

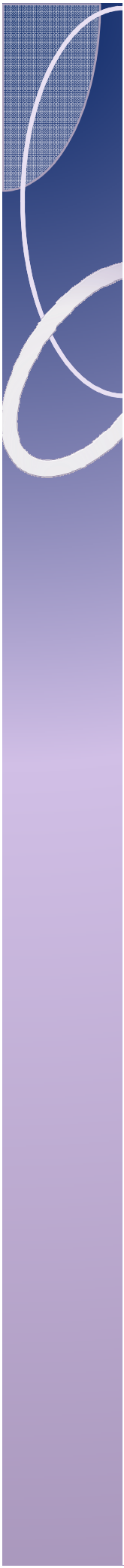
Carol Davila University of Medicine and Pharmacy

Bucharest, ROMANIA



INTERNATIONAL MASTER PROGRAM

MEDICAL BIOPHYSICS AND CELLULAR BIOTECHNOLOGY



The main target of the **Master Program on Medical Biophysics and Cellular Biotechnology** are young people willing to follow a career in Romania or abroad in the fields of biomedical research and laboratory, willing to use and develop biomedical equipments in national health system/universities/research/industry units.

The Master Program offers the introduction required by occupational market to **bio- and health-related domains** by **theoretical background** and **practical laboratory skills**.

Essential skills in biophysics/biology/biotechnology laboratory, radiobiology and radiotherapy, biomedical imaging, molecular/immune-histochemical diagnostics are acquired.

The Master Program is **organized and based** at *Carol Davila* University of Medicine and Pharmacy, Department of Biophysics and Cellular Biotechnology, in collaboration with *Amethyst Center of Radiotherapy* and several centers of excellency in Pathology and Laboratory Medicine .

Apart the permanent staff, **invited professors** from European universities are lecturing every year on up-to-date topics related to the Master Program.

The Master students are trained to perform an **original supervised research** for their M.Sc. diploma project . The best of them are involved in national/international research projects of our department.

Topics

Biophysical principles of laboratory techniques : optical and fluorescence spectroscopy, optical and fluorescence microscopy, magnetic resonance spectroscopy, optical and electrical manipulation and characterization of living cells, electrophoresis and other techniques of separation, etc.

Cell biotechnology: cell culture, cell viability tests, study of cellular apoptosis flow cytometry technique and clinical applications, antigen/antibody interaction – based techniques, etc.

Genomics and proteomics

Noninvasive methods used in diagnostics and therapy: echography, audiology, photodynamic therapy, electrochemotherapy, etc.

Biophysical principles of medical imaging (CT, RMI, PET, SPECT)

Molecular diagnostic in pathology – concepts, methods, techniques

Ionizing radiation in diagnostic and treatment. Clinical radiobiology

Interaction of electric fields and electromagnetic radiation with living cells

Basics of statistics and advanced processing of experimental data

LASERs in medicine. From physical principles to applications

Basic of neuronal networks

Modern principles of processing of visual and auditive signal



Lecture on irradiation planning with Professor Ion Christian Chircuta at Amethyst Center

Topics

All courses are supported by hands-on practicals based on up-to-date equipment



Individual work with cultured cells supervised by Assoc. Prof. Mihaela Moiescu, is encouraged for improving personal skills



Professor Ion Christian Chiricuta explaining the multileaf collimator of the linear accelerator at the Amethyst Center



Master student performing an immunohistochemistry practical



Professor Tudor Savopol explains to Master students how fluorescence spectra may be used for exploring the structure of lipid membrane in preparation of the practical work

Opportunities

- To complete the Bologna 1st cycle of studies by a M.Sc. degree
- To add new specialization to your Bachelor degree
- Getting the knowledge and laboratory skills required by occupational market for getting a job in *research and clinical analysis laboratories, biomedical units of public and private entities, radiobiology and immunochemistry diagnostics laboratories, etc.*
- Opportunities to continue the Master studies with a PhD in the same/other department in Romania or abroad
- Participation in national and international research projects followed by publication of the scientific results in International Data Base quoted journals
- Participation in national and international schools and conferences, recommendation in view of successful applications for short and long term scientific exchanges in Europe and USA
- Human and logistic support to perform an original laboratory study for the M.Sc. Diploma project
- Accreditation from the Romanian Medical Association (Colegiul Medicilor din România) for 100 EMC credits
- CNCAN (Comisia Națională pentru Controlul Activităților Nucleare) Certificate Level 2 of Radioprotection in Diagnostic and/or Interventional Radiology

International collaboration within the Master Program

Universidad Complutense de Madrid, Facultad de Ciencias Fisicas



National Technical University of Athens, School of Applied Mathematics and Physical Sciences



Université Paris 13, UFR Médecine, Santé, Biologie Humaine



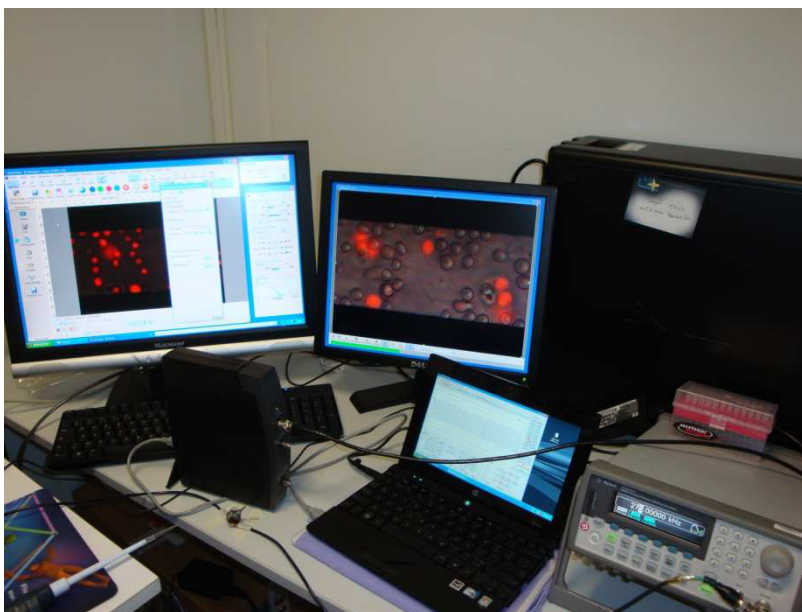
Open to graduates of

biology, chemistry-biochemistry, physics, biotechnology, medicine, pharmacy, dentistry, agronomy, engineering and any other related specialty (1° cycle Bologna diploma)

The Master Program has a duration of **4 semesters** and corresponds to **120 transferable credits** (30 ECTS/semester).



Master student performing experiments with optical tweezers interacting with a living cell for his M. Sc. Diploma project



Experimental set-up for electrical manipulation of fluorescent and non-fluorescent cells available in the Department of Biophysics and Cellular Biotechnology for a M. Sc. Diploma project



Professional status of Master alumni

Work in any research or medical investigation laboratory as well as in private or public medical therapy centers

Work as medical physicist /biophysicist /biologist/biochemist/ chemist in medical system

Follow up a teaching career for graduate/postgraduate studies: human and veterinary medicine, physics, biology, chemistry

Work as an expert/consultant in specific areas: cellular and molecular biophysics, bionics, bioengineering, dosimetry, radio-diagnostic, radiotherapy, public health

Admission

Interview with a 1st part for evaluating the candidate's scientific background (see bibliography) and a 2nd part for presenting the CV and motivation

Bibliography

Campbell N.A., Reece J.B, Mitchell L.G, Taylor M.R, Biology – Concepts and Connections, 4th Edition, Editor House Benjamin Cummings, 2003, chapters 1-4 (pages 2-69)

Details on required admission documents and calendar are available on the university website:

<http://umfcd.ro/educatie-umf/masterat/>



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