

College
of Medicine
& Medical
Sciences

CMMS



PhD in Molecular Medicine



Program Overview

Molecular Medicine is a new field that exploits advances in molecular and cellular biology to characterize how normal cellular processes either fail, or subverted, in disease. Increasingly, medical practitioners, professionals and researchers in the health and life sciences need to understand and evaluate advances in molecular medicine in order to keep abreast with developments in their fields.

The PhD in Molecular Medicine, which started in 2006, was established with the aim of offering advanced learning and practical training to:

- Master holders in Medical Sciences planning an academic career in the area of Molecular Medicine.
- Technicians with MSc degree wishing to upgrade their expertise in specialized areas of Molecular Medicine.
- Personnel engaged in the practice of Molecular Medicine, Genetics and Inherited Diseases, including physicians, who wish to specialize in Molecular Medicine.

The Program offers specialties in the following areas:

- Medical Genetics
- Biochemical Genetics
- Cytogenetics
- Immunology
- Nanomedicine

The duration of the program is 3 – 4 years during which the students study 48 credits hours inclusive of a PhD thesis which is equivalent to 24 hours.



Vision

The Molecular Medicine program's vision is to be a uniquely, innovative and effective educational and research program to serve the health needs of the GCC citizens, and globally contribute to excellence in research and development, clinical services and health education.

Mission

The mission of the Molecular Medicine Program is to gain theoretical and practical knowledge of molecules and molecular mechanisms of body functions in health and disease for better diagnosis, treatment and protection from common and rare diseases.

Program Objectives

- To get theoretical background on the fundamental principles vital to the understanding of molecules that are keys to normal functioning of the body and those related to the deep-seated mechanisms of diseases.
- To conduct mission oriented research that is directed to resolving medical issues via in-depth analysis and investigation rendering to molecular diagnosis.
- To acquire various skills, among them mastering selected techniques for analysis, measurements and manipulation of these molecules to improve diagnosis, treatment, and prevention of diseases as well expressing scientific findings in oral and written forms producing quality research papers.



Learning Outcomes

A PhD holder in Molecular Medicine will be able to:

- Conduct scientific research investigating a problem in Molecular Medicine, Genetics and Inherited Diseases demonstrating his ability to use a sound scientific approach and competence in Molecular Medicine techniques and methods related to his field of research.
- Write scientific papers, grant applications and work independently.
- Teach and supervise undergraduate, graduate students and technical staff.
- Gain administrative responsibilities, which will allow him to develop, supervise and organize a molecular lab.

Program Outline

The curriculum is organized around 6 - 8 semesters (of 16 weeks duration each). The first semester consists of core courses, while the second semester is devoted to specialized courses. During each semester the student organizes with the supervisor/s the required courses and the research work, which all spread over the semesters of the academic year. Topics for the thesis will be decided in consultation with the Director of the PhD program taking into consideration the students' interests and ongoing research activities. Thesis work can be partly performed by the student in his/her institution provided that a qualified supervisor is identified and technical facilities are available to carry out the planned experiments. Internal and external examiners evaluate the written dissertation and examine the student orally. The PhD degree requirements include 24 credit hours of courses and a 24 credit hour thesis to be completed within 2 - 3 academic years (Total = 48 credit hours). The program is implemented by a Director and decisions are made by an Academic Committee consisting of members representing the major specialties in the program.



Outline of Courses

A. Core Courses in General Science

The requirement of this Core Course must reach at least 6 credit hours.

Course Code	Course Name	Credit Hours
Course A.1	Philosophy of Science and Ethics	2 Credit Hours
Course A.2	Pedagogic/Presentation Technology	2 Credit Hours
Course A.3	Information Technology	2 Credit Hours
Course A.4	Good Laboratory Practice	2 Credit Hours
Course A.5	Animal Models for Human Diseases	2 Credit Hours
CMMS 621	Inferential Statistics and its Applications	2 Credit Hours
CMMS 604	Research Methodology	2 Credit Hours



B. Basic Courses in Molecular Medicine

The requirement of these Basic courses in Molecular Medicine must reach at least 6 credit hours.

Course Code	Course Name	Credit Hours
Course B.1	The Frequency and Clinical Spectrum of Genetic Diseases	2 Credit Hours
Course B.2	Structure, Organization, and Regulation of Human Genes	1 Credit Hour
Course B.3	The Techniques of Gene Analysis	1 Credit Hour
Course B.4	Finding Our Way Around the Human Genome	2 Credit Hours
Course B.5	The Molecular Pathology of Single Gene Disorders	2 Credit Hours
Course B.6	Molecular Genetics and Common Diseases	2 Credit Hours
Course B.7	Cancer (Molecular Aspects)	2 Credit Hours
Course B.8	Carrier Detection and Prenatal Diagnosis of Genetic Disease	2 Credit Hours
Course B.9	Gene Therapy, Gene Cloning and Ethical Issues	2 Credit Hours



C. Specialized Courses in Molecular Medicine

The requirement of these Courses must reach at least 3 credit hours.

Course Code	Course Name	Credit Hours
Course C.1	Biochemistry of Nucleic Acids	1 Credit Hour
Course C.2	Chemistry of Proteins	1 Credit Hour
Course C.3	Applications of Mass Spectrometry in Biochemistry	1 Credit Hour
Course C.4	Genetic Basis of Metabolic Diseases	1 Credit Hour
Course C.4	Practical Approach to Cytogenetics	1 Credit Hour
Course C.6	An Introduction to Molecular Immunology	1 Credit Hour
Course C.7	Practical Issues in Molecular Diagnostics	1 Credit Hour



D. Specialized Courses in Molecular Genetics

The requirement of the Molecular Genetics Course must reach 3 credit hours.

Course Code	Course Name	Credit Hours
Course D.1	Introduction to Molecular Genetics	1 Credit Hour
Course D.2	PCR and Reverse Genetics	1 Credit Hour
Course D.3	Gene Expression	2 Credit Hours
Course D.4	Genome Structure and Stability	2 Credit Hours
Course D.5	Genetic Engineering of Eukaryotic Organisms	2 Credit Hours
Course D.6	Molecular Bases of Evolution	2 Credit Hours



E. Advanced Specialized Courses

The requirement of the advanced specialized Courses must reach 6 credit hours.

Course Code	Course Name	Credit Hours
Course E.1	Special Topics in Analytical Chemistry	3 Credit Hours
Course E.2	Enzyme Reaction Mechanisms	3 Credit Hours
Course E.3	Special Topics in Biochemistry	3 Credit Hours
Course E.4	Special Topics in Chemistry	3 Credit Hours
Course E.5	Proteomics	3 Credit Hours
Course E.6	Developmental Biology and Cellular Signaling	3 Credit Hours
Course E.7	Inflammation and Allergy	3 Credit Hours
Course E.8	Cellular and Molecular Immunology	3 Credit Hours
Course E.9	Cellular and Molecular Developmental Biology	3 Credit Hours
Course E.10	Introductory Course in Tumor Biology/Oncology	3 Credit Hours

F. PhD Project

Course Code	Course Name	Credit Hours
Course K24	Thesis	24 Credits Hours



Methods of Assessment

Students' performance will be evaluated based on:

- Assignments
- Presentations
- Continuous assessment
- Written and oral exams

Admission Requirements

- The applicant is a citizen of one of the GCC countries or a citizen of an Arab country and is resident in one of the GCC countries.
- Nomination / No objection letter from the Ministry of Higher Education of the applicant's country (GCC citizens).
- A Master of Science degree from a University recognized by AGU.
- Evidence of adequate proficiency in the English language (Minimum TOEFL score of 450 or IELTS of 5).
- Final acceptance shall be made after passing a personal interview.

Graduation Requirements

- Successfully complete a minimum of 24 credit hours of course work.
- Carry out a laboratory-based research project and submit and successfully defend a written thesis (24 credit hours).
- Obtain a minimum cumulative GPA of 3.0 out of 4.0.



Program Faculty

Dr. Abdelhalim Deifalla	Professor, Department of Anatomy
Dr. Afif Ben Salah	Professor, Department of Family and Community Medicine
Dr. Khaled Greish	Professor, Department of Molecular Medicine
Dr. Mohamed Dahmani	Professor, Department of Life Science
Dr. Moiz Bakhiet	Professor, Department of Molecular Medicine
Dr. Randah Hamadeh	Professor, Department of Family and Community Medicine
Dr. Raouf Fadhel	Professor, Department of Anatomy
Dr. Ahmed Jaradat	Associate Professor, Department of Family and Community Medicine
Dr. Ghada Al-Kafaji	Associate Professor, Department of Molecular Medicine
Dr. Khaled Tabbara	Associate Professor, Department of Microbiology, Immunology & Infectious Diseases
Dr. Sebastian Taurin	Associate Professor, Department of Molecular Medicine
Dr. Sfoug AlShammary	Associate Professor, Department of Molecular Medicine
Dr. Cristina Skrypnik	Assistant Professor, Department of Molecular Medicine



Dr. Deeba Shamim

Assistant Professor, Department of Medical Biochemistry

Dr. Jamil Ahmed

Assistant Professor, Department of Family and Community Medicine

Dr. Mariam Ghloom

Assistant Professor, Department of Molecular Medicine

Dr. Nouredine Ben Khalaf

Assistant Professor, Department of Life Sciences

Dr. Safa Taha

Assistant Professor, Department of Molecular Medicine
