UNIVERSITY POLITEHNICA OF BUCHAREST

F[illegible]F ENGINEERING IN FOREIGN LANGUAGES - FACULTY OF APPLIED CHEMISTRY AND MATERIALS SCIENCE

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Campus "Polizu", Building I Room I-103, Gh. Polizu Street. 1-7, Bucharest, Postal Code 011061, Romania ; E-mail: secretariat@chim.upb.ro | Secretary phone/fax: +4021 311 1796

MASTER

English Language

ADVANCED MATERIALS PROCESSING AND DESIGN

(AdvMatProc)

(2 years, 4 semester)

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OBJECTIVES OF THE PROGRAMME

The master program proposed the following general objectives:

(a) Specialization and improvement of bachelor graduates in the field of processing, characterisation and testing of the materials. The following candidates are eligible for admission:

- engineers, especially chemical, materials science, medical engineers, bioengineers, etc.
- chemists from different topics including analytical chemists, environmental chemists, etc which are extensively using materials in their activity;
- biochemists
- medical doctors, both human and veterinary divisions,
- biologists
- pharmacists
- experts in the above enumerated categories.

(b) Empowering and improving the need of undergraduate/ graduates of Bologna cycle for carrying out research, to search quality consultancy and expertise in the field of processing and testing the quality of the developing materials and devices.

With the proposed courses - which include teaching, practice and research – the master program ensures both fundamental and applied training in materials processing, design, characterisation and testing of materials and derived devices in the field of industrial, medical, environmental, energy, electric or electronic applications. The program is mainly focused on developing knowledge and skills to enable graduates to identify current problems/challenges and especially to propose solutions and to manufacture materials appropriate to the desired application.

The master program brings together basic and applied sciences disciplines. The structure of the study plan is especially developed to assure one semester of mainly basic disciplines while the most of the second semester of the first year is devoted to the main processing techniques to manufacture 0-3D

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materials according to their envisaged applications. The first semester of the second year will be devoted to the discovery of the most important characterization and testing techniques and such, allowing in the second semester full-time involvement for research activities and finalizing the dissertation.

In the context of European and Global Requirements related to development of novel or improved materials, with increasing standards and diversity, with an accentuated degree of decentralisation it is important to learn young master students to develop materials with imposed characteristics and performances. Currently, by our knowledge, in Romania there is no such master fully devoted to processing and design of materials and absolvents can easily find positions in existing SMEs or, with the aim of the Start-up Nation or other programs to develop their proper business.

This program aims to combine chemistry, engineering, materials science with biomedical, environmental, energy, electric or electronic applications.

TARGET GROUPS

The master program Advanced Materials Processing and Design is especially devoted to graduates from different specialties, such as:

- Engineering sector: metallurgy, medical engineering, chemical engineering, materials science - engineers – plan: four years to complete the cycle II - Bologna - Predoctoral master;
- Engineering and Management – plan: five years;
- biologists, biochemists, chemists, cycle II - Bologna - Predoctoral master,
- medical doctors from both veterinary and human sector;
- Other Cycle II - Bologna - Predoctoral master;
- pharmacists, physicians or other specialties of biochemical and technological faculties, or interdisciplinary;
- doctoral conducting internship in the fields of medical engineering, chemical engineering, biochemistry, medicine or interdisciplinary.

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CURRICULUM

The Master program was designed according to the following structure:

I. Some basic knowledge related to the design, synthesis, functionalization and correlations about the materials:

- Advanced methods of synthesis of substances and materials
- Advanced Methods of Surfaces and Interfaces Functionalization
- Correlations of composition – synthesis – processing – properties in term of functions of use of materials
- CAD of Materials with Predetermined Morpho-Structural Features;
- Design and manufacturing of materials with special applications

II. The most important manufacturing methods:

- Advanced manufacturing techniques of 3D materials
- Advanced manufacturing techniques of 2D materials
- Advanced manufacturing techniques of 1D materials
- Advanced manufacturing techniques of 0D materials

III. The most important characterization methods:

- Advanced microscopy techniques
- Advanced Techniques of Spectrometric Analysis
- X-Ray Diffraction and Fluorescence
- Complex thermal analysis

IV. General issues related to:

- How to prepare a scientific work
- Standards for testing and certification of materials in terms of targeted application/evaluation of their performance