

EDICINE (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)
0510-502	Advanced Biostatistics	(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 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**.

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 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
NUCLEAR MEDICINE**

Program code: 0555

INTRODUCTION

The Department of Nuclear Medicine (Faculty of Medicine) offers a Master of Science Program in **Nuclear Medicine**. English is the Language of instruction and research. The aim of this program is to provide training for physicians who are interested in the field of Nuclear Medicine, to improve research and clinical standards in the field of Nuclear Medicine, and to prepare physicians by building professional competence to pursue higher scientific research and clinical training in the field by providing the necessary basic principles in these areas. Only thesis option is offered.

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

42 TOTAL COURSE CREDITS

29 COMPULSORY (credits in parenthesis)

0510-501	Biostatistics and Computer in Medicine	(2)
0555-501	Nuclear Medicine physics	(2)
0555-502	Nuclear Medicine Instrumentation	(2)
0555-503	Radiopharmacy	(2)
0555-504	Computer Application in Nuclear Medicine	(2)
0555-505	Radiobiology and Radiation Protection	(1)
0555-506	Clinical Nuclear Medicine I	(4)
0555-507	Clinical Nuclear Medicine II	(4)
0555-508	Clinical Nuclear Medicine III	(4)
0555-509	Seminar I	(1)
2000-501	Scientific Writing and Communication Skills	(3)
2000-503	Ethics and Professionalism	(2)

4 ELECTIVES

0510-503	Epidemiology	(1)
0520-504	Immunity and Infection	(2)
0530-561	Cardiovascular Physiology	(3)
0530-562	Renal Physiology	(3)
0530-564	Gastrointestinal Physiology	(3)
0530-565	Endocrine Physiology	(3)

0530-566	Neurophysiology	(3)
0555-510	Advances in Nuclear Medicine	(4)
0555-511	Computational Methods	(2)

9 COMPULSORY

0555-597	Thesis	(0)
0555-598	Thesis	(0)
2000-599	Thesis	(9)

COURSE DESCRIPTION

0555-501: NUCLEAR MEDICINE PHYSICS CR: 2

Concepts and principles of basic nuclear medicine physics; to include interactions of Particulate and electromagnetic radiation, production, modes of radioactive decay, radiation detectors, and their applications, and internal dosimetry.

0555-502: NUCLEAR MEDICINE INSTRUMENTATION CR: 2

Instrumentation of imaging devices is presented in this course including basic function, principles of operation, design considerations, and applications of the nuclear medicine imaging systems.

0555-503: RADIOPHARMACY CR: 2

The design, production, preparation, quality control and biological behaviour of radiopharmaceuticals.

0555-504: COMPUTER APPLICATION IN NUCLEAR MEDICINE CR: 2

Lecture and practice on the principles and application of computers in management of information, data acquisition, and data processing in the nuclear medicine department.

0555-505: RADIOBIOLOGY AND RADIATION PROTECTION CR: 1

Biological effects of ionizing and non-ionizing radiation on cells and whole body, radiation protection instrumentation and their application.

Dosimetry to include calculation of radiation absorbed dose. Safe handling of unsealed radioactive sources to include regulatory policies.

0555-506: CLINICAL NUCLEAR MEDICINE I CR: 4

Basic clinical aspects of nuclear medicine. It includes both theory through didactic lectures and practice in clinical service and laboratory. In the practical portion the candidate will participate in obtaining patient's information, preparing radiopharmaceuticals, operating equipment, doing quality control tests and attending reading sessions.

0555-507: CLINICAL NUCLEAR MEDICINE II CR: 4

Clinical aspects of nuclear medicine; theoretical and practical. The candidate will participate, in the practical portion, in obtaining patient's information, examine patients, checking studies before the patient leaves the department and check the quality control tests. The candidate will learn how to process the information obtained and write preliminary reports. The course also deals with invitro nuclear medicine studies.

0555-508: CLINICAL NUCLEAR MEDICINE III CR: 4

An advance course in clinical nuclear medicine to include interpretation of studies using correlative imaging approach, identifying technical pitfalls and studying the less commonly performed procedures. The course also deals with therapeutic nuclear medicine and understanding the administrative aspects of managing a nuclear medicine laboratories.

0555-509: SEMINAR I

CR: 1

Preparation of a seminar on one topic allotted by the advisor. Presentation in the Department.

0555-510: ADVANCES IN NUCLEAR MEDICINE

CR: 4 PR: 0555/501,502,503,506,507

Advanced aspects of nuclear medicine science and clinical practice. Students must have mastered basic physics, instrumentation, radiopharmacy, radiochemistry, and computer science before enrolling for this course. In addition, clinical nuclear medicine courses 1&2 are required. Instruction will include both theory taught through didactic lectures and practical application in the clinical service and the laboratory. Topics to be considered include PET, SPECT, instrumentation, radionuclide therapy, nuclear oncology, and nuclear cardiology at an advanced level.

0555-511: COMPUTATIONAL METHODS

CR: 2

Advanced aspects of computational methods as applicable to the nuclear medicine sciences and the clinical practice of nuclear medicine.

0555-597: THESIS

CR: 0

0555-598: THESIS

CR: 0

2000-599: THESIS

CR: 9