

1. Field of study	Materials Science and Engineering
2. Faculty	Faculty of Science and Technology
3. Academic year of entry	2019/2020 (winter term), 2020/2021 (winter term), 2021/2022 (winter term), 2022/2023 (winter term), 2023/2024 (winter term), 2024/2025 (winter term)
4. Level of qualifications/degree	second-cycle studies (in engineering)
5. Degree profile	general academic
6. Mode of study	full-time
7. ISCED code	0715 (Mechanics and metal trades)
8. Connection between the field of study and university development strategy, including the university mission	An interdisciplinary field of study "Materials Engineering" delivered on all 3 levels of education integrates very well with two strategic objectives identified in the University of Silesia Development Strategy. These are: "Innovative education and modern teaching offer" and "Active cooperation of the University with its environment". The University of Silesia is the only university in Poland offering M.Sc. studies in the field of materials engineering. A modern teaching offer includes two specialities: Materials Science and Biomaterials, which - through introduction of a number of specialisations - pave the way for individualisation of the education. A close relationship with the industry and medicine is one of priority objectives of education in this field of study, allowing students to learn the specificity of relevant branches of industry, the demand for graduates with an appropriate education, technological or inventive needs. Students of this field prepare their diploma - M.Sc. - theses in cooperation with industrial companies and enterprises operating both in the area of technology and of medicine. On the one hand this allows a better use of graduates scientific potential and on the other hand adapting the syllabus to the market needs. The skill of designing, the knowledge of manufacturing methods and of introducing new innovative materials integrates this field of study with the general trend and strategy of education directed towards the knowledge based economy.
9. Number of semesters	4
10. Degree	magister inżynier (Master's Degree with engineering competencies)
11. Specializations	Biomaterials Functional Materials Materials Science Recycling
12. The semester from which the specializations starts	1
13. Percentage share of scientific or artistic disciplines in education (along with the indication of the leading discipline)	<ul style="list-style-type: none"> • <i>[leading discipline]</i> materials engineering (engineering and technology): 100%
14. Percentage of the ECTS credits for each of the scientific or artistic disciplines to which the learning outcomes are related to the total number of ECTS credits (along with the indication of the leading discipline)	<p>Biomaterials:</p> <ul style="list-style-type: none"> • <i>[leading discipline]</i> materials engineering (engineering and technology): 100% <p>Functional Materials:</p> <ul style="list-style-type: none"> • <i>[leading discipline]</i> materials engineering (engineering and technology): 100% <p>Materials Science:</p> <ul style="list-style-type: none"> • <i>[leading discipline]</i> materials engineering (engineering and technology): 100% <p>Recycling:</p>

		<ul style="list-style-type: none"> • <i>[leading discipline]</i> materials engineering (engineering and technology): 100%
15.	Number of ECTS credits required to achieve the qualification equivalent to the level of study	Biomaterials: 120, Functional Materials: 120, Materials Science: 120, Recycling: 120
16.	Percentage of the ECTS credits for optional modules in relation to the total number of ECTS credits	Biomaterials: 44%, Functional Materials: 47%, Materials Science: 44%, Recycling: 48%
17.	Total number of ECTS credits that a student must obtain in the modules taught	Biomaterials: 104, Functional Materials: 104, Materials Science: 104, Recycling: 104
18.	Number of ECTS credits that a student must obtain in modules assigned to disciplines within the humanities or social sciences (not less than 5 ECTS) - in the case of fields of study assigned to disciplines within the fields other than, respectively, humanities or social sciences	Biomaterials: 6, Functional Materials: 6, Materials Science: 6, Recycling: 6
19.	Graduation requirements for a particular specialization	<u>Biomaterials</u> - Assessment of learning outcomes poszczególnych modules - Achievement of the required ECTS / g grid study <u>Functional Materials</u> - Assessment of learning outcomes poszczególnych modules - Achievement of the required ECTS / g grid study <u>Materials Science</u> - Assessment of learning outcomes poszczególnych modules - Achievement of the required ECTS / g grid study <u>Recycling</u>
20.	Organization of the process of obtaining a degree	<p>Students of the second year of studies, inspired by their interests, choose M.Sc. thesis supervisors after semester 1 of studies. Together with the supervisor they specify the topic, the objective, the scope of thesis and tasks to be accomplished in accordance with the formula provided below.</p> <p>The diploma obtaining is related to passing a diploma examination, consisting of two parts. The first part is related to the thesis presented by the student. It consists in the presentation of achievements resulting from the diploma thesis development and in showing the subject-matter knowledge related to the dealt topic. The second part is a knowledge exam, related to the studied speciality.</p> <p>The final mark of the diploma examination is determined by the Examination Commission in accordance with requirements included in the regulations of studies at the University of Silesia.</p>

		The M.Sc. diploma exam is taken at the Examination Commission appointed by the Deputy Dean appropriate for the field of study. The Examination Commission consists of: the chairman and minimum two members (thesis supervisor and/or tutor, thesis reviewers).
21.	Internships (hours and conditions) in the case of practical programmes and in general university programme - if such requires internship	<u>Biomaterials</u> lack of practice <u>Functional Materials</u> lack of practice <u>Materials Science</u> lack of practice <u>Recycling</u> lack of practice
22.	Total number of ECTS credits that a student must obtain in internships	Biomaterials: 0, Functional Materials: 0, Materials Science: 0, Recycling: 0
23.	Number of ECTS credits - higher than 50% of the total number of credits - that a student must obtain: <ul style="list-style-type: none"> in general university programmes within a module connected with research carried out in the scientific or artistic disciplines to develop his/her knowledge and research skills; in practical programmes within a module to develop practical skills 	Biomaterials: 100, Functional Materials: 102, Materials Science: 81, Recycling: 99
24.	General description of the programme	Materials Engineering is an interdisciplinary field of scientific-technical research, which analyses the influence of materials chemical and physical structure on their electrical, mechanical, optical, surface, chemical, magnetic and thermal properties as well as on various combinations of those properties. Materials engineering comprises a number of modern physical and chemical research techniques, which may be used to characterise both the structure and properties of materials. These techniques aim at studying the influence of structure on materials properties, in particular those, which are practically used in various technologies. This enables working out methods of obtaining materials featuring precisely defined practical properties. These studies influence not only the planned structure of end products but also help to examine and work out effective methods of their production and processing. Research carried out within the materials engineering leads to working out new materials, although it is commonly applied also to improve those already used.
25.	General description of the specialization	<u>Biomaterials</u> As part of the specialization according to the study plan are implemented appropriate specialist modules , monographic lectures and seminar programs. For the "Biomaterials" speciality a broadening of individualisation for the education path with a medical attitude was suggested by the introduction of two specialisations: "Intelligent biomaterials" and "Materials testing methods". Graduates possess an advanced knowledge in the field of biomaterials used for implants and artificial organs. They know the structure and operation of implants, artificial organs and tissues as well as the influence of physiological-biological environments on the degree of biomaterials degradation with

particular emphasis on toxicological and allergenic issues. They know advanced testing methods allowing a thorough analysis of biomaterials structure and properties. They can use the knowledge about the materials engineering and technology to prepare expert opinions on materials and to design technological processes and studies extending the use and acquisition of new materials for medical applications. The obtained comprehensive knowledge about materials engineering and in particular in the field of biomaterials predestine graduates to start a consultant activities in the area of medicine.

An interdisciplinary scope of knowledge about team management in research and industrial activities, IT systems and computer-aided engineering work, material selection and manufacturing technology systems operation is a common feature of both specialities. Graduates are prepared to take creative initiatives and decisions related to materials engineering and technologies and to carry out business on their own as well as to work in small and medium size enterprises, with special emphasis on the area combining materials engineering, medicine and veterinary science.

Functional Materials

Materials Science

Most of European universities provide fields of study in the area of "Materials Science", named: „Materials Science”, „Materials Engineering” or „Materials Science and Engineering”. These fields of study are distinguished by varying specialisations acquired by students in the field of knowledge of structure, properties and applications of specific material types. Graduates obtain the title of Master of Science (M.Sc.-) with an extension informing about the achieved specialisation, e.g.: M.Sc. – Advanced Materials, M.Sc. – Biomaterials, M.Sc. – Materials and Business, Using this experience students are offered within the "Materials Science" speciality five specialisation blocks covering various types of materials or related issues: "Nanomaterials", "Materials for medicine", "Functional materials", "Materials recycling" or "Computer modelling of materials". From this point of view a graduate of the second level has skills and advanced knowledge about materials engineering, engineering materials designing, working and processing as well as forming their properties, and also about IT applied to the materials science.

Recycling