MEDICINE (FACULTY BASED COURSES)

INTRODUCTION

All medicine graduate programs may require from their students to study the following Faculty Based Courses. These courses may be considered compulsory for some programs and electives for the others.

0500-501	Basic Molecular Biology	(1)
0500-502	Basic Immunology	(1)
0500-503	Research Communication I	(1)
0500-504	Research Communication II	(1)

COURSE DESCRIPTION

0500-501: BASIC MOLECULAR BIOLOGY
CR: 1

Nucleic acid structure and functions; DNA analysis by agarose gel and DNA sequencing; DNA Replication: Mechanism, Regulation, Differences between prokaryotic and eukaryotic process; DNA damage, repair and mutagenesis, and diseases associated with defective repair; Transcription mechanisms and processing of primary RNA; The genetic code, protein synthesis and regulation; Restriction and modification enzymes and their importance in molecular biology.

0500-502: BASIC IMMUNOLOGY
CR: 1

Introduction to immunity, Innate and acquired immunity, Organs and cells of the immune system, the Major Histocompatibility Complex and its role in antigen presentation, Humoral immunity, antibodies and complement, Cell-mediated immune function T cells and macrophages, Cytokines and their roles in immune responses, Transplantation immunology, immunoprophylaxis and immunotherapy, Autoimmunity and autoimmune diseases, Hypersensitivity

500-503: RESEARH COMMUNICATION I
CR: 1

The aim of this course is to improve the student's ability to locate and retrieve information in the library, take effective notes, recognize and manipulate biomedical word roots and affixes of classical origin, write scientific English and communicate effectively in seminars. The course has the following components, which are designated to achieve this aim: Library skills, biomedical terminology, basic information structure, processing and seminar skills.

0500-504: RESEARH COMMUNICATION II
CR: 1

This course has its emphasis on improving the student's ability to collect and organize relevant information, and then communicate that information effectively for research reporting purposes, whether as a written report or a seminar presentation. The timing of the course is contrived to oblique the student to present his thesis back ground and methods in a seminar.

MEDICINE (GENERAL COURSES)

INTRODUCTION

All Medical graduate programs require the study of one or more of the following courses offered by the **Department of Community Medicine and Behavioral Sciences**.

0510-501	Biostatistics and Computer in Medicine	(2)
0510-502	Advanced Biostatistics	(1)
0510-503	Epidemiology	(1)
0510-504	Radiotracer Methodology in Biological Research	(2)
0510-601	Biostatistical Method in Medical Research	(3)
0510-602	Epidemiology of Infectious Diseases	(3)

COURSE DESCRIPTION

0510-501: BIOSTATISTICS AND COMPUTER IN MEDICINE
CR: 2

This is a 2 credit hour faculty-required course intended for students joining the graduate M.Sc. program in the Faculty of Medicine, Kuwait University. The course takes into account the fact that enrolled students belong to various backgrounds and hence it includes a diversity of topics to meet their interest. The course is characterized by the inclusion of statistical methods in epidemiology (relative risk, odds ratio to measure the association between diseases and factors, evaluation of diagnostic tests), determination of size of investigations and power, analysis of variance, and design of controlled randomized clinical trials. It also includes multivariate statistical methods such as multiple linear regression and binary multivariable logistic regression. It focuses on concepts, limitations, validity and assumptions underlying these statistical methods.

The course also provides students with knowledge about hardware and software computer technology in addition to addition to the skills of applying the procedures of the SPSS statistical package, and information about computer uses in medicine (hospital information system, drug information system and computer-assisted diagnoses).

0510-502: ADVANCED BIOSTATISTICS
CR: 1

Planning of statistical investigation. Controlled comparative studies: Clinical and simple comparative trials, two period cross over design. Analysis of variance. Experimental design. The control of misclassification error. Survivorship tables and life tables. Biological assays: Parallel-line, slope ratio and quantal response. Non-parametric statistics: One-sample run test, Mann-whitney test, Kruskal-Wallis analysis of variance, and Kendall rank correlation.

0510-503: EPIDEMIOLOGY
CR: 1

Scope of epidemiology, basic measures of frequency, sources of morbidity data, direct and indirect standardization. Planning of an epidemiological investigation, survey planning, variability of measurements, validation and problems in validation, measurement of experimental error, population screening and disease control.

0510-504: RADIOTRACER METHODOLOGY IN BIOLOGICAL RESEARCH
CR: 2

This course provides an introduction to the principles and procedures underlying the use of radioactive isotopes in biological research. The material will be presented at a level requiring only elementary mathematics and the principles and procedures will be illustrated with practical examples drawn from actual laboratory work. The course begins with the materials, and detection and measurement of radiation, and progresses to discussions and illustrations of the applications and problems of radiation measurement and experimental design in biology and medicine and methods used for reduction of radiation exposure. Hazards associated with the use of radioactive material will be discussed. Topics which will be given special emphasis include Gamma and Beta counting of biological samples autoradiography, radiochromatography, use in life science and clinical research, and radiation safety measures.

0510-601: BIOSTATISTICAL METHODS IN MEDICAL RESEARCH
CR: 3 PR: 0510-501 or its equivalent.

The course primarily aims at equipping students with tools of research. This includes univariate statistical methods update, sampling methods and sample size, experimental design, multivariate analysis, logistic regression, survival analysis: clinical trials, statistical methods in epidemiology, analysis of matched data and nonparametric statistics. Mann-Whitney, Wilcoxon paired test, Kruskal-Wallis and Spearman rank correlation.

0510-602: EPIDEMIOLOGY OF INFECTIOUS DISEASES
CR: 3

Concepts and definitions, eipdemiological models, causality, epidemic process, indices of health and disease, natural history of infectious diseases, contact patterns, measuring infectivity, methods and techniques for studying an infection in the community, time and place clustering, use of routinely collected data, special surveys, surveillance of infectioue diseases, field investigation, analysis of an outbreak, seroepidemiology, the effect of bias, confounding and misclassification on the identification of source/reservoir of infection and mode of transmission, statistical techniques often used in infectious disease epidemiology, mathematical models for epidemics, primary and secondary prevention in the infectious disease epidemiology, epidemiology of vacation, control, elimination and eradication, epidemiology of emerging infections and epidemiology of specific infectious diseases.

MASTER OF SCIENCE
PHYSIOLOGY
Program code: 0530

INTRODUCTION

The Department of Physiology (Faculty of Medicine) offers a Master of Science program in Physiology. Only full-time students are admitted to this program. The program is designed to raise general knowledge of physiology and to acquire an in depth knowledge in specific topics in physiology. This knowledge is required to join any Ph.D. program in physiology or to pursue a career in a wide range of areas where knowledge of human physiology is an advantage, e.g. in academic and non-academic environments including pharmaceutical and medical or biotechnology industry, education, healthcare, health promoting activities such as exercise and nutrition, or other health related business, law, and policy. During this program, a successful student should develop ability to identify research strategy to explore physiological or pathophysiological mechanisms, develop hypothesis, design experiments, evaluate and present results.

According to the University Council decision dated 4/2/2007, Thesis students admitted with effect from September 2007 are exempted from the comprehensive examination.

PROGRAM REQUIREMENTS

31 TOTAL COURSE CREDITS

17 COMPULSORY COURSES (credits in parenthesis)

0510-501	Biostatistics & Computer in Medicine	(2)
0530-511	Seminar I	(1)
0530-512	Seminar II	(1)
0530-521	Experimental Physiology	(1)
0530-533	System Physiology	(3)
0530-538	General Physiology	(2)
0530-539	Advanced Cellular Physiology	(1)
0530-574	Advanced Physiology I	(1)
2000-501	Scientific Writing and Communication Skills	(3)
2000-503	Ethics and Professionalism	(2)

5 ELECTIVES COURSES

The students may choose an elective course from the following, or from other M.Sc. programs at Kuwait University, or other accredited Universities related to his/her student with the approval of the Graduate Program Director.

0530-522	Advanced Experimental Physiology	(2)
0530-535	Integrative Physiology	(2)
0530-537	Pathophysiology	(1)
0530-551	Nerve and Muscle Physiology	(3)
0530-552	Fluid, Electrolytes and Acid-Base Physiology	(3)
0530-553	Exercise Physiology	(3)
0530-554	Computational Physiology: Introduction in advanced image processing and quantification	(3)
0530-555	Nutrition and nutrition related disease	(3)
0530-561	Cardiovascular Physiology	(3)
0530-562	Renal Physiology	(3)
0530-563	Respiratory Physiology	(3)
0530-564	Gastro-Intestinal Physiology	(3)
0530-565	Endocrine Physiology	(3)
0530-566	Neurophysiology	(3)
0530-567	Reproductive Physiology	(3)
0530-575	Advanced Physiology II	(2)
0530-576	Advanced Physiology III	(3)

9 COMPULSORY COURSES

0530-597	Thesis	(0)
0530-598	Thesis	(0)
2000-599	Thesis	(9)

COURSE DESCRIPTION

0530-511: SEMINAR I
CR: 1

Current literature topics in physiology. Introductory course for first semester graduate students in physiology.

0530-512: SEMINAR II
CR: 1 PR:0530-511

The course will introduce basic principles of physiological research, preparation of scientific projects, and writing scientific reports. The students will also have an opportunity to get familiar with techniques currently used in the departmental labs.

0530-521: EXPERIMENTAL PHYSIOLOGY
CR: 1

The course will introduce basic principles of physiological research, preparation of scientific projects, and writing scientific reports. The students will also have an opportunity to get familiar with techniques currently used in the departmental labs.

0530-522: ADVANCED EXPERIMENTAL PHYSIOLOGY
CR:2 PR:0530-521

Same as 0530-521 but advanced concepts.

0530-533: SYSTEM PHYSIOLOGY
CR: 3

The course covers the physiology of all major organ systems in the body.

0530-535: INEGRATIVE PHYSIOLOGY
CR: 2

The major theme of this course is to homeostasis. In addition to that, environmental physiology is also addressed. Lecture material ranges from cellular processes to the whole organism and the interaction with the environment.

0530-537: PATHOPHYSIOLOGY
CR: 1

The coal of this course is to introduce students to main concept in Pathophysiology and the effect of organ dysfunction or failures on homeostasis.

0530-538: GENERAL PHYSIOLOGY
CR: 2

The course introduces the fundamental mechanisms underlying normal function of cells, tissues, organs, and organ systems of the human body. These include body fluid compartment, diffusion, osmosis, membrane transport, cell membrane physiology, electrophysiology, cellular signaling, and general principle of neuronal and muscle function. The molecular and cellular concepts of cardiovascular, renal, acid-base, respiratory, gastrointestinal, neurological and endocrine physiology are also presented.

0530-539: ADVANCED CELLULAR PHYSIOLOGY
CR: 1

The course will cover more advanced concept in cellular physiology that are not presented in the course General Physiology.

0530-551: NERVE AND MUSCLE PHYSIOLOGY
CR: 3

An advanced course on the biophysics, electrical phenomena of excitable tissue, metabolism, energetic and molecular architecture of muscle contraction.

0530-552: FLUID, ELECTROLYTES AND ACID-BASE PHYSIOLOGY
CR: 3

An advanced course in the principles underlying the regulation of body fluids, electrolytes and acid-base balance.

0530-553: EXERCISE PHYSIOLOGY
CR: 3

Application and interpretation of the principles of physiology involved in muscular activity. Current research in exercise physiology as well as laboratory experiences demonstrating these principles.

0530-554: COMPUTATIONAL PHYSIOLOGY: Introduction in advanced image processing and quantification
CR: 3

This course introduces MSc students into processing and quantitative analysis of medical images, including microscopic pictures (immunofluorescence, phase contrast, histology etc.) and x-ray and MRT images series. It provide an entry into the basics of digital image architecture, image type, image conversion and construction of videos from image series.

0530-555: Nutrition and nutrition related disease
CR: 3

This course describes the role of macro and micronutrients in the pathophysiology of several chronic diseases, such as: obesity, atherosclerosis, diabetes type 2, metabolic X syndrome, osteoporosis. Basic principle of nutrition, related metabolic processes, energy balance, food intake, and body weight regulation will be also addressed.

0530-561: CARDIOVASCULAR PHYSIOLOGY
CR: 3

An advanced course detailing the properties of cardiac muscle, conducting systems and electro-physiology of the heart, myocardial contractility-excitation-contraction coupling, electro cardiogram, cardiac output, measurement and control, physics of blood flow, pressure and resistance, control of circulation (overall and regional including that of individual organs), fluid exchange in tissue, cardiovascular homeostasis-gravitational effects, exercise, hemorrhagic shock and heart failure, cardiac function tests.

0530-562: RENAL PHYSIOLOGY
CR:3

An advanced course in renal mechanisms, filtration, reabsorption, secretion, concentration and dilution, homeostatic role, non-excretory function of kidneys, maintenance of body fluid pH assessing acid-base status, compensatory mechanisms.

0530-563: RESPIRATORY PHYSIOLOGY
CR: 3

An advanced course in the study of factors which control pulmonary ventilation and the tests used to measure pulmonary efficiency and function. Special emphasis will be placed on topics such as: alveolar ventilation diagrams; alveolar gas exchange, pulmonary oedema, ventilation-perfusion relationships; transport of gases; resistive and elastic work of breathing; central organization of respiratory neurons; peripheral and central chemoreceptors; control of tracheobronchial smooth muscle tone; respiratory reflexes; non-respiratory functions of the lung; functions tests; adaptation to high altitude, space, and underwater physiology.

0530-564: GASTRO-INTESTINAL PHYSIOLOGY
CR: 3

Motility of G.I.tract (pressure sphincters), secretion; digestion and absorption; G.I. hormones; gastric function tests; tissues biochemistry.

0530-565: ENDOCRINE PHYSIOLOGY
CR: 3

An advanced course in neuroendocrine interrelationship, hypothalamo-hypopyseal tracts and hypophyseal portal circulation; hypothalamic control of pituitary function, hypothalamic neurosecretions, releasing and inhibitory factors; control of endocrine function by the hypothalamo-hypophyseal axis, concept of negative and positive feedback mechanisms; the role of hormones on regulation of homeostatic mechanisms, hormonal regulation of blood sugar, hormonal regulation of fluid volume, electrolyte and osmolar concentration, hormonal regulation of calcium homeostasis and hormonal control of metabolism, methods of investigating endocrine malfunction by chemical methods, bio and radioimmunossays.

0530-566: NEUROPHYSIOLOGY
CR: 3

Morphology and biophysical properties of membrane: Nerve impulse transmission, intracellular traffic of the neuron, junctional transmission and cellular interactions, transmission at automatic ganglia. Central neural control of autonomic functions: Neuronal mechanisms underlying electrical activity of brain. Receptor morphology, transduction of sensory stimuli, properties of receptors, modality, specificity threshold, receptor potentials, adaptation projection of sensory impulses, primary sensory area, association areas, sensory testing. Vision as an example of sensory coding, retinal receptors, photopic, scotopic colour vision, adaptation, subcortical and cortical organisation: simple, complex, hypercomplex cells, models of data analysis, perception. Brainstem organisation of visceral functions, conventional and current concepts, anatomical, physiological and neurochemical hypothalamic organisation, role of hypothalamus in energy metabolism, body fluid homeostasis and thermoregulation, hypothalamic endocrine interaction, cortical limbic, hypothalamic relationship in the control of visceral functions.

0530-567: REPRODUCTIVE PHYSIOLOGY
CR: 3

An advanced course in function of the reproductive system. Male reproductive system: Structure and function of the testes and secondary sex organs, secretion and actions of testosterone, infertility and fertility control. Female reproductive system: Structure and function of ovary, oviduct, uterus, vagina, oogenesis, ovulation, secretion and action of estrogen and progesterone, physiological changes at puberty and the menopause, description of the menstrual cycle and its control by hypothalamic adenohypophyseal and ovarian hormones, fertilization and implantation, pregnancy, including placental function and birth, infertility and fertility control.

0530-574: Advanced Physiology I
CR: 1

Different areas of physiology will be integrated. The topics will be tailored to the research program of the candidate and cloud include such areas as perinatal physiology, thermogenesis, exercise physiology, physiological basis of stress, growth, development and aging.

0530-575: Advanced Physiology II
CR: 2

Same as 0530-574 but taken for 2 credit.

0530-576: Advanced Physiology III
CR: 3

Same as 0530-574 and 0530- 575
but taken for 3 credit.

0530-597: THESIS
CR: 0

0530- 598: THESIS
CR: 0

2000-599: THESIS
CR: 9