

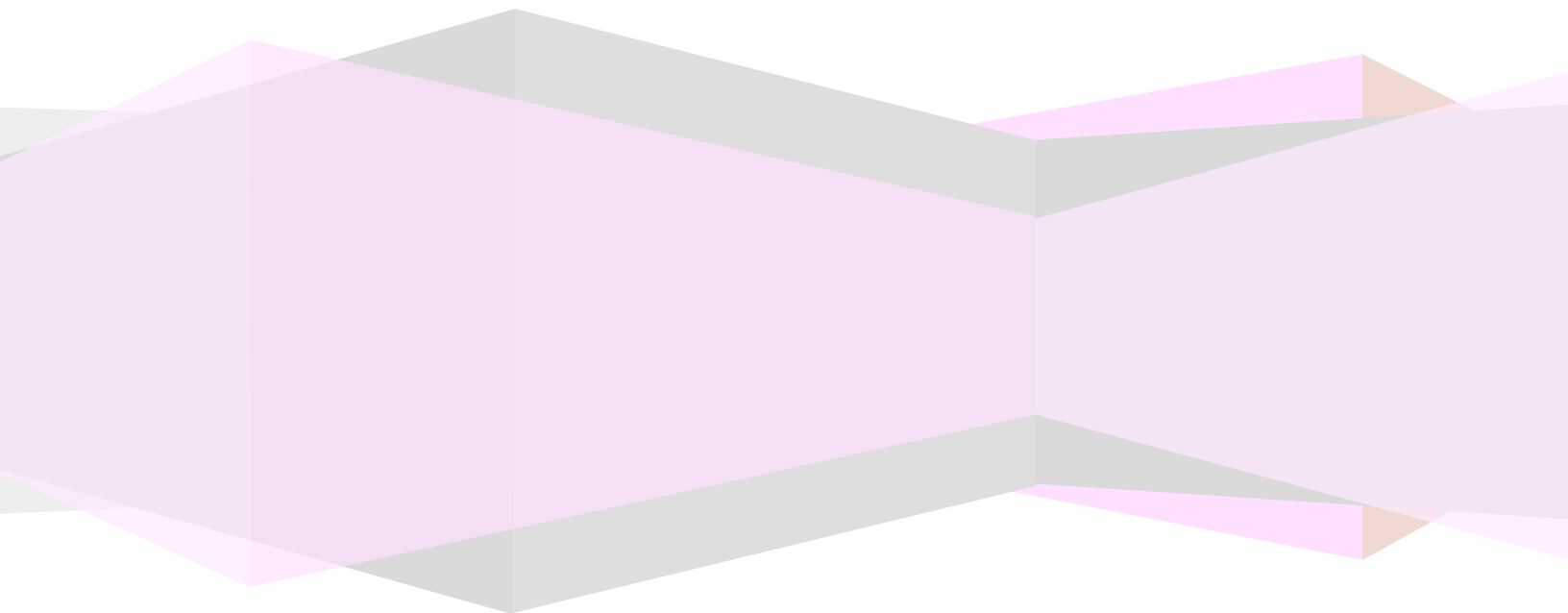


German University in Cairo

Faculty of Postgraduate Studies and Scientific Research

Diploma in Translational Biology & Molecular Medicine

Course Catalogue
Academic Year 2020-2021



I. Overview of the Diploma

The Faculty of Postgraduate Studies and Scientific Research at the German University in Cairo (GUC) offers a postgraduate diploma in Translational Biology & Molecular Medicine. This two-semester practical postgraduate program provides students with a broad foundation in basic and applied molecular genetics with hand-on practical experience. This course will mainly target those students who want to pursue research abroad in biology research at large including molecular medicine, genetics, molecular biology, biochemistry, immunology, cancer research, etc. The focus will be on understanding central principles and fundamental mechanisms for the organization, expression, variation, regulation and evolution of the genetic material, as well on methods for molecular genetic analyses and gene technology. This diploma is unique and not provided in other Egyptian Universities or Research centers.

The program aims are:

1. Filling the gap between pharmaceutical education (and other allied health sciences) and advanced biomedical research
2. Offering a solid foundation in modern molecular biology and molecular genetics that qualifies students to pursue their postgraduate MSc or PhD degrees or research career.
3. Providing in-depth hand-on experience in experimental molecular genetics, using modern methods of molecular biology and genetics that are not possible to learn during undergraduate studies

II. Market Need and Employability

The diploma is geared towards graduates who have a strong interest in a future career in biomedical research. The presented advanced molecular knowledge and practice is not offered by any Egyptian university either on the undergraduate or postgraduate levels. It is suitable for GUCian and non-GUCian graduates who have biomedical backgrounds including pharmacy, medicine, science, dentistry, veterinary, and biotechnology. There is a deep necessity for this diploma to fill the gap between undergraduate biomedical education and advanced biomedical research in national and international institutions. It will also facilitate the acceptance of GUC graduates in advanced research Universities and research centers abroad. There is a noticeable increase in the number of GUC and non-GUCian graduate who want to pursue their academic career abroad especially in the fields of advanced biomedical research. The diploma provides wider range of knowledge and practical experience than the corresponding MSc. It is complementary to clinical practice in medicine and pharmacy.

The Diploma graduate can be employed in widely varied fields including:

1. Research career in biomedicine at large (including molecular medicine, genetics, molecular biology, biotechnology, pharmaceutical biology, biochemistry, immunology, molecular pathology, molecular pharmacology, cancer, neurological, and cardiovascular research, etc.) in Egypt and abroad.
2. Academic career in biomedicine at international Universities

3. Research and academic biomedical career at GULF countries
4. R & D at international pharmaceutical companies
5. Biotechnology start-ups and established factories
6. Biomedical research companies
7. Clinical laboratories at hospitals and private sector to work as molecular biologist or geneticist
8. Clinical trial specialist (genetic studies)
9. Molecular biology sales representative
10. Senior product specialist in molecular biology
11. Forensic DNA Analyst
12. National and international health organizations and agencies
13. Science and medical publishers

III. Eligible Attendee and Target Audience

GUCian and non-GUCian University graduates of biomedical sciences including pharmacy, medicine, science, dentistry, veterinary, and biotechnology who want to engage in advanced biomedical research. Senior students in the last year of those faculties can also apply if their undergraduate schedule allows.

IV. Objectives and Outcomes

A. Diploma's Objectives

At the completion of the Diploma, the graduate will:

- Understand key experimental techniques used in modern molecular biology research
- Develop the skills to analyze and present experimental data both in oral and written form
- Have the ability to design relevant experiments and to practice critical evaluation of the data and the conclusions
- Acquire the theoretical and practical basis for further academic studies or professional practice in areas related to molecular medicine and translational biology.

B. Diploma's Outcomes

The graduate will gain specific knowledge and skills in widely varied areas:

1. Knowledge and understanding- After completing the Diploma, the students should be able to:
 - a. Describe how genetic variation originates, and affects traits and development of disease in individuals
 - b. Explain principles underlying core DNA technologies
 - c. Express molecular basis of heritable diseases
 - d. Recall how genomic information is translated to protein structure, folding and function
 - e. Define the link between bioinformatics and laboratory-based experiments
 - f. Summarize different types of genetic testing and advancement in nucleic acids analysis techniques
2. Intellectual skills- After completing the Diploma, the students should be able to:
 - a. Integrate knowledge on how genetic information is inherited, expressed and regulated
 - b. Suggest experimental solutions to common problems occurring in basic and applied molecular genetic research
 - c. Differentiate between different methods of genomic and genetic analysis
 - d. Analyze the association of genetic information with disease incidence
 - e. Predict miRNA-targeting genes by bioinformatics
 - f. Correlate the theoretical information with practical experiments
3. Professional skills- After completing the Diploma, the students should be able to:
 - a. Critically read publications in the scientific literature. Analyze and evaluate experimental results and compare such findings to the literature
 - b. Develop effective presentations and reports
 - c. Apply different experimental techniques of molecular genetics in clinical practice.
 - d. Interpret genetic and biomarkers data
 - e. Demonstrate different hallmarks of cancer
 - f. Develop basic laboratory skills to study structure, function and properties of genes
4. Transferable skills- After completing the Diploma, the students should be able to:
 - a. Develop skills to communicate scientific results in writing through composing a research article based on laboratory results.
 - b. Search for information and correlate theoretical information with clinical data

- c. Work effectively in team
- d. Develop oral presentation skills
- e. Practice safe handling of biohazardous materials, and work in a hygienic environment
- f. Solve problems and cases relevant to the lab topic

V. Curricula

FIRST SEMESTER COURSES:

Code	No.	Course	h/w	ECTS
TB & MM	101	Genomic Organization, Function and Analysis	3	8
TB & MMp	102	Basic Molecular Techniques in Biomedical Research	4	8
TB & MM	103	Bench to Bedside – Seminar in TB & MM (1)	2	4
ECTS = 20 Credit Points				

SECOND SEMESTER COURSES (SUMMER):

Code	No.	Course	h/w	ECTS
TB & MM	201	Medical Genomics	3	8
TB & MMp	202	Molecular Methods in Genomic Medicine	4	8
TB & MM	203	Bench to Bedside – Seminar in TB & MM (2)	2	4
ECTS = 20 Credit Points				
Total ECTS = 40 Credit Points = 234 h Contact Hours = 960 h Work Load				