AND LEARNING RESOURCES

Subject	Text books and websites	Authors	Edition
physiology	Guyton and Hall Textbook of Medical Physiology	John Hall and Michael Hall	14th
	Ganong's Review of Medical Physiology	Kim Barrett , Susan Barman , Jason Yuan, Heddwen Brooks	26th
	Lange Endocrine Physiology	Patricia E.Molina	5th
Anatomy	Grey's anatomy for students	Richard Drake	4th
	Principles of Human Anatomy.	Gerard J Tortora, Mark Nilsen	14th
	Clinical Anatomy for Medical Students. By R.S. Snell	Richard S Snell	5th
	Basics of Histology	L.Carlos Junqueira	12th
	Before we are birth	K.L. Moore and T.V.N. Persaud,	10th
Biochemistry	Harper's Illustrated Biochemistry	Victor W. Rodwell , David A. Bender , Kathleen M. Botham , Peter J. Kennelly , P. Anthony Weil.	31th
	Thomas M. Devlin. Textbook of Biochemistry with Clinical Correlations	John Wiley & Sons	7th
Pathology	Robbins Basic pathology	Kumar, Abbas &Aster	Elsevier Inc:10th edition, (2018). ISBN: 978-0-323-3531 7-5.
Pharmacology	Lippincott Illustrated Reviews: Pharmacology (Lippincott Illustrated Reviews Series)	Karen Whalen Pharm. D BCPS	8th
Community medicine	*https://www.google.com/url?sa=t&source=web&rct=j&url=https://www.cdc.gov/diabetes/pdfs/data/statistics/national-diabetes-statistics report.pdf&ved=2ahUKEwj0l6aPnL70AhXEMewKHTWnANMQFnoECAUQAQ&usg=AOvVaw3Z8K8tYlB3N3dqm9GwcA9a *https://books.google.com/books/about/Oxford_Textbook_of_Endocrinology_and_Dia.html?id=9R-RAAAAQBAJ		

STUDENT LEARNING OUTCOMES MATRIX

Program Learning Outcomes	Course Objectives	Course Student Learning Outcomes		Assessment Method
		Topic	Involved lectures, names and numbers	
MD program	***A-Biomedical Knowledge*** **1. Describe Structures of the various endocrine glands, their development, their histology and their blood supply.** **2. Identify the classification of the hormones, their basic structure, their mechanism of action and their synthetic pathways.** **3. Understand the regulation of hormone synthesis and secretion.** **4. Understand the physiological role of hormones in achieving homeostasis, including their interaction with the other chemical messenger systems of the body.** **5. Know the pathogenesis, morphological changes and the complications associated with the disruption of endocrine function.** **6. Understand the use of hormones and their derivatives in the diagnosis and treatment of the various endocrine disorders.** **7. Identify the Public health issues associated**	**(1)** Introduction of endocrinology	**physiology lecture (1): basics of endocrinology** ● Outline the role of the endocrine system and hormones as an integral part of homeostasis. ● Define the terms hormone, target cell, and receptor. Discuss how hormones can influence responsiveness of the target cell by modulating receptor function and define desensitization, downregulation, and upregulation of hormone receptors. ● Describe the mechanism of hormone secretion, hormone transport, duration of hormone action and hormonal clearance ● Identify the general mechanisms that regulate hormone secretion. ● Explain the principles of feedback control (negative and positive) of hormone secretion and understand feedback loops regulating hormones secretion. ● Describe cyclical variations that occur in hormone release. ● Understand the general principles for the assessment of endocrine functions. ● Outline the main types of endocrine disorders including hyposecretion, hypersecretion and hormone resistance. **Biochemistry lecture (1,2): (Basics of signal transduction)** ● Identify the nature of different hormones. ● Classify hormone types (steroids, proteins and short peptides, and amino acids). ● Provide examples of each of the following major classes of receptors and compare and contrast their mechanism of signaling and termination: receptor tyrosine kinases, serine/threonine linked receptors, G-Protein coupled receptors, cytoplasmic/nuclear receptors and guanyl cyclase linked receptors. ● Describe how alterations in signal transduction pathways can lead to human disease. ● Describe how signal transduction pathways can be used as targets for disease therapy	Exams

	with the common endocrine disease. ***B-Clinical Skills*** **1. Discuss the presentation and investigations associated with a witnessed patient encounter.** **2. Know key clinical anatomical landmarks of the major endocrine organs.** **3. Know the key biochemical markers measurable in patients to evaluate endocrine disorders.** ***C-Critical thinking skills:*** **1-Observe, identify and predict health problem based on previous experience and make decisions based on evidence rather than opinion** **2-Locate , apprise , (Analyze and evaluate) and assimilate (gathering) evidence from literature related to patients health problems**			

		(2) Pituitary gland, hypothalamus and pineal body	**Anatomy lecture (1,2): anatomy of Pituitary gland, hypothalamus and pineal body:** ● Identify names and location of each endocrine gland in the human body. ● Identify location of hypothalamus in human body. ● Discuss extensions, parts and zones of hypothalamus. ● Identify important hypothalamic nuclei. ● Important hypothalamic connections. ● Blood supply of hypothalamus. ● Development of hypothalamus. ● Identify position, shape and size of pituitary gland. ● Discuss relations of pituitary gland and importance. ● Enumerate blood supply of pituitary gland. ● Anatomical parts of the pituitary gland. ● Discuss the hypothalamic hypophyseal portal circulation. ● Discuss hypothalamic hypophyseal tract. ● Identify the histological features of different cells in the anterior lobe of the pituitary gland. ● Identify the histological features of different cells in the posterior lobe of the pituitary gland. ● Explain sources of each part of the pituitary gland. ● Enumeration of congenital anomalies of pituitary gland ● Identify site, size, and importance of pineal body. **Physiology lecture (2): (Pituitary Hormones and Their Control by the Hypothalamus)** ● Identify the hypothalamic structures associated with pituitary gland (Review) ● Identify the anatomical features of the pituitary gland (Review) ● Describe the anatomic connections between the hypothalamus and the pituitary gland and the functional significance of each connection. (Review) ● Describe the different cell types and vascular supply of the anterior pituitary lobe and ● Describe the physiological role of the portal circulation. ● Identify hypothalamic hormones that control the secretion of the anterior pituitary hormones and describe their route of transport from the hypothalamus to the pituitary gland ● Identify the three categories of anterior pituitary hormones and describe the actions of tropic hormones on target peripheral glands. ● Understand negative feedback control of anterior pituitary hormone secretion and describe the short- and long-loop negative feedback control of hypothalamic and anterior pituitary hormone secretion. ● Understand the principles of evaluating the hypothalamic pituitary axis target gland axis ● Predict Understand the consequences of hypopituitarism. **Physiology lecture (3): Endocrine regulation of growth** ● List the general characteristics of human growth at different stages of development .	

			● Describe the rate of growth at different stages of growth and development ● List the hormones necessary for normal growth and describe their function and the relative importance of these hormones at different stages of growth ● Describe the relative importance of different hormones at different stages of growth ● Describe the metabolic and growth promoting actions of growth hormone. ● Understand the regulation of growth hormone secretion with focus on the roles of hypothalamic factors, glucose, and insulin-like growth factor-I (IGF-I) ● Describe the rate of growth at different stages of growth and development ● List the other hormones necessary for normal growth and describe their function ● Describe the relative importance of different hormones at different stages of growth **Physiology lecture (4): Hormones of the posterior pituitary gland (Neurohypophysis)** ● Describe the physiological and anatomical relationships between the hypothalamus and the anterior and the posterior pituitary (Review). ● Understand the integration of hypothalamic and pituitary function and identify the two different pathways that mediate hypothalamic–pituitary interactions. ● Identify the hormones released by hypothalamic nuclei and their release by the posterior pituitary. ● List the target cells for vasopressin and explain why vasopressin is also known as antidiuretic hormone (ADH). ● Describe the physiological effects of ADH and understand its mechanism of action. ● Describe the stimuli and mechanisms that affect vasopressin secretion. ● Identify disease states caused by under-secretion and over secretion of vasopressin and list the principal symptoms of each. ● Outline the principles of water deprivation test and its use in the diagnosis of diabetes insipidus. **Physiology lecture (5): Hormonal regulation of Lactation and parturition (Role of prolactin and oxytocin)** ● Describe the neuroendocrine regulation of milk secretion and milk ejection. ● Describe the physiological effects of oxytocin on uterus and its role in the initiation and maintenance of labor. ● Describe the effects of oxytocin on mammary glands and its role in milk letdown. ● Understand the regulation of oxytocin secretion.	

			● Describe the function of prolactin and its effects on the mammary gland and its role in lactation. ● Understand the regulation of prolactin secretion during pregnancy and during lactation. ● Describe the mechanism of action of oxytocin and prolactin (Review). ● **Pharmacology lecture (1): Hypothalamic, anterior and posterior pituitary hormones analogues and their effects** ● Describe the anatomical and physiological connections between the hypothalamus and the pituitary glands. (Review) ● Overview of the hypothalamic, anterior pituitary and posterior pituitary hormones and their synthetic analogs (Adrenocorticotropic (ACTH), Growth (GH), GH-inhibiting, Gonadotropins-Releasing (GnRH), Gonadotropins (FSH and LH) hormones and prolactin. ● Overview of the posterior pituitary hormones and their synthetic analogs (Oxytocin and Vasopressin) ● Describe the mechanism of action (MOA) and the clinical effects of these analogs. ● Illustrate the clinical applications, adverse effects, and routes of administration for the synthetic analogs of above-mentioned hormones **Pathology lecture (1): Pituitary gland pathology** ● Discuss the endocrine system's general division, functions, and diseases. ● Mention the causes of hyperpituitarism. ● Be familiar with pituitary adenomas' clinical features, pathogenesis, and morphology. ● Describe the numerous forms of pituitary adenomas in further depth, including the hormones released and their clinical manifestations. ● Discuss the causes and symptoms of hypopituitarism. ● Describe the different types of posterior pituitary gland syndromes (Diabetes Insipidus and syndrome of Inappropriate Antidiuretic Hormone (SIADH)	
		(3) Thyroid gland	**Anatomy lecture (3): (Anatomy of thyroid gland)** ● Discuss the anatomical position, shape, weight and capsule of thyroid gland. ● Discuss important relations of thyroid gland ● Enumerate blood supply of thyroid gland and its importance ● Understand lymphatic drainage of thyroid gland ● Enumerate innervation of thyroid gland ● Discuss the histological features of thyroid follicle ● Differentiate between follicular and parafollicular cells ● Discuss development of thyroid gland ● Explain thyroglossal duct and its fate. ● Discuss the congenital anomalies of thyroid gland ● Discuss the applied anatomy of thyroid gland	

			Physiology lecture (6): Thyroid gland hormones ● Describe the absorption, uptake, distribution, and excretion of iodide. ● Identify and describe the steps in the biosynthesis, storage, and secretion of triiodothyronine (T3) and thyroxine (T4) and their regulation (Review). ● Describe the regulation of thyroid stimulating hormone by thyroid releasing hormone and T4, T3 ● Discuss T4 and T3 transport and duration of action ● Explain the importance of thyroid hormone binding in blood on free and total thyroid hormone levels. ● Characterize physiological consequences of thyroid hormones binding to transporting proteins ● Describe the physiologic effects and mechanisms of action of thyroid hormones. ● Describe the regulation of thyroid hormones secretion. ● Understand the causes and describe the consequences of over- and under-secretion of thyroid hormones. ● Explain the physiological basis of signs and symptoms seen in hypo and hyperthyroid state **Biochemistry lecture (3): Thyroid gland hormones** ● Describe the synthesis and secretion of thyroid hormones T4, rT3 and T3 noting the steps that occur exclusively in the thyroid gland and those in peripheral tissues. ● Explain how the secretion of thyroid hormones is regulated by Thyroid Releasing Hormone (TRH) and Thyroid Stimulating Hormone (TSH). ● Discuss the regulation of iodine uptake by the thyroid gland and the effects of iodine deficiency ● Describe iodine metabolism ● Describe the molecular basis of thyroid hormone action ● List thyroid function tests and evaluate the results to reach a clinical diagnosis. **Pharmacology lecture (2): the pharmacology of thyroid hormones** ● Describe the synthesis and feedback regulation of thyroid hormones. ● Understand the mechanism of action, the effects and the pharmacokinetics of thyroid hormones. ● Describe the symptoms and management of hypothyroidism and list relevant drugs. ● Describe the symptoms and management of hyperthyroidism and list relevant drugs. ● Identify symptoms of thyroid storm and treatment options. **Community lecture (1): Epidemiology of thyroid diseases** ● Identify types of thyroid dysfunction ● Know clinical picture especially dangerous signs	

			● Size of the thyroid dysfunction problem in the community ● Causes, risk factors and how to manage the problem of thyroid dysfunction ● Importance of prevention of neonatal hypothyroidism. **Pathology lecture (2,3): Thyroid gland pathology I, II** ● Discuss the causes of thyrotoxicosis and hyperthyroidism. ● Be familiar with the clinical features of hyperthyroidism. ● Discuss the diagnostic tests of hyperthyroidism. ● Discuss the primary and secondary causes of hypothyroidism. ● Be familiar with the clinical features of hypothyroidism. ● Discuss Hashimoto's thyroiditis, including the pathogenesis and clinical and morphologic features. ● Discuss granulomatous, lymphocytic, and Riedel thyroiditis in detail. ● Discuss Graves' disease's pathogenesis, clinical features, and morphology. ● Discuss the different types, clinical features, and morphology of diffuse and multinodular goiter. ● Discuss the general rules while approaching the thyroid gland nodules ● Mention the classification of the thyroid gland neoplasms ● Discuss the general features, pathogenesis, clinical features, and morphology of thyroid follicular adenoma ● Describe in detail about the pathogenesis of the four types of thyroid carcinoma. ● Discuss papillary thyroid carcinoma, including the clinical features and gross and microscopic features. ● Discuss follicular carcinoma and concentrate on the main diagnostic features.	

			● Discuss in detail the clinical and morphologic features of anaplastic and medullary thyroid carcinoma	
		(4) Suprarenal (adrenal) gland	● Anatomy lecture (4): Anatomy of suprarenal gland ● Describe site, weight and dimensions of suprarenal gland ● Describe the anatomical features of suprarenal gland ● Enumerate blood supply and lymphatic drainage of suprarenal gland ● Describe the important relations of the right and left suprarenal gland ● Compare between right and left suprarenal gland ● describe the histological features of suprarenal gland ● Differentiate between 3 zones of suprarenal cortex ● Describe the embryological sources of suprarenal cortex and medulla. ● ● Physiology lecture (7,8): (Hormones of adrenal gland) ● Identify the functional zones (one medullary and three cortical zones), of the adrenal gland and describe the principal hormones secreted from each zone. ● Understand the cellular mechanisms of action of adrenal cortical hormones (Review) ● Identify the major physiological actions of glucocorticoids. ● Describe the components of the neuroendocrine axis that control glucocorticoid secretion. ● Describe the causes and consequences of over and under-secretion of glucocorticoids and adrenal androgens. ● Identify the major mineralocorticoids and identify their biological actions and target tissues.	Exams

			● Describe the role of the adrenal cortex in regulation of plasma sodium, potassium and blood volume ● Describe the principal physiological stimuli that cause mineralocorticoid secretion and their connection to regulation of sodium and potassium homeostasis. ● Describe the aetiology and consequences of over- and under-secretion of mineralocorticoids. ● Describe the biological consequences of activation of the adrenal medulla and identify the target organs or tissues for catecholamines along with the receptor subtype that mediates the response. ● Identify the physiological actions of catecholamines and their mechanisms of action. ● Name the key stimuli causing catecholamine secretion. ● Describe the interactions of adrenal medullary and cortical hormones in response to stress. ● Identify pathologies caused by the over secretion of adrenal catecholamines ● Biochemistry lecture (4): (steroid hormones) ● Illustration of steroid hormones synthesis ● Discuss the biological effects of glucocorticoids ● List and interpret lab test used for assessment of glucocorticoid secretion ● ● Pharmacology lecture (3-4): (Pharmacology of the adrenal hormones) (corticosteroids) ● Overview of the functional zones of the adrenal gland and describe the main hormones secreted from each zone (review). ● List key adrenal corticosteroids. ● Describe the physiological effects of glucocorticoids and mineralocorticoids. ● Understand the mechanism of action, the pharmacokinetics and dosing of corticosteroids and their analogs.	

			● Describe the clinical and therapeutic uses of the corticosteroids, their side effects and understand the discontinuation process. ● Describe inhibitors of adreno-corticoid biosynthesis of function and their clinical application ● Pathology lecture (4,5): adrenal glands Pathology I,II ● Mention the three types of hyperadrenalism syndromes. ● Discuss in detail the causes and clinical features of Cushing's Syndrome ● Discuss the morphologic features seen in the pituitary and adrenal glands in the case of Cushing syndrome. ● Discuss the causes, clinical features, and morphology associated with hyperaldosteronism. ● Be familiar with the causes of adrenogenital syndrome. ● Discuss in detail the different clinical and morphologic aspects of congenital adrenal hyperplasia (CAH). ● Mention the different types of adrenal insufficiency. ● Discuss the causes of primary acute and chronic adrenocortical insufficiency in detail. ● Discuss the secondary causes of adrenocortical insufficiency. ● Be familiar with the clinical features and different morphologic patterns in adrenal insufficiency. ● Discuss adrenocortical adenoma and carcinoma. ● Discuss the adrenal medulla neoplasms (pheochromocytoma and neuroblastoma). ● Discuss the different types of multiple endocrine neoplasia and the primary organs involved in each	
		(5) Endocrine part of pancreas	**Anatomy lecture (5): Anatomy and histology of endocrine part of pancreas** ● Identify the endocrine part of pancreas ● Histological features of islets of Langerhans	

			Physiology lecture (9,10): **(Physiology of the Hormones released by the endocrine Pancreas) and (glucose Homeostasis)** ● Identify the principal hormones secreted from the endocrine pancreas, their cells of origin, and their chemical nature. ● Understand the nutrient, neural, and hormonal mechanisms that regulate pancreatic hormone release. ● List the principal target organs for insulin and glucagon action and their major physiologic effects. ● Identify the time course for the onset and duration of the biologic actions of insulin and glucagon. ● Identify the normal range of plasma glucose concentrations and the hormonal regulation of its metabolism, storage, and mobilization. ● Identify the disease states caused by over secretion, undersecretion, or decreased sensitivity to insulin, and describe the principal manifestations of each. **Biochemistry lecture (5, 6): (insulin and diabetes mellitus)** ● Summarize the process by which insulin is synthesized ● Describe the properties of the insulin receptor and outline the molecular events which, after ligand binding, lead to IRS activation. ● Describe the effect of insulin on the processes and pathways that regulate blood glucose homeostasis. ● Compare and contrast the characteristics of insulin-dependent and non-insulin-dependent glucose transporters. ● Compare and contrast the effect of insulin on the metabolic events which follow glucose uptake in liver, muscle and adipose tissue. ● Evaluate and interpret values of the oral glucose tolerance test (OGTT) in normal persons and in diabetic patients. ● List indications for OGTT ● Discuss the diagnostic criteria for Diabetes mellitus. ● **Pharmacology lecture (5-8):** **(Management of Diabetes Mellitus)** ● Overview of main hormones secreted from the endocrine pancreas. ● Differentiate between DM types in terms of age at onset, causes and treatment concepts. ● Describe insulin biosynthesis and regulation. ● List main insulin analogs ● Understand the mechanism of action, pharmacokinetics and side effects of the insulin and its analogs. ● Explain insulin preparation types, onset of action, timing of peak level and approaches to adjust dose and type of insulin. ● Describe insulin combinations and intensive insulin treatment.	

			● Understand the "incretin effect" in DM type 2 and the role of glucagon-like peptide-1 (GLP-1). ● Describe the mechanism of action, pharmacokinetics, clinical use and side effects of GLP-1 agonists. ● Illustrate the pharmacology of oral hypoglycemic agents (mechanism of action, pharmacokinetics and adverse effects). **Community lecture (2): (Epidemiology of diabetes mellitus)** ● Discuss types of DM ● Enumerate Clinical picture especially dangerous signs ● Understand size of DM problem in the community ● Explain causes of DM and how to manage the problem. **Pathology lecture (6,7): (Pathology of Endocrine pancreas I, II)** ● Define diabetes mellitus and the criteria for diagnosis. ● Discuss the general classification of DM. ● Discuss the pathogenesis of the different types of DM (mainly types 1 and 2). ● Describe the general initial clinical features of different types of diabetes. ● Discuss the acute metabolic complications of DM (DKA and hyperosmolar nonketotic coma (HHS). ● Discuss the pathogenesis of chronic complications of diabetes. ● Discuss in detail about the clinical features of macrovascular and microvascular diseases in diabetes, including diabetic nephropathy, neuropathy, and visual impairments. ● Discuss the diabetic morphologic features in the pancreas and other organs (eyes, kidneys, and nerves). ● Mention the general features of pancreatic neuroendocrine tumors. ● Discuss in detail the clinical and morphologic features of insulinoma and gastrinoma. ● Discuss other rare pancreatic neuroendocrine tumors	
		(6) Parathyroid gland	**Anatomy lecture (6): Anatomy and histology of parathyroid gland)**	

			● Discuss the anatomical position of parathyroid gland ● Enumerate blood supply and nerve supply of parathyroid gland ● Discuss the histological features of parathyroid gland **Physiology lecture 11: Hormonal Regulation of Calcium and Phosphate** ● Identify the normal range of dietary calcium intake, calcium distribution in the body, and routes of calcium excretion. ● Identify the normal range of dietary phosphate intake, phosphate distribution in the body, and routes of phosphate excretion. ● Know the cells of origin for parathyroid hormone synthesis and secretion ● Identify the target organs and cell types for parathyroid hormone and describe its effects on each. ● Describe the regulation of parathyroid hormone secretion and the role of the calcium-sensing receptor. ● Understand the causes and consequences of a) over-secretion, and b) under-secretion of parathyroid hormone ● Name the stimuli that can promote secretion of calcitonin, its actions, and identify which (if any) are physiologically important. ● Understand the mechanism of calcium homeostasis and the hormonal regulation by parathyroid hormone, calcitonin and vitamin D. ● Define tetany and explain how hypocalcemia causes tetany. ● List main types of tetany ● List the main provoking clinical tests of latent tetany **Pathology lecture (8): Parathyroid glands Pathology** ● Mention the causes of hyperparathyroidism. ● Discuss in detail the causes, pathogenesis, clinical features, and morphology of primary hyperparathyroidism. ● Be familiar with secondary hyperparathyroidism's causes, clinical features, and morphology. ● Describe the causes and clinical manifestations of hypoparathyroidism. ● **Pharmacology lecture (9):** ● Describe the pharmacology of PTH, Calcitonin and Vitamin D.	

			● Enumerate their analogs, clinical use and adverse effects. ● Understand the dual anabolic/catabolic effects of PTH and its implication in osteoporosis management.	

Practical labs:

(A) Anatomy & Histology labs: (2 anatomy labs):

Program Learning Outcome	lab objectives	Course Student Learning Outcomes	• Assessment Methods
MD program	• Anatomical site of hypothalamus and important relation	• Identify site of hypothalamus and important anatomical relations	• Exams
	• Anatomical site of pituitary gland and important relations	• Identify pituitary gland and its different parts. • Identify the important relations of pituitary gland	
	• Anatomical site of thyroid glands and important relation	• Identify site, shape of thyroid gland • Identify different parts of thyroid gland • Identify the important relations of thyroid gland • Identify the blood supply of thyroid gland • Identify the congenital anomalies of thyroid gland	
	• Anatomical site of parathyroid gland and important relation	• Identify site of parathyroid gland	
	• Anatomical features of suprarenal gland and important relations	• Identify the site, shape of each suprarenal gland • Identify the important relation of the right and left suprarenal gland	
	• Histological features of pituitary gland	• Identify the histological features of anterior lobe of pituitary gland • Identify the histological features of posterior lobe of pituitary gland.	
	• Histological features of thyroid follicles	• Identify the histological features of follicular and parafollicular cells	
	• Histological features of parathyroid gland	• Identify the histological features of chief cells and oxiphiol cells	
	• Histological features of suprarenal gland	• Discuss the histological differences between the 3 cortical zones of suprarenal glands	
	• Histological features of endocrine part of pancreas	• Identify the histological differences between four types of islets of Langerhans.	

(B) Pathology labs: (2 Labs):

Program Learning Outcome	Lab objectives	Course Student Learning Outcomes	Assessment Methods
MD program	• Pathology of the pituitary, thyroid gland	• Be familiar with the gross and microscopic features of pituitary adenoma. • Discuss the microscopic features of the different types of thyroiditis and Graves' disease. • Be familiar with the morphologic features of multinodular goiter. • Discuss the gross and microscopic features of different types of thyroid tumors (adenoma and carcinoma)..	Exams
	• Pathology of endocrine pancreas , adrenal gland and parathyroid glands	• Discuss the gross and microscopic features of the diseases causing cortical adrenal hyperfunction and hypofunction. • Discuss the morphologic features of adrenal cortex neoplasms. • Be familiar with the microscopic features of adrenal medulla tumors (pheochromocytoma and neuroblastoma • Discuss the diabetic morphologic features seen in the pancreas or as a complication in different organs, including kidneys, eyes, and nerves. • Discuss the morphologic features of pancreatic neuroendocrine tumors. • Discuss the morphologic features of parathyroid gland adenoma and hyperplasia	Exams

[C] Biochemistry labs: (2 biochemistry labs):

Program Learning Outcome	lab objectives	Course Student Learning Outcomes	• Assessment Methods
MD program	• Interpret and analyze random, fasting blood glucose and oral glucose tolerance tests	• Perform blood glucose on lab equipment (spectrophotometer) competently • Interpret the results correctly to identify normal, pre-diabetes, diabetes staes	• Exams
	• Interpret and analyze thyroid function tests	• Describe the steps to perform TSH on lab equipment (ELISA) competently • List thyroid function tests and evaluate test results (TSH, T4, T3) to reach a clinical diagnosis.	• Exams

ACADEMIC SUPPORT

It is The Hashemite University policy to provide educational opportunities that ensure fair, appropriate and reasonable accommodation to students who have disabilities that may affect their ability to participate in course activities or meet course requirements. Students with disabilities are encouraged to contact their Instructor to ensure that their individual needs are met. The University through its Special Need section will exert all efforts to accommodate for individual's needs.

Special Needs Section: Student Services and Care Unit

Tel: 053903333 ext. 4132 / 4583 / 5023

Location: Deanship of Students Affairs

Email: **stydent@hu.edu.jo**

Participation

Class participation and attendance are important elements of every student's learning experience at The Hashemite University, and the student is expected to attend all classes. A student should not miss more than 15% of the classes during a semester. *Those exceeding this limit of 15% will receive a failing grade regardless of their performance*. It is a student's responsibility to monitor the frequency of their own absences. Attendance record begins on the first day of class irrespective of the period allotted to drop/add and late registration. It is a student's responsibility to sign-in; failure to do so will result in a non-attendance being recorded.

In exceptional cases, the student, with the instructor's prior permission, could be exempted from attending a class provided that the number of such occasions does not exceed the limit allowed by the University. The instructor will determine the acceptability of an absence for being absent. A student who misses more than 25% of classes and has a valid excuse for being absent will be allowed to withdraw from the course.

Plagiarism

Plagiarism is considered a serious academic offence and can result in your work losing marks or being failed. HU expects its students to adopt and abide by the highest standards of conduct in their interaction with their professors, peers, and the wider University community. As such, a student is expected not to engage in behaviours that compromise his/her own integrity as well as that of the Hashemite University.

Plagiarism includes the following examples, and it applies to all student assignments or submitted work:

- **Use of the work, ideas, images, or words of someone else without his/her permission or reference to them.**
- **Use of someone else's wording, name, phrase, sentence, paragraph, or essay without using quotation marks.**
- **Misrepresentation of the sources that were used.**

The instructor has the right to fail the coursework or deduct marks where plagiarism is detected.

Late or Missed Assignments

In all cases of assessment, students who fails to attend an exam, class project or deliver a presentation on the scheduled date without prior permission, and/or are unable to provide a medical note, will automatically receive a fail grade for this part of the assessment.

- **Submitting a term paper on time is a key part of the assessment process. Students who fail to submit their work by the deadline specified will automatically receive a 10% penalty. Assignments handed in more than 24 hours late will receive a further 10% penalty. Each subsequent 24 hours will result in a further 10% penalty.**
- **In cases where a student misses an assessment on account of a medical reason or with prior permission; in line with university regulations an incomplete grade for the specific assessment will be awarded and an alternative assessment or extension can be arranged.**

Student Complaints Policy

Students at The Hashemite University have the right to pursue complaints related to faculty, staff, and other students. The nature of the complaints may be either academic or non-academic. For more information about the policy and processes related to this policy, you may refer to the students' handbook.

COURSE ASSESSMENT

Course Calendar and Assessment

Students will be graded through the following means of assessment and their final grade will be calculated from the forms of assessment listed below with their grade weighting taken into account. The criteria for grading are listed at the end of the syllabus.

Assessment	Grade Weighting	Deadline Assessment
Exam 1	40%	*TBD*
Exam 2	20%	*TBD*
Final Exam	40%	*TBD*

Description of Exams:

- **Test questions will predominately come from material presented in the lectures. Semester exams will be conducted during the regularly scheduled lecture period. The exam will consist of multiple-choice questions.**
- **Make-up exams (short Essay questions): Only documented absences will be considered as per HU guidelines.**
- **Re-sit (incomplete exam): for failed and absent students as per HU guidelines.**
- **Raised average exam: as per HU guidelines.**

Grades are not negotiable and are awarded to the MD program according to the following criteria*:

Letter Grade	Description	Grade Points
A+	Excellent	4.00
A		3.75
A-		3.50
B+	Very Good	3.25
B		3.00
B-		2.75
C+	Good	2.50
C		2.25
C-		2.00
D+	Pass	1.75
D	Pass	1.50
F	Fail	0.00
I	Incomplete	-