

SYLLABUS

Name of Course: Endocrinology (PHYS-220)

Length of Course: 3 units, 44 hours (4 hrs. lecture/week)

Course Description: This is a comprehensive study of the endocrine system which will allow the student to integrate and better understand the functions of the other systems of the body. The relationship of the nervous system to the endocrine system is explored in the context of signaling within a multicellular organism. Also, the pathological conditions and diagnostic procedures associated with endocrine imbalance are investigated.

Prerequisites: PHYS-122, CHEM 133

Course Offered By: Basic Science Department

Required Text: Marieb EN. Human Anatomy and Physiology. (9th ed. 2013)

Recommended Text: Goodman HM. Basic Medical Endocrinology. (4th ed. 2009)

Reference Texts: Guyton AC. Textbook of Medical Physiology. (12th ed. 2011)

Materials: Class notes for the course are available in the bookstore. Lecture slides with basic text are available on Canvas.

Method of Instruction: Lecture utilizing PowerPoint and a visual presenter is conducted in a format which facilitates student interaction with the material. This means that questions and a dialogue between faculty and student are encouraged. The instructor will proceed to organize the system from “above-down” (meaning superior to inferior anatomical location of glandular bodies). The first few weeks are devoted to basic endocrine function. The following several weeks retrace the sequence from superior to inferior both reviewing normal endocrine function and adding the most important disease conditions affecting the endocrine system.

Grades and Method of Grading:

A 4.0 90 - 100%

B 3.0 80 - 89%

C 2.0 70 - 79%

F 0.0 Fail – The student must repeat the course

1. Quizzes- Based on material in the notepacket, 11- 15 MCQ's each given during the first hour on Wednesdays of weeks 3, 5, 7, 9. Quizzes are of equal weight; the average =50% of total. We will count 3 out of 4 quizzes, so the student can miss one without penalty.
2. A comprehensive final exam = 50% of total points. It is 52 multiple choice questions with percent calculated from 50 so that any 2 questions are a bonus.

Extra Credit: There will be one or two questions on each quiz and on the final through which a student can gain bonus points. These questions will be derived from lecture material but will be more challenging of the student's ability to think critically.

Grades and the Grading System Final Grades are available online through the CAMS student portal. If there are any questions on grading procedures, computation of grade point average, or the accuracy of the grade report, please contact the Registrar's Office or the Office of Academic Affairs. Grades will be reported and evaluation will be based on the Academic Policies, Procedures, & Services. Please refer to Evaluation Policy (**Policy ID: OAA.0007**)

In order to maintain **Satisfactory Academic Progress**, a student must maintain a 2.0 or better in each and every course. **Any grade less than a C must be remedied by repeating the class.** Please refer to Satisfactory Academic Progress (**Policy ID: OAA.0006**)

Attendance: Please refer to Attendance Policy (**Policy ID: OAA.0002**)

Conduct and Responsibilities: Please refer to the Personal Conduct, Responsibility and Academic Responsibility Policy (**Policy ID: OAA.0003**)

Make-up Exams: Please refer to Make-up Assessment Policy (**Policy ID: OAA.0001**)

Request for Special Testing: Please refer to Request for Special Testing (**Policy ID: OAA.0004**)

Accommodation for Students with Disabilities:

If you have approved accommodations, please make an appointment to meet with your instructor as soon as possible. If you believe you require an accommodation, but do not have an approved accommodation letter, please see the Academic Counselor Lori Pino in the Office of Academic Affairs. Contact info: Lpino@lifewest.edu or 510-780-4500 ext. 2061. Please refer to Service for Students with Disabilities Policy (**Policy ID: OAA.0005**)

Electronic Course Management:

Canvas is LCCW's Learning Management System (LMS). Canvas will be used throughout the quarter during this course. Lectures, reminders, and messages will be posted. In addition, documents such as the course syllabus and helpful information about the class project will be posted. Students are expected to check Canvas at least once a week in order to keep updated. The website address for Canvas is <https://lifewest.instructure.com/login/canvas> Please refer to the Educational Technologies Policy (**Policy ID: OAA.0009**)

Course Goals

The student will develop an understanding of the role of the endocrine system in maintaining homeostasis and health. The student will be better able to understand the integrative workings of the human body by studying this signaling system. The student will have been introduced to the significant endocrine pathologies which appear as comorbid conditions in the field and will be better equipped to educate their patients on disease prevention where applicable.

Course Objectives:

Week 1 • Assign a “chart of basic endocrine function” to be tested by multiple choice questions in week 3 • Assign the Introductory pages in the reader covering basic concepts • Introduce the system and concepts of signaling • Explain the biochemistry of hormones (peptides, steroids, catabolic anabolic) • Emphasize the significance of the steroids to the clinical realm • Begin the explanation of basic endocrine function with the pineal gland and melatonin • Describe the anatomical relationships of the Pituitary Gland and Hypothalamus • Introduce the hypothalamus as the true master gland with Releasing hormones and inhibitory substances • Examine the neurohypophysis and its secretions – ADH and Oxytocin

Week 2 - Continue the survey of Gland – Hormone – Target/ General effect • Discuss anterior pituitary secretions and target organs of LH, FSH, TSH, GH, • PRL, ACTH • Explain mechanisms of hormone action: synergism, antagonism, permissive effects

Week 3 • Finish the survey of all hormones including leptin. Explain measurement of hormones, titers, and radioimmunoassay • Explain control of secretion by neural, endocrine, and humoral factors • Explain target- receptor interactions: up and down regulation, dose-responsiveness, and mimicry • Describe mechanisms of elimination and their significance to health

Week 4 Begin coverage of “Details and Diseases” portion of the course • Repeat the function of the Pineal Gland including traditional and current concepts regarding melatonin • Repeat coverage of the Posterior pituitary gland with pathology of ADH – (vasopressin) – diabetes insipidus Oxytocin-positive feedback • Explain the significance of intracranial pathology-adenomas and ischemia • Explain the Anterior Pituitary Gland histopathology including adenomas and shock pituitary (Sheehan’s Syndrome)

Week 5 • Repeat growth hormone and its mechanism of action to include its diabetogenic effect • Discuss GH pathology: acromegaly, gigantism, dwarfism, and progeria • Describe detailed prolactin pathways, the Lactation Amenorrhea method of birth control and the pathology associated with prolactinoma

Week 6 • Describe corticotropinoma and Cushing’s disease • Explain the role of TSH in hypo and hyperthyroidism • Repeat thyroid function - thyroxine and triiodothyronine • Explain thyroid pathology including Grave’s disease, Hashimoto’s dx, • myxedema, and cretinism • Define goiter: toxic, nontoxic, and endemic • Present cases of thyroid panels to explain negative feedback • Present cases of thyroid panels to determine hypo or hyper thyroid dx • Challenge the student to correlate thyroid levels with metabolism and clinical presentation

Week 7 • Repeat the difference between parafollicular cells – calcitonin and parathyroid with PTH • Review parathyroid hormone – calcium and phosphate concentrations • Discuss Vitamin D synthesis, bone synthesis, PTH action • Explain primary and secondary hyperparathyroidism • Discuss the clinical considerations of hypoparathyroidism • Define the terms: nephrocalcinosis, osteoporosis, rickets, and osteomalacia

Week 8 • Explain the details of the Adrenal Gland and the catecholamines • Indicate the relationship between the medulla, the sympathetic nervous system, and the acute stress response • Point out the layers of the adrenal cortex and their secretions • Explain the role of the adrenocortical hormones in the chronic stress response • Discuss the zona glomerulosa – aldosterone as mineralocorticoid; mechanisms of action, regulation, relationship to kidney • Discuss the zona fasciculata – cortisol as glucocorticoid; mechanisms of action, relationship to immunity and structural integrity • Discuss the zona reticularis -sex hormone production • Discuss the significant adrenal pathology including pheochromocytoma, primary and secondary hyperaldosteronism, Cushing’s syndrome, Addison’s Disease, and adrenogenital syndromes

Week 9 • Point out in detail the beta and alpha cells of the islets of Langerhans • Review the regulation of insulin • Review its effects on carbohydrate, lipid, and protein metabolism • Briefly review glucagon • Explain the difference between diabetes insipidus and mellitus • Begin to differentiate the Types of diabetes through insulinitis • Explain how autoimmune insulinitis generates insulin dependence • Show a comparison between Type I and Type II • Challenge the student to contrast these types by at least 5 ways • Present/read cases of the two types over time • Define conditions of insulin shock • Define conditions of ketoacidosis • Explain Hb A1C and diagnostic markers • Present diabetic sequelae

Weeks 10 • Briefly review endocrine control of reproductive function including the hypothalamic/ pituitary/ gonadal axis • Review the female menstrual cycle • Examine endometriosis and polycystic ovarian syndrome • Review male hormones and conversion of testosterone to DHT • Examine benign prostatic hyperplasia and Leydig cell tumors

Student Learning Outcomes

Satisfactory completion of this course will provide the student with the foundation necessary for understanding future clinical problems of the endocrine system.

1. The student will demonstrate an understanding of the anatomy of the endocrine system. (PLO:3)
2. The student will demonstrate an understanding of the basic properties of hormones. (PLO:3)
3. The student will demonstrate the role of the hormones in maintaining body function. (PLO:3)
4. The students will demonstrate those endocrine details helpful in the clinical realm. (PLO:3)
5. The student will demonstrate knowledge of the major endocrine disorders. (PLO:3)

Program Learning Outcomes (PLO): Students graduating with a Doctor of Chiropractic degree will be proficient in the following:

1. **ASSESSMENT AND DIAGNOSIS:** An assessment and diagnosis requires developed clinical reasoning skills. Clinical reasoning consists of data gathering and interpretation, hypothesis generation and testing, and critical evaluation of diagnostic strategies. It is a dynamic process that occurs before, during, and after the collection of data through history, physical examination, imaging, laboratory tests and case-related clinical services.
2. **MANAGEMENT PLAN:** Management involves the development, implementation and documentation of a patient care plan for positively impacting a patient's health and well-being, including specific therapeutic goals and prognoses. It may include case follow-up, referral, and/or collaborative care.
3. **HEALTH PROMOTION AND DISEASE PREVENTION:** Health promotion and disease prevention requires an understanding and application of epidemiological principles regarding the nature and identification of health issues in diverse populations and recognizes the impact of biological, chemical, behavioral, structural, psychosocial and environmental factors on general health.
4. **COMMUNICATION AND RECORD KEEPING:** Effective communication includes oral, written and nonverbal skills with appropriate sensitivity, clarity and control for a wide range of healthcare related activities, to include patient care, professional communication, health education, and record keeping and reporting.
5. **PROFESSIONAL ETHICS AND JURISPRUDENCE:** Professionals comply with the law and exhibit ethical behavior.
6. **INFORMATION AND TECHNOLOGY LITERACY:** Information literacy is a set of abilities, including the use of technology, to locate, evaluate and integrate research and other types of evidence to manage patient care.
7. **CHIROPRACTIC ADJUSTMENT/MANIPULATION:** Doctors of chiropractic employ the adjustment/manipulation to address joint and neurophysiologic dysfunction. The adjustment/manipulation is a precise procedure requiring the discrimination and identification of dysfunction, interpretation and application of clinical knowledge; and, the use of cognitive and psychomotor skills.
8. **INTERPROFESSIONAL EDUCATION:** Students have the knowledge, skills and values necessary to function as part of an inter-professional team to provide patient-centered collaborative care. Inter-professional teamwork may be demonstrated in didactic, clinical or simulated learning environments.
9. **BUSINESS:** Assessing personal skills and attributes, developing leadership skills, leveraging talents and strengths that provide an achievable expectation for graduate success. Adopting a systems-based approach to business operations. Networking with practitioners in associated fields with chiropractic, alternative medicine and allopathic medicine. Experiencing and acquiring the hard business skills required to open and operate an on-going business concern. Participating in practical, real time events that promote business building and quantifiable marketing research outcomes
10. **PHILOSOPHY:** Demonstrates an ability to incorporate a philosophically based Chiropractic paradigm in approach to patient care. Demonstrates an understanding of both traditional and contemporary Chiropractic philosophic concepts and principles. Demonstrates an understanding of the concepts of philosophy, science, and art in chiropractic principles and their importance to chiropractic practice.