

**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.

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

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**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 background 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**.

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|----------|------------------------------------------------|-----|
| 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) |

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**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 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, epidemiological 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 infectious 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 vaccination, control, elimination and eradication, epidemiology of emerging infections and epidemiology of specific infectious diseases.

## MASTER OF SCIENCE ANATOMY

### **INTRODUCTION**

The Department of Anatomy (Faculty of Medicine) offers a Master of Science program in **Anatomy**. Only full-time students are admitted to this program.

*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**

The program requirements are:

#### **36 TOTAL COURSE CREDITS**

#### **22 COMPULSORY (credits in parenthesis)**

|          |                                             |     |
|----------|---------------------------------------------|-----|
| 0510-501 | Biostatistics and Computers in Medicine     | (2) |
| 0560-506 | Tissue and Organ Histology                  | (2) |
| 0560-507 | Neuroanatomy                                | (2) |
| 0560-515 | Introduction to Cell Biology                | (2) |
| 0560-516 | Introduction to Human Development           | (1) |
| 0560-533 | Anatomy I                                   | (3) |
| 0560-534 | Anatomy II                                  | (3) |
| 0560-535 | Microscopic Techniques                      | (2) |
| 2000-501 | Scientific Writing and Communication Skills | (3) |
| 2000-503 | Ethics and Professionalism                  | (2) |

#### **5 ELECTIVES**

The remaining 5 credit hours may be selected from any of the following 500 level graduate courses offered by the Faculty of Medicine with the approval of the academic advisor.

|          |                                      |     |
|----------|--------------------------------------|-----|
| 0560-523 | Seminars in Advanced Cell Biology    | (1) |
| 0560-536 | Regulation of Human Development      | (1) |
| 0560-537 | Advance in Neuroscience Research     | (2) |
| 0560-538 | Introduction to Tissue Culture       | (2) |
| 0560-539 | Fine Structure of Cells              | (2) |
| 0560-540 | Behavioral Neuroscience Methods      | (2) |
| 0560-541 | Neurobiology of Pain                 | (2) |
| 0560-542 | Advances in Developmental Toxicology | (1) |

**9 COMPULSORY (Thesis)**

|          |     |
|----------|-----|
| 0560-597 | (0) |
| 0560-598 | (0) |
| 2000-599 | (9) |

**COURSE DESCRIPTION****0560-506: TISSUE AND ORGAN HISTOLOGY  
CR: 2**

The human anatomy at the microscopic level starts in this course with the study of the microscopic structure and characteristic features of the basic tissues that constitute the organs and systems. This is followed by the study of the microscopic organization of the organs and systems that gives each of them their peculiar features relevant to their gross appearance and function. In addition to the lecture sessions, practical sessions are conducted on conventional light and electron microscopic preparations. This course is essential for future biomedical research and may provide basis for studies in histopathology.

**0560-507: NEUROANATOMY  
CR: 2**

The study of both peripheral and central nervous systems is provided in this section. This includes the topography of the brain, spinal cord and their meningeal coverings as well as their blood supply and cerebrospinal fluid circulation. Also it deals with neuronal pathways and connections and functional and applied aspects. In this course the various parts of the body are linked together under the umbrella of the nervous system as the most important control system of the body.

**0560-515: INTRODUCTION TO CELL  
BIOLOGY  
CR: 2**

This course deals with the study structure of the cell and the subcellular structures with reference to their functional significance. It includes cellular mechanisms that rules homeostasis, cell cycle and differentiation. Relation to tissue formation, reaction and apoptosis are emphasized to understand the body functions in health and disease.

**0560-516: INTRODUCTION TO HUMAN  
DEVELOPMENT  
CR: 1**

This course is designed to study the development and growth of humans including embryogenesis, organogenesis and postnatal growth with emphasis on correlation of development with gross anatomy and common developmental anomalies.

**0560-523: SEMINARS IN ADVANCED CELL  
BIOLOGY  
CR: 1 PR: 0560-515**

This course is designed to provide students with an active learning environment. The focus of this course is on development of critical thinking and analyses. Students are required to discuss and critique research articles. The course will enable students to interact amongst themselves, integrate the knowledge and develop new ideas. Students will be exposed to a variety of research topics and techniques through published scientific articles. In addition to weekly discussions, students are required to give a short talk on the selected articles. The role of the faculty is to help students learn how to engage in a thinking process that will enhance their ability to communicate, reason and format hypothesis. Students will also be encouraged to attend the Faculty of Medicine seminar series as and when topics in cell biology are covered.

**0560-533: ANATOMY I  
CR: 3**

The course is designed to study the organization of the thorax, abdomen, pelvis, perineum and lower limbs in human body. The course contents are the gross anatomy of the (i) Thorax, (ii) Abdomen, Pelvis, (iii) Perineum and (iv) Lower limb. The course includes a systematic dissection of the above regions following the lectures. The applied and clinical correlations will be discussed wherever necessary, in addition to radiological anatomy.

**0560-534: ANATOMY II**  
**CR: 3**

This course is designed to study the organization of the head and neck and upper limb with their functional significance. The course contents are gross anatomy of (i) Head and Neck (ii) Upper limb. Identification of the bones, muscles, viscera, glands, vessels and nerves and their functional and clinical significance will be discussed. The course includes dissection of the regions following the lectures. The applied and clinical correlations will be discussed wherever necessary, in addition to radiological anatomy.

**0560-535: MICROSCOPIC TECHNIQUES**  
**CR: 2**

This course aims to provide students with a theoretical background and practical experience in a variety of microscopical techniques commonly used in studying cell biology. Advances made in microscopical techniques will be covered with emphasis on the advantages and limitations of each technique. The use of microscopy in characterizing normal cells and tissues will be examined. A variety of topics will be covered including light microscopy, histochemistry, immunohistochemistry, fluorescence microscopy, and confocal microscopy.

**0560-536: REGULATION OF HUMAN DEVELOPMENT**  
**CR: 1 PR: 0560-515, 0560-516**

Normal development of embryos is tightly regulated by numerous intrinsic and extrinsic pathways. Abnormal development and eventual congenital anomalies result due to imbalances induced in these mechanisms. This course aims to concisely explain the main and well known molecular mechanisms that regulate embryonic and fetal development. This course includes a series of lectures and laboratory training of a technique that could identify the proteins involved in a few signaling pathways.

**0560-537: ADVANCE IN NEUROSCIENCE RESEARCH**  
**CR: 2 PR: 0560-507**

This course is designed to examine the core material on essential topics in neuroscience from the molecular to the systems levels. The course will cover broad areas in up-to-date neuroscience research with specific emphasis on anatomical

approaches. Students will become acquainted with the main theories, research and advances in selected topics of neuroscience. Teaching sessions will include lectures, discussions and lab rotations.

**0560-538: INTRODUCTION TO TISSUE CULTURE**  
**CR: 2**

The main objective of this course is to introduce the students to the principles of tissue culture and application of tissue culture techniques in biomedical research. The course will include one lecture (1 h) and one lab (3 h) every week.

**0560-539: FINE STRUCTURE OF CELLS**  
**CR: 2 PR: 0560-515**

This course is designed to study ultrastructure of cells and tissues. Basic techniques of transmission and scanning electron microscopy will be learned and students will prepare biological specimens and evaluate the ultrastructure and surface morphology. Special techniques to study ultrastructure of cells, tissues and organs will be discussed. Current research articles on the use and application of electron microscopes will be discussed.

**0560-540: BEHAVIORAL NEUROSCIENCE METHODS**  
**CR: 2PR: 0560-507**

This course is designed primarily to educate graduate students in planning and executing learning and memory related behavioral experiments. This course includes theory and the practical use of water maze, radial arm maze, and passive avoidance behavioral tests. Further, the course includes collection of appropriate literature, design an experiment with water maze /radial arm maze/passive avoidance behavioral test/tests. The course also includes collection of the behavioral data, analysis of the collected data with suitable statistical methods, drawing conclusions and writing a manuscript by graduate students. The course would provide the students with ample knowledge on behavioral neuroscience research methodology.

**0560-541: NEUROBIOLOGY OF PAIN**  
**CR: 2PR: 0560-507**

This course is designed to present the theory and research on the anatomical structures and physiological processes involved in the transmission and modulation of pain. The latest practices in experimental pain research including the standards of current research methodologies,

analytical procedures, and interpretation of results will be discussed. The course will provide training in neuropathic pain research focused on preclinical rodent models of neuropathic pain and on methods for measuring pain.

**0560-542: ADVANCES IN DEVELOPMENTAL TOXICOLOGY**  
**CR: 1 PR: 0560-515**

This course is designed to provide basic knowledge of how the exogenous substances affect the function of development of fetuses.

This course focuses on the general principles of developmental toxicology, mechanisms by which exogenous insults affect the normal reproductive function, and experimental models and techniques used in assessing the actions of reproductive toxicants.

**0560-597: THESIS**  
**CR: 0**

**0560-598: THESIS**  
**CR: 0**

**2000-599: THESIS**  
**CR: 9**