

PROGRAMME PROFILE

Educational Programme	Science and Engineering of Oxide Materials and Nanomaterials
Degree Awarded	Bachelor
Standard Length of Studies (Number of ECTS Credits)	4 years - 8 semesters - 240 ECTS
Type of Study	Full-Time
Higher Education Institution	Babes-Bolyai University Cluj-Napoca, Romania
Faculty / Department	Faculty of Chemistry and Chemical Engineering
Contact Person	Assoc. prof. PhD GOREA Maria
Phone	0741055027
Fax	0264593833
E-mail	mgorea@chem.ubbcluj.ro
Website	
Profile of the Degree Programme	Chemical Engineering
Target Group / Addressees	Graduates of secondary education with basic level of knowledge in chemistry wishing to further develop competencies in this field.
Entrance Conditions	30% baccalaureate examination score + 70% average score at the subject "Chemistry" over grades IX-XII.
Further Education Possibilities	Master Studies
Description of Study	The aim of this specialisation is to prepare the graduates for better using industrial processes, as well as for being able to design and carry on research in the field of Oxidic materials and nanomaterials (ceramics, glass, binders).
Purposes of the Programme	<ol style="list-style-type: none"> 1. Formation of the chemical engineer with basic competencies in Oxide materials science and with specific competencies in designing of ceramic, glassy and binding materials, as well as nanomaterials. 2. Providing the work market of Romania with chemical engineers able to perform according to the needs of mono- or poly interdisciplinary jobs in the Oxide materials field (industry, small and medium-sized enterprises, laboratories, secondary education etc). 3. An increase in the performances of the chemical engineers by connecting their academic experience to the revolution defined by the production of specific components and their micro- and nano-characterization, as well as to the modernisation and diversification of technologies in the field of Oxide materials. 4. Provide compatibility between the competencies of indigenous chemical engineers with the quality standards requested by the EU for preparing them to join international teams. 5. Formation of chemical engineer in order to be able to upgrade the level of experience by accessing master and

	<p>doctoral studies in a wider range of specialisations oriented towards: products for electronics and electrotechnics, biomaterials, materials used for their mechanical, thermomechanical or thermal properties. Highly-performant building materials, nanomaterials, thin films etc.</p> <p>6. Formation of chemical engineers who, based on their trained skills followed by specialisation could then represent a major source for future researchers in specialised institutes, or academic staff for university-level education.</p>
Specialization / Area of Expertise	The graduate holding a Chemical engineer diploma with specialisation in Oxide materials and nanomaterials sciences and engineering will be able to work in any economical, administrative, or practical enterprise, in positions such as: Technological Engineer (exploitation of equipment in Oxide materials industry); Designer Engineer (elaboration of projects by using well-known methods and principles of Oxide materials industry); Engineer in the Department of Processes Automation (monitoring automatic processes); Laboratory engineer (monitoring laboratory analyses, data interpretation); Management and marketing activities in processes industry as well as in the professional training and development of personnel.
Extra Peculiarities	-
Practical Training	Throughout the course students are required to undertake the practical work at Babeş-Bolyai University, industrial companies, laboratories of chemical analysis.
Final Examinations	Graduation thesis
Gained Abilities and Skills	<p>I. General competences</p> <p>Knowing and understanding essential phenomena, concepts, principles and theories of chemical engineering and Oxide materials science. Designing a product and monitoring a process based on data collecting and critical evaluation in the view of improving its performances, by complying with the legal norms for protection related to the functioning of equipments and with the regulations on environment protection and sustainable development;</p> <p>Using informatics technologies for documenting, data processing, simulation and leading chemical processes;</p> <p>Communicating and supporting their own ideas and opinions in a clear and concise manner, by using various written and oral communication ways, including informatics technologies (internet included), also in a foreign language;</p> <p>Taking the responsibility of elaborating a self-development programme via involvement in a <i>lifelong learning</i> process required for maintaining the standard professional performance in time;</p> <p>Capacity to apply general knowledge of: organic</p>

chemistry, inorganic chemistry, analytical chemistry, physical chemistry, mathematics, physics, mechanics, electrotechnics, property transport and transfer phenomena, systems theory, computing, analysis and synthesis of materials, automatic leading and optimisation of chemical processes for practicing chemical engineering;

Capacity to understand and to adapt to new hardware and software products of information technology and applying them in chemical engineering.

II. Speciality competences

Capacity to apply specialised knowledge for developing Oxide materials. Oxide materials science. Materials and technologies. Transport and kinetic phenomena in solids. Notions of crystallography and mineralogy.

Specialised competences on equipment and operations applied to silicate and oxide materials. Specific operations and equipments for silicate and oxide materials. Mass and thermal transportation and transfer processes.

Specialised competences on the development of glassy and crystalline solids. Silicate and Oxide structures, processes and phenomena typical for solid state reactions, glass-usual compositions and technologies.

Specialised competences on development of thermal-technological installations and systems engineering. Types and characteristics of dryers and burners for Oxide and silicate materials. Thermal phase equilibrium in mono-binary, and ternary systems with applications in ceramics, glass and cement producing.

Specialised competences on development of ceramic and refractory materials, materials analysis. Raw materials, compositions, microstructure, properties, traditional and advanced technologies. Investigation methods for silicate solids.

Specialised competences on development of inorganic binders, advanced materials, thin layers. Inorganic binders, mortars and concrete.

Specific products and technologies. Advanced Oxide materials, composites, ceramic glazes. Nanomaterials.

Capacity of applying interdisciplinary knowledge (chemical engineering, mechanics, electrics, automatisations, environmental and economic sciences etc.) for evaluating and solving complex problems in chemical systems;

Capacity to show initiative in evaluating and solving specific problems for chemical, industrial and laboratory systems;

Capacity to design, set-up and lead practical experiments at

	<p>laboratory-, pilot-, or industrial-scale by using specific equipment and to interpret the collected data;</p> <p>Capacity to establish interpersonal relations in favour of team work.</p>
Job Placement, Potential Field of Professional Activity	<p>The graduate of the specialization Science and Engineering of Oxide Materials and Nanomaterials can work in: departments of production, exploitation and design of chemical plants in industrial companies; management departments of companies, particularly those in traditional and advanced ceramics, glass and binders (Portland cement, lime, plaster) industry, mortars and concretes; in consulting services at firms marketing materials and equipment specific to chemical plants and laboratories (including research) but also in every company running activities that involve chemical processes.</p> <p>On condition of promoting The Program of Psycho-Pedagogical Studies Ist Level, the holder of this certificate can work as a teacher in the compulsory pre-university educational system.</p>

Date: 27.10.2010

Signature: Assoc. Prof. Dr. Maria GOREA