كلية الطب البشري
Faculty of Medicine

The Hashemite University

Course Syllabus

Endocrine System (ES)

1	Course title	Endocrine System (ES)
2	Course number	111501302
3	Credit hours (theory, practical)	4 hours
	Contact hours (theory, practical)	Theory: 62 Practical: 24 hours/Student
4	Course meeting time Course location	A module type on daily basis for four weeks Faculty of Medicine stadium
5	Program title	Doctor of Medicine (MD)
7	Awarding institution	The Hashemite University
8	Faculty	Faculty of Medicine
9	Department	Basic medical sciences
10	Level of course	Third year medical students
11	Year of study and semester (s)	2018/2019 First semester
12	Final Qualification	MD degree
13	Other department (s) involved	None
14	Language of Instruction	English
15	Date of production/revision	1/9/2018

Course Coordinator:

Mohammad A. Shaban. MD. PhD.
Room 3020. Office hours 11:00 a.m-1:00 p.m. on Sun, Mon and Tue and on any other time on appointment with the department secretary. Phone # 5433. email mshaban54@yahoo.com

Course Description:

This course describes the endocrine system as a regulator of different important growth, metabolic and developmental body functions. It covers the origin, microscopic and gross structures. It describes its role and the integration with nervous system on maintaining the harmony of the internal function adaptation to the variability of the external environments.

Intended Learning Outcomes (ILOs):

By the end of this module, students are expected to fulfill the following general objectives:

*__Know__ what are the endocrine system means and its role in regulation of different body function compared to other regulatory systems
*__Identify__ location, gross and microscopic appearance of various endocrine glands, their development, relation to neighboring structures
*__Know__ how this system regulates itself
*__Know__ different types of hormones produced by this system and to __compare__ and group them according to the embryological and microscopic structure of different endocrine glands
*__Know__ effects of hormones on different tissues
*__Know__ different structural and functional changes and the effect of this change on other glands or tissues
*__Use__ these information to __explain__ findings in different pathological conditions
*__Use__ these information in understanding how drugs (hormonal and non-hormonal) are used in correction of abnormal function
*__Formulate__ an evaluation plan for diagnosis and correction of endocrine disease
*__Prepare__ the student for clinical years to use these information and apply it once he faces an endocrine disease

Topic Outline and Schedule:

SPECIFIC (LEARNING) OBJECTIVES:

After studying the material covered in lectures & practical sessions of this course, using his/her private self learning time in a productive way, the student is expected to achieve the following specific objectives:

A. LECTURES:

Lecture (L) Number, Subject, & Title	LECTURE OBJECTIVES
Endocrine Anatomy, Histology & Embryology: 6 Lectures & 4 Practical's: The Dean, Professor Dr. Darwesh Badran, PhD.; Professer Dr. Ashraf Ramsi Yusuf PhD.; Associated Professor Dr. Reith Alsaffar, PhD., & Dr. Mustafa Saad, MSc.	

1st Lecture	- **List** all endocrine glands. - **Describe** the location, gross and microscopic structure of hypothalamus, and pituitary
2nd Lecture	- **Describe** the location, gross and microscopic structure of the thyroid, parathyroid
3rd Lecture	- **Describe** the location, gross and microscopic structure of the suprarenal, and endocrine pancreas
4th Lecture	- **Describe** the relation, blood, nerve supply and lymphatic drainage of hypothalamus, pituitary, thyroid, parathyroid, suprarenal, and endocrine pancreas
5th Lecture	- **Describe** the hypothalamic-pituitary axis and the hypothalamic-hypophyseal portal circulation
6th Lecture	- **Describe** fetal development of the endocrine system
Endocrine Physiology: 12 Lectures: Assistant Professer Dr. Mohammad Shaban, PhD.	
1st Lecture	- **Outline** the role of hormones as an integral part of the control mechanism used to regulate different metabolic, developmental, growth and reproductive functions in the human body - **Describe** how feedback relationship is important in determining the level of circulating hormones - **Characterize** the major hormonal bio rhythms - **Describe** intracellular, molecular and functional changes as a result of hormone binding to target tissue receptors - **Identify** hormones working through membrane receptors and nuclear receptors - **Justify** the site of hormone receptor to its hormone structure, transport modality and hormone duration of action - **List** adenohypophyseal & neurohypophyseal hormones - **Describe** the regulation of anterior pituitary hormones by the hypothalamus. - **Explain** physiological role of portal circulation - **Design** an experiment to show the importance of pituitary gland in close proximity to the hypothalamus
2nd Lecture	- **Describe** regulation of growth hormone secretion - **List** the physiological factors which stimulates and inhibits growth hormone secretion - **Describe** the role of the hypothalamus, growth hormone releasing hormone and somatostatin in the control of growth hormone secretion - **Describe** the growth and metabolic functions of growth hormone in different age periods
3rd Lecture	- **Describe** the regulation of prolactin secretion - **Explain** the importance of inhibitory mechanism in prolactin regulation - **Illustrate** the pattern of prolactin secretion in different age period and its importance in breast development and function
4th Lecture	- **Describe** the posterior pituitary gland relationship with the hypothalamus - **Compare** antidiuretic hormone and oxytocin in relation to their structure - **List** the physiological effects of antidiuretic hormone - **Describe** the regulation of antidiuretic hormone secretion

5th Lecture	- **List** the major physiological effects of oxytocin - **Describe** the regulation of oxytocin secretion
6th Lecture	- **Describe** the regulation of thyroid stimulating hormone by thyroid releasing hormone and T4, T3, somatostatin and dopamine - **Discuss** T4 and T3 transport and duration of action - **Describe** physiological aspects related to the formation and secretion of thyroid hormones - **Characterize** physiological consequences of thyroid hormones binding to transporting proteins - **List** the main physiological actions of thyroid hormones - **Describe** the regulation of thyroid hormones secretion - **Explain** the physiological basis of signs and symptoms seen in hyo and hyperthyroid state
7th Lecture	- **Assess** the physiological importance of ionized calcium in different physiological functions - **Illustrate** calcium compartments in the body - **Illustrate** calcium and phosphate absorption, metabolism and excretion - **Describe** the role of vitamin D in calcium and phosphate absorption - **Outline** the effect of calcium ion concentration on the regulation of the active form of vitamin D levels
8th Lecture	- **List** the major physiological effects of PTH - **Explain** the regulation of PTH secretion - **List** the major physiological actions of calcitonin - **Illustrate** the regulation of calcitonin secretion - **Compare** between PTH and calcitonin as regulators of calcium levels
9th Lecture	- **Describe** plasma glucose level in well fed and poor fed state - **Illustrate** plasma pattern of glucose, Insulin and glucagon after a meal and in between meals - **Explain** principal hormones that affect blood glucose concentration in well and poor fed state - **Explain** metabolic effects of presence and absence of insulin - **Explain** the regulation of insulin secretion - **Explain** physiological effects of glucagon - **Describe** the regulation of glucagon secretion - **Explain** metabolic, short- and long-term physiological changes of high level of plasma glucose
10th Lecture	- **Describe** physiological changes in diabetes mellitus type I and type II - **Discuss** complications of diabetes from physiological perspective
11th & 12th Lectures	- **Describe** the role of adrenal in preparing the body to face stress - **List** the catecholamines secreted by the adrenal medulla - **Describe** the actions of catecholamines in human body - **List** the factors that regulate adrenal medullary secretion - **Describe** the hypothalamic pituitary adrenal axis - **Describe** the role of the adrenal cortex in regulation of plasma sodium, potassium and blood volume - **Describe** the major physiological effects of mineralococorticoids - **Describe** the regulation of mineraloocorticoids secretion

	- **Describe** the major physiological effects of glucocorticoids - **Describe** the regulation of glucocorticoids secretion - **Describe** defects and consequences of enzymatic deficiency in the pathway of steroid synthesis (BP, blood volume, androgens and blood glucose)
Endocrine Biochemistry: 8 Lectures: Professor Dr. Thana Bilal, PhD.	
1st and 2nd Lectures	- **Identify** the nature of different hormones. - **Classify** hormone types (steroids, proteins and short peptides, and amino acids) - **Describe** hormone biosynthesis, storage, secretion and transport of different hormone groups. - **Compare** life span of different hormones and effect on duration of hormone action - **Illustrate** targeting, delivery and response of hormones. - **Illustrate** hormonal interactions (systemic, cellular, synergistic and inhibitory). - **Describe** general aspects, governs regulation of hormone secretion - **Describe** intracellular and molecular changes as a result of hormone binding to target tissue receptors
3rd Lecture	- **Define** the concept of second messenger and list all second messengers - **Illustrate** PIP2 turnover (Ca+2/protein kinase C systems) - **List** actions of diacylglycerol (DAG) - **Characterize** cAMP as a second messenger - **List** intracellular actions of Camp
4th and 5th Lectures	- **Define** the concept of second messenger and list all second messengers - **Illustrate** PIP2 turnover (Ca+2/protein kinase C systems) - **List** actions of diacylglycerol (DAG) - **Characterize** cAMP as a second messenger - **List** intracellular actions of cAMP - **Describe** thyroid hormone biosynthesis: monoiodotyrosines, diiodotyrosines, T3, T4 and reverse T3 - **Describe** metabolism of iodide and iodine - **Discuss** the role of peroxidase, iodinase, coupling, protease, dehalogenase and thyroglobulin - **Explain** thyroid stimulating hormone action via cAMP
6th Lecture	- **Describe** the synthesis and storage of insulin - **Describe** enzymatic changes of glucose metabolic pathways in the well-fed state and during starvation in various tissues (liver, brain, muscle and adipose tissues) - **Describe** the regulation of glycogen metabolism, glycolysis, hexose monophosphate pathway and gluconeogenesis by insulin/counter-regulatory hormones ratio
7th Lecture	- **Describe** the biosynthesis of epinephrine
8th Lecture	- **Explain** how hormonal lab tests are used to reach a clinical diagnosis. - **Describe** the importance of dynamic hormonal testing in the evaluation of hormone functions
Endocrine Pathology: 8 Lectures: Associated Professor Dr. Mohammad Kamel Mohammad Alwiswasi, PhD, FRCPath.	

1st Lecture	**- List** the causes & effects of anterior pituitary gland diseases (hyper- & hypopituitarism) **- Classify** adenomas of the anterior lobe of pituitary gland according to their (i) functional status & (ii) type of hormone production **- Describe** the pathogenesis, gross & microscopic features of pituitary adenomas in general
2nd Lecture	**- Describe** the pathologic & clinical effects of: prolactinomas, growth hormone-producing, corticotroph cell (cushion disease), & gonadotroph, & thyrotroph adenomas **- Describe** the causes & clinical manifestations of hypopituitarism **- Enumerate** the Types, causes, & effects of diabetes insipidus **- Define** the syndrome of inappropriate anti diuretic hormone (SIADH) secretion **- Enumerate** the causes & diagnostic criteria of: thyrotoxicosis & hypothyroidism **- Describe** cretinism & myxedema
3rd Lecture	**- Classify** diseases of the Stomach **- Describe** the Pathogenesis, Pathologic Features, & Complications Of (I) **Chronic Gastritis** (H Pylori-Induced & Drug-Induced Gastritis), & (Ii) **Acute Gastritis**. **- Describe** the Etiology, Pathogenesis, & Pathological Features, & Complications Of Both **Acute & Chronic Peptic Ulcers**
4th Lecture	**- Enumerate** the main types of thyroiditis **- Describe** the etiology, pathogenesis, gross & microscopic features & diagnosis of: (1) thyroiditis: including hashimoto's, de quervain, subacute lymphocytic, & riedel (2) graves disease (3) diffuse multinodular goiters, both endemic & sporadic
5th Lecture	**- List** the main types of thyroid tumors **- Describe** the etiology, pathogenesis, pathological features & diagnosis of benign thyroid adenomas **- Describe** the etiology, pathogenesis, pathological features, diagnosis & rotes of spread of each type of the thyroid carcinomas (papillary, follicular, medullary, & anaplastic) **- List** the causes & effects of primary hyperparathyroidism
6th Lecture	**- List** the causes & effects of primary hyperparathyroidism **- Describe** the molecular pathogenesis, types, pathological changes (in the parathyroid glands, bones, & kidneys), & the clinical features of parathyroid tumors **- List** the causes of hypercalcemia **- List** the causes of secondary hyperparathyroidism **- Describe** the causes & effects of hypoparathyroidism
7th Lecture	**- Describe** the pathogenesis of**:** (1) Type 1 & 2 diabetes mellitus (DM) (2) The complications of DM **- Describe** the pathological changes of: (1) DM in the pancreas

	(2) DM Late complications, including diabetic macrovascular disease, microangiopathy, nephropathy, neuropathy, & the ocular complications of DM - **Describe** the pancreatic endocrine neoplasms, including insulinomas, gastrinomas, glucagonomas, VIPoma [vasoactive intestinal peptide (VIP) producing tumor]
8th Lecture	- **Describe** the causes & pathological features of the different forms of: (1) hypercortisolism (cushing syndrome) (2) hyperaldosteronism - **Describe** the causes & pathological features of primary (acute & chronic) & secondary adrenocortical insufficiency (hypoadrenalism) - **Describe** the pathological features & effects of the main adrenal tumors (adenomas, carcinomas, & pheochromocytomas) - **Describe** the multiple endocrine neoplasia syndromes (Type 1, Type 2A & 2B)
Endocrine Pharmacology: 10 Lectures: Professer Dr. Ahmad Shaban Abo-Sief, PhD.	
1st & 2nd Lectures	- **List** synthetic analogs of hypothalamic hormones - **Describe** mechanism of action of these synthetic analogs - **Illustrate** their clinical uses and routes of administration - **List** side effects hypothalamic synthetic analogs
3rd & 4th Lectures	- **Describe** growth and metabolic effects of growth hormone - **List** the principal insulin-like growth factors and describe their relationship to the actions of growth hormone - **Describe** pharmacology of anterior pituitary hormones, review their pharmacological actions - **List** synthetic analogs and describe their routes of administration - **Describe** their clinical uses and adverse reactions
5th &6th Lectures	- **Illustrate** the pharmacology of thyroid hormones - **Describe** the pharmacology of antithyroid drugs - **Describe** the clinical uses, routes of administration and adverse reactions of antithyroid drugs - **Characterize** the pharmacology of the parathyroid hormone, vitamin D and calcitonin - **List** synthetic analogs and describe their routes of administration, clinical uses and their adverse reactions - **Integrate** growth hormone vit.D and parathyroid gland roles in growth
7th & 8th Lectures	- **Explain** the pharmacology of insulin - **Illustrate** the pharmacology of oral hypoglycemic drugs - **Describe** clinical uses, administration and adverse reactions - **Describe** the synthetic analogs and their routes of administrations
9th & 10th Lectures	- **Explain** the rationale of replacement therapy. - **Illustrate** the pharmacology of glucocorticoids in terms of pharmacokinetics, mechanism of action and adverse reactions. - **Describe** the synthetic analogs and their routes of administration. - **Explain** the rationale of replacement therapy
Endocrine Community Medicine: 2 Lectures: Associated Professor Dr. Emman Alkamel, PhD.	
1st Lecture	- **Describe** epidemiology of diabetes mellitus (DM) - **Classify** DM

	- **Describe** signs and symptoms - **List** the causes - **Explain** pathophysiology - **Describe** the epidemiological aspects of DM regarding age distribution, incidence and prevalence risk factors and trend - **Identify** the diagnostic methods - **List** general public awareness policies
2nd Lecture	- **Epidemiology** of thyroid diseases - **Classify** goiters, hypo and hyperthyroidism - **Describe** signs and symptoms - **List** the causes - **Explain** pathophysiology - **Describe** the epidemiological aspects of goiter regarding age distribution, incidence and prevalence risk factors and trend - **Identify** the diagnostic methods. - **Describe** public protective measures to prevent neonatl hypothyroidism - **List** general public awareness policies

B. PRACTICAL LABORATORY SESSIONS:

PRACTICLE SESSION	**General Objective**
1st anatomy practical session	**Identify** different parts of the thyroid gland and its relations
2nd anatomy practical session	**Identify** the adrenal gland and its relations
3rd anatomy practical session	**Identify** the pituitary gland and its relations
4th anatomy practical session	**Identify** the ultra-structural components of the following glands and correlate between them: Pituitary gland, Thyroid gland, Parathyroid glands, Pancreas, Adrenal glands
1st pathology practical session	**Pathology of the thyroid gland** Describe the morphology of various types of thyroiditis Describe the features of nodular colloid goiter Describe the features of adenomas Describe the features of various carcinomas
2nd pathology practical session	**Pathology of the pituitary gland** Identify various types of adenomas and the significance of using immunological stains in their categorization Describe the morphology of craniopharyngioma
3rd pathology practical session	**Parathyroid gland** Identify the morphological features of hyperplastic gland and compare with adenoma
4th pathology practical session	**Endocrine pancreas** Identify the morphological features of the pancreas in diabetes Identify the morphological features of islet cell adenoma
5th pathology practical session	**Adrenal gland** Identify the morphological features of atrophic and hyperplastic glands

	Compare with the features of cortical adenoma Identify the morphological features of pheochromocytoma Identify the morphological features of neuroblastoma

Development of ILOs is promoted through the following teaching and learning methods:
Integrated Modular System by:

- Lectures-Power Point presentations
- Departmental hand-outs
- animations, educational movies, illustrations
- Self-readings

Recommended Text Books, Atlases and supporting material
Text book and material:

NO *SPECIFIC* TEXTBOOK IS RECOMENDEDD. STUDENTS ARE ADVISED TO GO BACK TO INTERNET RESOURCES. HOWEVER, THE LATEST EDITIONS OF THE FOLLOWING EDUCATIONAL MATERIALS MAY BE OF SOME HELP

ANATOMY:

- Principles of Human Anatomy. By G.J. Tortora, Latest edition.
- Clinical Anatomy for Medical Students. By R.S. Snell, Latest edition.
- Basic Histology, by L. Carlos Junqueira. Latest edition.
- Before we are born. By K.L. Moore and T.V.N. Persaud, Latest edition.

BIOCHEMISTRY:

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

PHYSIOLOGY:

- Textbook of Medical Physiology, by Guyton and Hall, latest edition.
- Review of Medical Physiology, by William F. Ganong.

PATHOLOGY:

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

PHARMACOLOGY:

- Lipincott's Illustrated Reviews: Pharmacology.

Teaching Methods and Assignments:
Grading Policy:
Grades are based on the following:
Written First or Mid-Term exam at the end of the system: 40%
Practical exam at the end of the system: 20%
Final Course Exam: 40%
Total Points: 100%

Additional information:

Course Policies:
Late Assignments: According to college policy
Missed exams: According to college policy
Absence : According to college policy
Cheating: According to college policy
Classroom Protocol: According to college policy
Important Dates to Remember: October 4, 2018; and October 7, 2018
Student rights and responsibilities: According to college policy
The semester is 4 weeks: The Course includes 46 theory lectures & 9 practical session, 2 hours each/Student

The Hashemite University– Faculty of Medicine
☺ 2018/2019 endocrine MODULE Time table - 4 Credit Hours –
1st Semester: 3rd Year: 4 Weeks: September 9- October 7, 2018 Coordinator Mohammad A. Shaban. MD. PhD.

1st Week Day/ Date-2018	8 - 9	9 - 10	10.30 -11.30	11.30 - 12.30	12.30 - 2.30
Sun 9	PHYS 1	ANAT 1	PATH 1	PHYS 2	
Mon 10	PHYS 3	PHYS 4	ANAT 2	PATH 2	
Tue 11	HOLIDAY NEW YEAR				
Wed 12	PHYS 5	PHYS 6	ANAT 3	BCHM 1	
Thu 13	BCHM 2	PHRM 1	PHRM 2	ANAT 4	

2nd Week Day Date	8 - 9	9 - 10	10.30–11.30	11.30-12.30	12.30 - 3.30
Sun 16	PHYS 7	BCHM 3	ANAT 5	PATH 3	CLIN SKILLS/ANAT LAB
Mon 17	PATH 4	ANAT 6	PHARM 3	PATH LAB ALL GROUPS	
Tue 18	PHYS 8	BCHM 5	PHYS 9	CLINICA SKILLS / ANATOMY LAB	
Wed 19	CM 1	CM 2	PATH 5	PATH 6	
Thu 20	PHARM 4	PHARM 5	BCHM 7	BCHM 8	

3rd Week Day Date	8 - 9	9 - 10	10.30- 11.30	11.30-12.30	12.30 - 3.30
Sun 23	PHYS 10	PHARM 6	PATH 7	PATH 8	CLINICA SKILLS / ANATOMY LAB
Mon 24	PHYS 11	PHARM 7	PHARM 8	PHYS 12	PATH LAB ALL GROUPS
Tue 25		PHARM 9	PHARM 10		CLINICA SKILLS / ANATOMY LAB

Wed 26	**OPEN DISCUSSION PHARMACOLOGY**				
Thu 27					

4th Week Day Date	**8 - 9**	**9 - 10**	**10.30- 11.30**	**11.30-1.30**	**1.30-3.30**
Sun 30	**OPEN DISCUSSION BCHM / PHYSIOLOGY**				
Mon 1	**OPEN DISCUSSION ANAT / PATHOLOGY**				
Tue 2					
Wed 3					
Thu 4	**MIDTERM/PRACTICAL. 60 MCQ QUESTIONS FOR THE THEORY AND 20 FOR THE PRACTICAL**				
5th Week Day Date	**8 – 9**	**9 - 10**	**10.30- 11.30**	**11.30-1.30**	**1.30-3.30**
Sun 7	**FINAL 60 MCQ QUESTIONS**				
Mon 8	**GI MODULE**				

★ Summary of Endocrine MODULE teaching:
Anatomy:6L + 4P Physiology: 12L Biochemistry: 8L CM: 2L Pathology: 8L+ 5P Pharmacology: 10L
Total of 46 Lectures and 9 Practical (Two hours each) / student.
Clinical Skills Labs as above