THE CYPRUS INSTITUTE OF NEUROLOGY & GENETICS

MSc Biotechnology

CAN YOU MAKE A DIFFERENCE IN THE FIELD OF BIOTECHNOLOGY?

THE IMPORTANCE OF BIOTECHNOLOGY

At the Cyprus Institute of Neurology & Genetics (CING) we encourage our students to embark on the journey of Biotechnology, making a difference and a positive contribution to science and society. Biotechnology is undoubtedly important for its implications in various sectors of everyday life, utilizing cellular and bio-molecular processes that pave the way for the generation of cutting-edge new technologies and products that help improve life and nature in general. In particular, Biotechnology is the technology that uses living microorganisms to develop or create different products. Examples include the use of yeast in cheese and bread making, and the use of viral vectors for the creation of human vaccines (ie SARS-CoV-2 vaccine) or using bacteria to clean waste waters. Overall, recent advances in Biotechnology had a positive impact on the production of healthy food, improvement of the medical sector, reducing the world's environmental footprint, and reducing the rate of infectious diseases. As a result, Biotechnology is widely considered to be the engine of the global economy in the 21st century.

MSC BIOTECHNOLOGY AT THE CING

The Biotechnology programme at Masters (MSc level) offers students a unique opportunity to gain a comprehensive understanding of the field of biotechnology. The programme includes three stimulating mandatory courses: **Molecular Virology and Immunology, Microbial Biochemistry** and **Fundamentals of Biotechnology.** Through these courses, students will become familiar with the wide range of biotechnology tools that are currently used in different industrial settings.

- The course in **Molecular Virology and Immunology** extensively covers the area of Medical Biotechnology, including lectures on the production of vaccines, antibodies, and drugs for therapeutic purposes.
- The course in **Microbial Biochemistry** provides students with knowledge about bacterial and other microbial processes and is enriched with lectures from experts specialized in the food and wine industry
- The course in **Fundamentals of Biotechnology** also covers the use of cutting-edge biotechnology tools for medical purposes, as well as agricultural biotechnology, waste-water management and bioethics.

In addition to the mandatory courses, a number of elective courses as listed below are also available, allowing students to broaden their knowledge and specialize in an area of interest:

- Methodologies and Technologies Applied in Medical Genetics
- Cellular and Molecular Neuroscience
- Molecular Basis of Monogenic Diseases
- Gene and Cell Therapy
- Biochemical Basis of Genetic Diseases
- Bioinformatics.

As a part of the programme, students will also carry out a research or library project within the state-of-the-art facilities of the CING or at collaborating institutions in industry and other academic/research institutions in Cyprus. The CING and its collaborators conduct internationally renowned, pioneering research work, providing students with the knowledge and tools to complete a competitive and advanced research or library project.

INTENDED LEARNING OUTCOMES

The programme has been carefully designed to align the skills that graduates will acquire with market demands, ensuring that graduates are well-prepared for industry-ready, knowledgeable, and adaptable careers. The programme also provides graduates with the opportunity to continue their academic career by pursuing a PhD.

Upon completing this programme, MSc graduates will have acquired a detailed knowledge of the major biotechnology topics, with emphasis on how the wide range of Biotechnology tools are utilized in industry and applied for research purposes. Of equal importance, students will gain knowledge and experience directly from experts currently working in various industrial settings, providing them with the unique opportunity to acquire hands-on-experience.

MSC BIOTECHNOLOGY AT THE CING IS SUITABLE FOR YOU

If you are a graduate with a background in medicine, biological and related sciences, genetics, neuroscience, biomedicine, chemistry, Pharmacy, agronomy, biochemistry engineering and other related fields, looking to progress to Postgraduate level.

MINIMUM ADMISSION CRITERIA:

- A Bachelor's degree from a recognised accredited institution, in a related field.
- English Language Certification or other accepted International standard, if the previous degree obtained was not in English
- 2 references

COURSE DESCRIPTIONS

BT101/MVI : MOLECULAR VIROLOGY AND IMMUNOLOGY

The course Molecular Virology and Immunology offered at the CING includes the main topics in the fields of Virology and Immunology. This course has a dual purpose: to provide an integrated and more advanced understanding of viruses in general and their role in disease pathogenesis, focusing on understanding the molecular basis of these processes; and secondly to provide broad knowledge of the basic concepts in cellular and molecular immunology. Emphasis will be also given in understanding the viral survival strategies and the immune mechanisms that result in elimination of viral pathogens, whilst at the same time the role of microbes, and viruses in particular, in medical biotechnology will be explored. An overview of available approaches (vaccines, antiviral drugs, immune technologies) for providing protection and treatment against viral diseases and of various cutting edge methodologies currently used for the diagnosis and monitoring of viral infections will also be provided by this course. Of equal importance, the basic concepts in the field of cell and tissue engineering will be also covered, highlighting how this field is likely to revolutionize the ways for improving the health and quality of life of patients by restoring, maintaining, or enhancing tissue and organ function. The interactions of antibody therapies and vaccines with the immune system will also be discussed. Tutorials held throughout the course will be utilized to address specific questions, helping students to broaden the knowledge acquired during lectures through group discussions and the use of original research papers. Finally, the workshops will be used to improve student's communication skills through oral presentations and small group discussions.
The course does not require any previous knowledge in virology and immunology.

BT102: MICROBIAL BIOCHEMISTRY

The course Microbial Biochemistry offered at the CING includes the main topics in the fields of biochemistry and microbiology. This course will provide an integrated understanding of microorganisms in general and biochemical processes characterizing their metabolisms as well as the role of bacteria and other microorganisms in health and human disease. The course will also provide basic concepts of use of microbes in genetic engineering and various industrial processes, mainly different food production industries. Tutorials held throughout the course will be utilized to address specific questions, helping students to broaden the knowledge acquired during lectures through group discussions and the use of original research papers. Finally, the workshops will be used to improve students' communication skills in oral presentations and small group discussions.

BT103: FUNDAMENTALS OF BIOTECHNOLOGY

The course Fundamentals of Biotechnology aims to prepare students with the scientific theoretical understanding of the fundamental principles of biotechnology and give an overview of the main fields such as medical, environmental, food and plant biotechnology. Students will learn how genetic modification and genome editing contribute to both medical and commercial research while providing you with insights in the key practical techniques required to work in these areas. They will develop a systematic understanding of how molecular biology and genomics contribute to the agricultural and environmental industry and build a comprehensive understanding of both technical approaches and real world applications of the technology. In addition, students will learn how biotechnology can contribute to medical advances (focusing on medical approaches, gene therapy, regenerative medicine and genome editing technologies) and develop a conceptual understanding of how today's challenges in these areas are being addressed.

*Refer to the CING Postgraduate Education Prospectus for full course descriptions of all other mandatory and elective courses.

MODES OF STUDY

FULL-TIME MODE: 13 months (taught courses & research/library project)
PART-TIME MODE: 24 months (with minimum of one course per semester, among those offered in the referred semester)

TUITION FEES: €8.000

For application procedure and further tuition and scholarship information please see the main CING Postgraduate Education Prospectus or visit the website www.cing.ac.cy/education.

Accreditation has been awarded for all programmes via the official accreditation bodies of the Republic of Cyprus, with effect as of the date of establishment. The programmes are re-evaluated every five years

TOTAL of 90 ECTS must be completed successfully to acquire the MSc title in Biotechnology	**50 ECTS from the taught courses** 3 mandatory courses + 2 elective course + 40 ECTS from the **research or library project**	**10 ECTS** per course/research/library module (excluding MRP102A/B and MLP102A/B, worth 15 ECTS each)

FULL TIME SCHEDULE

AUTUMN SEMESTER *30 ECTS must be completed in this semester, comprised of:* **2 MANDATORY COURSES + 1 ELECTIVE COURSE**	**2 MANDATORY COURSES** *(You will take **both** of these courses)* MOLECULAR VIROLOGY AND IMMUNOLOGY **MVI / BT101** MICROBIAL BIOCHEMISTRY **BT102**
	1 ELECTIVE COURSE *(You will select **one** of these courses as your elective)* METHODOLOGIES AND TECHNOLOGIES APPLIED IN MEDICAL GENETICS **MG103** CELLULAR AND MOLECULAR NEUROSCIENCE **NEURO101** MOLECULAR BASIS OF MONOGENIC DISEASES **MM101** BIOINFORMATICS **BMI101**

FULL TIME SCHEDULE

SPRING SEMESTER *30 ECTS must be completed in this semester, comprised of:* **1 MANDATORY COURSE + 1 ELECTIVE COURSE + 1 PROJECT MODULE** *(either Research or Library)*	**1 MANDATORY COURSE** *(You must take this course)* FUNDAMENTALS OF BIOTECHNOLOGY **BT103**
	1 ELECTIVE COURSE *(*You must select one of these courses as your elective)* GENE AND CELL THERAPY**MM104** MOLECULAR GENETICS **MG101** BIOCHEMICAL BASIS OF GENETIC DISEASES **MG104**
	1 RESEARCH MODULE or 1 LIBRARY MODULE *(In collaboration with partners from the Academia and Industry)* MSC RESEARCH PROJECT PART I **MRP101** MSC LIBRARY PROJECT PART I **MLP101**

FULL TIME SCHEDULE

SUMMER PERIOD *15 ECTS must be completed in this semester*	**1 RESEARCH MODULE or 1 LIBRARY MODULE** *(You will continue your Research Project or Library Project and report preparation)* MSC RESEARCH PROJECT PART II **MRP102A** MSC LIBRARY PROJECT PART II **MLP102A**

FULL TIME SCHEDULE

PERIOD SEPTEMBER-OCTOBER *15 ECTS must be completed in this semester*	**1 RESEARCH MODULE or 1 LIBRARY MODULE** *(You will continue your Research Project or Library Project, report preparation and thesis examination)* MSc RESEARCH PROJECT PART II **MRP102B** MSc LIBRARY PROJECT PART II **MLP102B**