COURSE PROGRAMME

1.	**Field of study**	**Biomedical Engineering**
2.	Academic year of entry	2018/2019 (summer term) *The number and date of a Faculty Council's resolution: 01/5.2/2019 (22.01.2019 r.)*
3.	Level of qualifications/degree	second-cycle studies (in engineering)
4.	Degree profile	general academic
5.	Mode of study	full-time
6.	ISCED code	0719 (Engineering and engineering trades, not elsewhere classified)

Learning outcomes

7.	Description of learning outcomes	Attachment no. 1
8.	Model learning outcomes	

Programme of study

9.	Connection between the field of study and university development strategy, including the university mission	Second-cycle studies in the field of biomedical engineering are a significant contribution to the achievement of the strategic objective No. 2 (Innovative education and modern teaching and research offer at the world level) and No. 3 (Active cooperation of the University with the environment), which were included in the document "Strategy for the Development of the University of Silesia in Katowice for the years 2012-2020". According to this document, the priority of the University in the field of modern education is the creation of new, interdisciplinary inter-faculty and inter-university study programs, conducted jointly with the socio-economic environment of the University. The task of the University is to provide students with comprehensive education, without neglecting knowledge and specialist skills relevant to particular fields of study. Compliance with the superior strategy automatically completes the Faculty's strategy, in particular the objective of improving the fields of study realized at the Faculty. The creation of second-cycle studies falls within this activity as a continuation of first-cycle studies.
10.	Number of semesters	3
11.	Degree	magister inżynier (Master's Degree with engineering competencies)
12.	Area (or areas - for joint or interdisciplinary studies) of education to which the programme is assigned and the leading discipline of art or science for the POL-on system	technical studies [biocybernetics and biomedical engineering]
13.	Areas, fields and disciplines of art or science to which the learning outcomes of the field of study are related, indicating the **percentage** shares in which the programme of study refer to the various fields of science	• technical studies • technology - 100% • biocybernetics and biomedical engineering
14.	Specializations	Imaging and modeling of materials for biomedical applications Modeling and simulation of biomedical systems

15.	Number of ECTS credits required to achieve the qualification equivalent to the level of study	Imaging and modeling of materials for biomedical applications: 90, Modeling and simulation of biomedical systems: 90
16.	Percentage of the ECTS credits for each of the areas to which the learning outcomes are related to the total number of ECTS credits	Imaging and modeling of materials for biomedical applications technical studies - 100% Modeling and simulation of biomedical systems technical studies - 100%
17.	Percentage of the ECTS credits for optional modules in relation to the total number of ECTS credits	Imaging and modeling of materials for biomedical applications: 61%, Modeling and simulation of biomedical systems: 61%
18.	Total number of ECTS credits that a student must obtain in the modules taught	Imaging and modeling of materials for biomedical applications: 45, Modeling and simulation of biomedical systems: 45
19.	Number of ECTS credits that a student must obtain in modules from humanities or social science areas of education (not less than 5 ECTS) - in the case of fields of study assigned to areas other than, respectively, the humanistic or social studies	Imaging and modeling of materials for biomedical applications: 6, Modeling and simulation of biomedical systems: 6
20.	Modules description (including learning outcomes, number of ECTS credits and assessment methods of the learning outcomes)	Attachment no. 2
21.	Course structure	Attachment no. 3
22.	Graduation requirements for a particular specialization	Imaging and modeling of materials for biomedical applications The conditions that must be met in order to complete studies in the field of biomedical engineering include: 1. obtaining the required learning outcomes, including getting credits and passing exams from all modules as well as obtaining the required number of ECTS points envisaged in the study plan and educational program for the whole course of education; 2. successful thesis defense in front of a board of examiners Completing studies in the field of biomedical engineering is certified by a higher education diploma. Modeling and simulation of biomedical systems The conditions that must be met in order to complete studies in the field of biomedical engineering include: 1. obtaining the required learning outcomes, including getting credits and passing exams from all modules as well as obtaining the required number of ECTS points envisaged in the study plan and educational program for the whole course of education; 2. successful thesis defense in front of a board of examiners Completing studies in the field of biomedical engineering is certified by a higher education diploma.
23.	Organization of the process of obtaining a degree	1. Second-cycle students choose a master’s thesis supervisor at the beginning of the first semester of study. 2. Students prepare their thesis (master's thesis) in accordance with the "Regulations for the preparation of diploma theses in the field

		of biomedical engineering". 3. The diploma (master's degree) exam takes place in front of a board of examiners appointed by the Institute of Computer Science of the Faculty of Computer Science and Materials Science, consisting of a chairman and two members (thesis supervisor, thesis reviewer). 4. The conditions for admission to the thesis defense and diploma exam are as follows: a. obtaining the required learning outcomes, including getting credits and passing exams from all modules as well as obtaining the required number of ECTS points envisaged in the study plan and educational program for the whole course of education for the second-cycle studies in biomedical engineering; b. submitting, by the end of the last semester, a student record book with complete entries; c. submitting copies of the diploma thesis and other documents (application, photos, etc.) in accordance with the current requirements for submitting theses at the Faculty of Computer Science and Materials Science; d. obtaining positive marks from two reviews of the thesis (from the thesis supervisor and reviewer).
24.	Internships (hours and conditions) in the case of practical programmes and in general university programme - if such requires internship	Imaging and modeling of materials for biomedical applications not applicable Modeling and simulation of biomedical systems not applicable
25.	Total number of ECTS credits that a student must obtain in internships	Imaging and modeling of materials for biomedical applications: 0, Modeling and simulation of biomedical systems: 0
26.	Number of ECTS credits - higher than 50% of the total number of credits - that a student must obtain: • in general university programmes within a module connected with research carried out in the area to develop his/her knowledge and research skills; • in practical programmes within a module connected with vocational preparation to allow a student to develop practical and social skills	Imaging and modeling of materials for biomedical applications: 84, Modeling and simulation of biomedical systems: 84
27.	Minimum staff resources and staff to student ratio	Attachment minimum staff

Additional information

28.	General description of the programme	The field of biomedical engineering (BME) is part of bioengineering sciences. The main issues it covers are as follows: medical informatics, bioinformatics, medical imaging, image processing, telemedicine, physiological signal processing, biomechanics, biomaterials, 3D modelling and biomedical optics.
29.	General description of the specialization	Imaging and modeling of materials for biomedical applications Problems related to biomaterials include: selection of materials for implants and their applications, the impact of the environment of the living organism on the implant behaviour, bioavailability, tissue reaction mechanisms, biophysical, biochemical and biomechanical requirements for implants, degradation of biomaterials, technologies of applying surface layers to implants, construction problems.

		Imaging and modelling of biomaterials enable to solve the above problems in a non-invasive way. Professional perspectives: • work in research institutions and research and development centres • work in institutions dealing with counselling and dissemination of knowledge in the field of biomedical engineering and biomaterial technology as well as computer support in technology Modeling and simulation of biomedical systems Creation of virtual models within the framework of biomedical engineering is now one of the basic activities for obtaining, for example, implants, prostheses or other objects cooperating with the human body. Graduates are able to form biomedical engineering problems, solve them through modelling, designing, developing technologies and constructions using computer techniques. Professional perspectives: • work in computer companies in the design and implementation of information systems • work in design, construction and technological units • work related to solving research and innovation problems and implementing new solutions
30.	Learning outcomes coverage matrix	Attachment no. 4

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(pieczęć i podpis Dziekana)