

**Subject area: CHEMISTRY**

**Master program: Polymers (Part-Time)**

### **1. Educational descriptors**

The goal of the master program Polymers (Part-time) is training of the students to possess both knowledge and skills in the four basic areas of the polymer science and practice: polymer chemistry and synthesis, polymer physics and theory, biopolymers and polymer materials science.

#### **Educational objectives**

The courses ensure that the students will acquire knowledge, skills and competences for theoretical comprehension and factual understanding of the processes of obtaining and applying polymers using contemporary mathematical methods, physical models, and specific software.

#### **Professional objectives**

Learning the disciplines included in the M.Sc. program POLYMERS prepares the graduates for working as specialists in modern polymer science and provides practical knowledge and skills.

### **2. Education (knowledge, skills and competences for successful professional activities, theoretical and practical training etc).**

The part-time education in POLYMERS lasts four semesters after the bachelor degree. During the first semester there are several courses, namely: Modern chemistry of polymers, New polymer materials, and methods for their characterization as well as Macromolecular engineering (controlled polymerization processes), Polymer blends, composites and nanocomposites, Physical methods for characterisation of polymers and polymer materials, High modulus and high strength polymers, Rheology and processing of polymers, Polymer solutions, networks and gels, Water soluble polymers and polyelectrolytes. In the second semester there are a set of courses on biopolymers (Biopolymers, Biorestoreable sources polymers, Bioactive, biocompatible and pharmaceutical polymers), Physics of polymers (Phase and relaxation transitions in polymers, Theory and computer modelling of polymer systems as well as the second part of polymer material science (Polymer fibres, films and liquid crystals, Organic and Inorganic hybrid polymers, Electro- and photoactive polymers, Destruction, stabilization and recycling of polymers, Element organic polymers, Thermal analysis of polymers. There are also a study internship and a term project during the first and second semester, a Pre-thesis practicum during the third semester and a Pre-thesis practicum + Master thesis preparation during the fourth semester. The idea is that the students are assigned research projects at an earlier stage, in order to be able to enter into the respective scientific area under the supervision of their scientific advisor and thus get the opportunity to reflect, do literature survey and work on their diploma thesis during the whole period of education. The pre-thesis practicum (1) aims at students' research that eventually will become their diploma thesis. The pre-thesis practicum (2) (during the fourth semester) is provisional for completion and defence of the diploma thesis.

The total ECTS credits awarded upon successful graduation are 90. The distribution is as follows: 45 ECTS credits for the first year (I and II semester) and 22 ECTS credits for the second year (III semester). For the IV semester (second year) the distribution is 8 ECTS for pre-thesis practicum (2) and 15 ECTS credits for the diploma work defence. The respective credits are awarded after completion of every discipline (compulsory, elective, practicum, diploma thesis defence). The student must choose a minimum of four elective disciplines: one in the first, two in the second, and one in the third semester – a total of 12 ECTS credits.

### **3. Professional Qualifications**

All students who have completed the M. Sc. Program POLYMERS (part-time) are awarded the academic degree Master of Science with professional qualification „Master in Chemistry - Polymers“. The polymer courses are a substantial contribution to shaping competitive polymer specialists with state-of-the-art cognitive and practical skills. All graduates are competitive to the market demands in Bulgaria and abroad.

### **4. Professional Realization**

All graduate M.Sc. in POLYMERS (part-time) are able to work in all scientific, educational, research and trade institutions, where a degree in Chemistry is needed. In addition, the students who have completed the program POLYMERS are well qualified to continue with PhD positions in Bulgaria and all over the world. Last but not least, the obtained Master degree assures training in the field of polymers in the living matter, high technologies, and information and nano-technologies.