Study programme

Major: Mechatronic Engineering with English as instruction language

Specialty: Mechatronic Design

Table of contents

General characteristics of the major

Basic information

Faculty name:	Faculty of Mechanical Engineering and Robotics
Major name:	Mechatronic Engineering with English as instruction language
Specialty name:	Mechatronic Design
Level:	Second-cycle (engineer) programme
Profile:	General academic
Form:	Full-time studies
ISCED classification:	0714
Number of ECTS credits necessary to complete studies at a given level:	90
Professional title awarded to graduates:	magister inżynier
Cycle start date:	2022/2023, summer semester
Duration of studies (number of semesters):	3

Field of science to which the major is assigned:

Field engineering and technical sciences

Discipline of science to which the major is assigned:

Discipline	Percentage	ECTS
Mechanical engineering	80%	72
Automation, electronics and electrical engineering	13%	12
Technical computing and telecommunications	7%	6

Relationship between the major and the AGH UST development strategy and the AGH UST mission

Study speciality Mechatronic Design of Mechatronic Engineering study field was created in 2011 as a result of enhancement of the university and the faculty's educational offer. The instruction language is English.
The study is carried out according to Bologna Process basing on two-cycles of higher-education qualifications, use of the European Credit Transfer and Accumulation System (ECTS), and including international student exchange.
Mechatronic Engineering is a modern field of study answering current needs of industry and services. Graduates are prepared to solve engineering problems basing on knowledge.
The faculty continuously improves quality of education through research activity, cooperation with research and development institutions as well as companies in Poland and abroad, supporting students' placement and activity of student scientific associations focused on mechatronic engineering. Organization of study is constantly perfected, and computerized tools are being introduced to improve efficiency of services for students.

Information on taking into account the socio-economic demand while creating the study programme and indication of the assumed learning outcomes matching the identified demand

Improvement of quality of life is to appreciable extent dependent on development of economic activity that applies advanced technologies. Therefore, curriculum of Mechatronic Engineering study field aims at educating citizens showing active and ethical attitude towards their duties and specialists capable of finding employment in institutions and companies involved in development of advanced technologies concerning design, manufacturing and operation of complex mechatronic systems composed of integrated mechanisms, data processing electronic circuits, control systems and software. Learning

outcomes of the Mechatronic Engineering study comprise computer aided engineering techniques and teamwork skills. As a result of high standards demanded during the study, the graduates become valuable part of society as well as true experts in mechatronic design.

Learning paths - scope in Polish and in English

Diploma paths - scope in Polish and in English

The names of the specialties in Polish and in English

Name [pl]	Name [en]
Mechatronic Design	Mechatronic Design

General information about the study programme

Major: Mechatronic Engineering with English as instruction language
Specialty: Mechatronic Design

General information related to the study program (general learning objectives and employment opportunities, typical jobs and opportunities for graduate continuing education)

Education at Mechatronic Design speciality is oriented on solving problems of various scope and complexity level, individually or in teams in the course of project or lab classes with the use of knowledge based methods.
The students are taught with the aim of gaining:
- knowledge concerning design of integrated systems composed of cooperating mechanical, electronic, control and software components
- skill of application of computer aided engineering tools to design and testing of mechatronic systems with the use of virtual and rapid prototyping techniques
- ability of working in multidisciplinary teams as well as awareness of need for continuous perfecting of professional qualifications.
The speciality's graduates are being employed as designers and integrators of mechatronic systems, maintenance engineers or they become individual entrepreneurs.
Typical employers of the graduates are companies offering engineering services, design units, factories as well as research and development institutions.
The graduates may continue education at the Mechanical Engineering based 3rd cycle or postgraduate study in Poland or abroad.

The program is accredited by the EAC of ABET. As such, it results in the following Student Outcomes:

1. an ability to apply engineering design to produce solutions in area of complex mechatronic systems that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
2. An ability to apply virtual prototyping tools to model and simulate effectively operation of complex mechatronic systems.
3. An ability to carry out rapid prototyping of components of mechatronic systems.
4. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.
5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6. An ability to communicate effectively with a range of audiences.
7. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
8. an ability to develop and conduct appropriate experimentation, analyse and interpret data, and use engineering judgment to draw conclusions.

Information on the study programme including the conclusions from the students and graduates careers monitoring

The careers of graduates are constantly monitored by the AGH Career Center. A Unit of Monitoring of Graduates Professional Development operates within the Centre aimed at job market analysis and research activities including monitoring of graduates career paths (first destination surveys). AGH UST graduates are interviewed several times after completing their studies. From these surveys, reports are prepared containing information such as the distribution of graduate employment, the strengths and weaknesses of graduates, and respondents' comments on suggested changes in the programs. These reports are then annually submitted to the authorities of the university and faculties. Based on them, changes in the particular programs and subjects are proposed. These may include the introduction of new subjects or changes to the existing ones.

Information on the study programme taking into account the requirements and recommendations of the

accreditation committees, in particular the Polish Accreditation Committee and industry accreditation committees

Mechatronic Engineering in English is accredited by ABET. The accreditation commission did not recommend changes to the study program, but ordered to increase the emphasis on student outcome monitoring. According to the recommendations, a suitable system was developed and implemented.

Information on including examples of good practice in the study program

The Mechatronic engineering program uses combining courses into large modules, so that students would learn comprehensively and carry out multidisciplinary projects.

Information on cooperation in the preparation of the study programme with external stakeholders, in particular associations, professional and social organizations

Within the Faculty of Mechanical Engineering and Robotics, there is a Social Board, which gathers several dozen representatives of the management staff of enterprises associated with AGH. Board members are annually surveyed for the needs and requirements of graduates of Mechatronics Engineering. The results of these surveys are then analyzed and taken into account in the creation and modification of study programs.
Personal activity of teachers who cooperate with companies in research and development projects or jointly initiate and supervise students' theses as well as placements provide a source of detail information concerning expected skills of the graduates which influence gradually upgrading of curricula and introduction of appropriate software and hardware tools into educational facilities of the faculty.

Duration, rules and form of the apprenticeship

During the 2nd cycle study every student must take part in a 4 weeks individual diploma training at a company or at a university or at a research and development institution. The training is scheduled for the first 4 weeks of the 3rd semester of study according to annual schedule of courses.

Admission criteria, rules and policies

Major: Mechatronic Engineering with English as instruction language
Specialty: Mechatronic Design

Description of competences expected from the candidate applying for admission to studies

Completed the 1st cycle engineering degree (Bachelor) study.
Having Bachelor’s or Master’s degree in Engineering.
The completed study curriculum must contain 60% of basic and study field related courses corresponding to curriculum of the first cycle study in Mechatronic Engineering

Recruitment conditions, including the winners and finalists of the central level high school scientific Olympics, as well as winners of international and national contests

Recruitment is conducted in accordance with the annual Resolution of the Senate of AGH-UST concerning the admission principles and procedures for the 1st and the 2nd cycle studies

The expected limit of admissions to studies along with an indication of the minimum number of admitted candidates required to successfully launch a study cycle

Minimum number of students: 12
Maximum number of students: 30

Learning outcomes

Major : Mechatronic Engineering with English as instruction language
Specialty: Mechatronic Design

Knowledge

KEU symbol	Directional learning outcomes	CEU symbol
IMA2A_W01	knowledge of some domains of the physics necessary for understanding complex physical phenomena occurring in mechatronic systems and devices and their surroundings	P7S_WG_A
IMA2A_W02	extensive and ordered knowledge of IT techniques applied in mechatronics	P7S_WG_A
IMA2A_W03	knowledge of development trends and most important recent achievements in mechatronics and, to a lesser extent, of automatics, robotics, machine construction, electronics and IT sciences	P7S_WG_A
IMA2A_W04	knowledge and understanding of the methodology of designing complex mechatronic equipment and methods and techniques used for thier design, knowledge of computer tools for the design and simulation of mechatronic devices	P7S_WG_A
IMA2A_W05	extensive and theory-based knowledge of mechatronic systems control	P7S_WG_A
IMA2A_W06	extensive and ordered knowledge of the management of mechatronic projects	P7S_WK_A
IMA2A_W07	theory-based detailed knowledge of selected aspects of testing, modelling, designing, production and operation of mechatronic systems and devices, as well as the materials and information processing methods used	P7S_WG_A, P7S_WG_A_Inz
IMA2A_W08	knowledge of the general rules for creation and development of individual entrepreneurship	P7S_WK_A_Inz

Skills

KEU symbol	Directional learning outcomes	CEU symbol
IMA2A_U01	ability to acquire information from literature, databases and other sources, integrate, interpret and critically assess the information obtained, draw conclusions, formulate and justify opinions	P7S_UW_A
IMA2A_U02	ability to work individually or in team, to estimate the time needed to complete a task, ability to manage a small team in a manner ensuring the deadline for the task to be met	P7S_UO_A
IMA2A_U03	ability to develop detailed documentation related to the completion of an experiment, project or research activity; ability to prepare an elaboration discussing the results obtained	P7S_UK_A
IMA2A_U04	ability to prepare and give a presentation on the completion of a project or research task and conduct a discussion regarding the presentation given	P7S_UK_A
IMA2A_U05	Sufficient competence in foreign language to talk about professional topics, read and understand scientific literature, as well as to prepare and give short presentations on the completion of a project or research task	P7S_UK_A
IMA2A_U06	ability to set directions for further learning and self-education	P7S_UU_A
IMA2A_U07	ability to use methods and mathematical models – and modify them as required if necessary – to analyse and design mechatronic components, equipment and systems	P7S_UW_A_Inz_01, P7S_UW_A, P7S_UW_A_Inz_02

KEU symbol	Directional learning outcomes	CEU symbol
IMA2A_U08	ability to assess and compare design solutions or manufacturing processes of complex mechatronic devices and systems in terms of the functional and economic criteria given	P7S_UW_A_Inz_01, P7S_UW_A
IMA2A_U09	ability to formulate a design specification of a complex mechatronic system or device, taking into consideration the legal aspects, such as the protection of intellectual property and other non-technical aspects, such as environmental impact, applying, among others, the standards regulating the operation of mechatronic equipment	P7S_UW_A_Inz_01, P7S_UW_A, P7S_UW_A_Inz_02
IMA2A_U10	ability to design mechatronic systems and devices for various applications, taking into consideration the given functional and economic criteria and, if required, adjusting the existing methods or developing new methods for design and CAD and CAE tools	P7S_UW_A, P7S_UW_A_Inz_02
IMA2A_U11	ability to formulate and – using appropriate analytical, simulation and experimental tools – test hypotheses related to modelling and designing mechatronic equipment and systems or designing their manufacturing processes	P7S_UW_A_Inz_01, P7S_UW_A, P7S_UW_A_Inz_02
IMA2A_U12	ability (while formulating and solving problems related to the modelling and design of mechatronic devices and systems or designing their manufacturing process) to integrate the knowledge of electronics, electrical engineering, IT sciences, automatics, robotics, mechanics, machine construction and operation and other discipline using the system-oriented approach, bearing in mind non-technical (including economic and legal) aspects	P7S_UW_A_Inz_01, P7S_UW_A, P7S_UW_A_Inz_02
IMA2A_U13	ability to propose improvements to the existing design solutions and models of mechatronic components, devices and systems	P7S_UW_A_Inz_01, P7S_UW_A, P7S_UW_A_Inz_02
IMA2A_U14	ability to assess the usefulness of recent achievements in the domain of materials, components, methods for the design and manufacture of mechatronic systems and devices featuring innovative solutions	P7S_UW_A_Inz_01, P7S_UW_A, P7S_UW_A_Inz_02

Social competence

KEU symbol	Directional learning outcomes	CEU symbol
IMA2A_K01	ability to think and act in an enterprising and creative manner	P7S_KO_A
IMA2A_K02	understanding of the need to formulate and communicate to society, via the media, information and opinions regarding the achievements of mechatronics and other aspects of the activity of a mechatronic engineer in a commonly understandable manner, presenting different points of view	P7S_KK_A, P7S_KO_A
IMA2A_K03	awareness of the social role of a graduate of technical studies, especially as regards the need to formulate and communicate to society, via the media, information and opinions regarding the achievements of mechatronics and other aspects of the activity of a mechatronic engineer; striving to convey such information and opinions in a commonly understandable manner	P7S_KR_A

Compliance table of engineering competence (Inz) with directional learning outcomes (KEU)

Major : Mechatronic Engineering with English as instruction language
Speciality: Mechatronic Design

Knowledge

CEU symbol	Learning outcomes for qualifications including engineering competence	KEU references
P7S_WG_A_Inz	knowledge of basic processes taking place in the life cycle of technical devices, facilities and systems	IMA2A_W07
P7S_WK_A_Inz	knowledge of basic principles of creating and developing various forms of individual entrepreneurship	IMA2A_W08

Skills

CEU symbol	Learning outcomes for qualifications including engineering competence	KEU references
P7S_UW_A_Inz_01	ability to plan and carry out experiments, including measurements and computer simulations as well as to interpret the obtained results and draw conclusions out of them. When identifying and formulating the specification of engineering problems and solving them, being able to: - use analytical, simulation and experimental methods; - recognize their systemic and non-technical aspects, including ethical connotations; - conduct a preliminary economic assessment of the proposed solutions and planned engineering activities; - perform a critical analysis of the functioning of existing technical solutions to further evaluate them;	IMA2A_U07, IMA2A_U08, IMA2A_U09, IMA2A_U11, IMA2A_U12, IMA2A_U13, IMA2A_U14
P7S_UW_A_Inz_02	ability to design solutions in compliance with the given specification as well as being able to: create simple devices, facilities and systems typical for the study major or implement processes using skillfully chosen methods, techniques, tools and materials	IMA2A_U07, IMA2A_U09, IMA2A_U10, IMA2A_U11, IMA2A_U12, IMA2A_U13, IMA2A_U14

Directional outcomes coverage matrix

Major: Mechatronic Engineering with English as instruction language
Specialty: Mechatronic Design

2022/2023/S/IIi/IMiR/IMA/MD

Subject	Code	Semestr	IMA2A_W01	IMA2A_W02	IMA2A_W03	IMA2A_W04	IMA2A_W05	IMA2A_W06	IMA2A_W07	IMA2A_W08	IMA2A_U01	IMA2A_U02	IMA2A_U03	IMA2A_U04	IMA2A_U05	IMA2A_U06	IMA2A_U07	IMA2A_U08	IMA2A_U09	IMA2A_U10	IMA2A_U11	IMA2A_U12	IMA2A_U13	IMA2A_U14	IMA2A_K01	IMA2A_K02	IMA2A_K03
Management engineering	RIMAMDS.IIi1HS.5da9fa5ac8549dbf93b8729412ac132b.22	1						x			x				x												
Ergonomy	RIMAMDS.IIi1HS.df85a2aeebe1e4770933895f6a3071b4.22	1							x		x							x							x		
Company management	RIMAMDS.IIi1HS.3ce645fb3a7f49b8f01fc8523d31b934.22	1						x		x		x															
Mechatronic system indentification	RIMAMDS.IIi1K.ef47afa2811b3758164b8fd249ffa38a.22	1	x						x		x						x				x	x					
Kinematics and dynamics of mechatronic systems	RIMAMDS.IIi1K.ab2f5abcbb6efbad0bd1b27624e54fe5.22	1				x			x			x	x				x										
Mechatronics	RIMAMDS.IIi1K.1112faafc7117d8ab54b1d1aa00f55a9.22	1				x													x							x	
Informatics in mechatronics	RIMAMDS.IIi1K.b6360b2210dc9273a51402ab3f852335.22	1		x															x	x		x					

Subject	Code	Semestr	IMA2A_W01	IMA2A_W02	IMA2A_W03	IMA2A_W04	IMA2A_W05	IMA2A_W06	IMA2A_W07	IMA2A_W08	IMA2A_U01	IMA2A_U02	IMA2A_U03	IMA2A_U04	IMA2A_U05	IMA2A_U06	IMA2A_U07	IMA2A_U08	IMA2A_U09	IMA2A_U10	IMA2A_U11	IMA2A_U12	IMA2A_U13	IMA2A_U14	IMA2A_K01	IMA2A_K02	IMA2A_K03
English B2+ course - compulsory ESP course for students of SECOND-CYCLE STUDIES in MECHATRONICS with ENGLISH as the instruction language at the Faculty of Mechanical Engineering and Robotics	RIMAMDS.IIi2JO.ef4557fa02b1ccf0f1bd0a9191bdbc2f.22	2													x												
English B2+ course - compulsory course for students of SECOND-CYCLE STUDIES	RIMAMDS.IIi2JO.5ecdcd70c5f967f68d851387d4713913.22	2									x				x												
English B2+ course - compulsory course for students of SECOND-CYCLE STUDIES at the Faculty of Computer Science, Electronics and Telecommunications (Computer Science)	RIMAMDS.IIi2JO.ff5757b98a7d5ad732f45e4c01bbb9e5.22	2									x		x		x												
Smart materials and structures	RIMAMDS.IIi2PJO.75c9c864dbfb6274be54a7503b5e1b9e.22	2	x		x	x			x		x	x	x	x			x							x	x	x	
3D printing technology	RIMAMDS.IIi2PJO.a9420442277e20c671a67f6f286b2faa.22	2			x	x			x			x					x	x		x			x	x	x	x	
MEMS fabrication systems	RIMAMDS.IIi2PJO.1181479c360138ff3c9c888a6aaa48c3.22	2	x						x								x										

Subject	Code	Semestr	IMA2A_W01	IMA2A_W02	IMA2A_W03	IMA2A_W04	IMA2A_W05	IMA2A_W06	IMA2A_W07	IMA2A_W08	IMA2A_U01	IMA2A_U02	IMA2A_U03	IMA2A_U04	IMA2A_U05	IMA2A_U06	IMA2A_U07	IMA2A_U08	IMA2A_U09	IMA2A_U10	IMA2A_U11	IMA2A_U12	IMA2A_U13	IMA2A_U14	IMA2A_K01	IMA2A_K02	IMA2A_K03
Mechatronic systems	RIMAMDS.IIi2K.b2212a1046562442ca34e164ab2fc780.22	2			x	x					x	x	x	x	x			x	x	x	x	x	x	x	x		x
Mechatronic design	RIMAMDS.IIi2K.b9b04e35dacca7185105bf5accebae6d.22	2	x	x		x			x								x			x	x		x	x	x			
Individual research project related to mechatronic design	RIMAMDS.IIi2K.fddc8b412e3fbdce845e32a9fe38f98b.22	2	x		x				x		x		x	x	x		x			x		x			x	x	
Electronics in mechatronics	RIMAMDS.IIi2K.21de89247e43b7693594928121ceed9f.22	2				x			x		x	x		x			x		x							x		
Design of composite parts	RIMAMDS.IIi4S.e235cf0f5046b57507f20a29d9225d77.22	3	x			x			x		x		x	x			x	x		x	x		x	x				
Operation and maintenance of mechatronic devices	RIMAMDS.IIi4S.0f9927bdddfabf8e869a5e0e8cdd3e70.22	3	x		x				x																			
Embedded systems	RIMAMDS.IIi4S.228078523cb7f097ecc55879565d142c.22	3		x													x			x	x		x		x			
Diploma Training	RIMAMDS.IIi4K.f00878b72b1aae627be56073cdece963.22	3				x			x			x	x	x											x	x	
Diploma Thesis	RIMAMDS.IIi4K.e53bc1ffec52171870fc55d1cec2fa6a.22	3	x	x	x	x	x	x	x		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
Project management	RIMAMDS.IIi4HS.8a38ca14dfd6a4112fda620666db2f11.22	3						x		x								x	x						x		
MEMS and nanotechnology	RIMAMDS.IIi4K.07b7a2f01a9cf93f1023f15453228f06.22	3	x						x								x										
Diploma Seminar	RIMAMDS.IIi4S.113e607328fe3b1feac36d5c37a13bcd.22	3	x	x	x	x	x	x	x		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Sum (elective):			5	2	4	4	1	3	7	1	7	4	4	3	5	1	6	4	1	4	3	1	4	4	5	3	0
Sum (obligatory):			5	3	3	7	1	2	8	1	5	5	5	5	3	1	7	3	6	5	4	5	3	3	7	4	2
Sum:			10	5	7	11	2	5	15	2	12	9	9	8	8	2	13	7	7	9	7	6	7	7	12	7	2

Characteristics matrix of learning outcomes in relation to modules

Major: Mechatronic Engineering with English as instruction language
Speciality: Mechatronic Design

2022/2023/S/IIi/IMiR/IMA/MD

Subject	Code	Semestr	P7S_WG_A	P7S_WK_A	P7S_WG_A_Inz	P7S_WK_A_Inz	P7S_UW_A	P7S_UO_A	P7S_UK_A	P7S_UU_A	P7S_UW_A_Inz_01	P7S_UW_A_Inz_02	P7S_KO_A	P7S_KK_A	P7S_KR_A
Management engineering	RIMAMDS.IIi1HS.5da9fa5ac8549dbf93b8729412ac132b.22	1		x			x		x						
Ergonomy	RIMAMDS.IIi1HS.df85a2aeebe1e4770933895f6a3071b4.22	1	x		x		x				x		x		
Company management	RIMAMDS.IIi1HS.3ce645fb3a7f49b8f01fc8523d31b934.22	1		x		x		x							
Mechatronic system indentification	RIMAMDS.IIi1K.ef47afa2811b3758164b8fd249ffa38a.22	1	x		x		x				x	x			
Kinematics and dynamics of mechatronic systems	RIMAMDS.IIi1K.ab2f5abcbb6efbad0bd1b27624e54fe5.22	1	x		x		x	x	x		x	x			
Mechatronics	RIMAMDS.IIi1K.1112faafc7117d8ab54b1d1aa00f55a9.22	1	x				x				x	x	x	x	
Informatics in mechatronics	RIMAMDS.IIi1K.b6360b2210dc9273a51402ab3f852335.22	1	x				x				x	x			
English B2+ course - compulsory ESP course for students of SECOND-CYCLE STUDIES in MECHATRONICS with ENGLISH as the instruction language at the Faculty of Mechanical Engineering and Robotics	RIMAMDS.IIi2JO.ef4557fa02b1ccf0f1bd0a9191bdbc2f.22	2							x						
English B2+ course - compulsory course for students of SECOND-CYCLE STUDIES	RIMAMDS.IIi2JO.5ecdcd70c5f967f68d851387d4713913.22	2					x		x						
English B2+ course - compulsory course for students of SECOND-CYCLE STUDIES at the Faculty of Computer Science, Electronics and Telecommunications (Computer Science)	RIMAMDS.IIi2JO.ff5757b98a7d5ad732f45e4c01bbb9e5.22	2					x		x						

Subject	Code	Semestr	P7S_WG_A	P7S_WK_A	P7S_WG_A_Inz	P7S_WK_A_Inz	P7S_UW_A	P7S_UO_A	P7S_UK_A	P7S_UU_A	P7S_UW_A_Inz_01	P7S_UW_A_Inz_02	P7S_KO_A	P7S_KK_A	P7S_KR_A
Smart materials and structures	RIMAMDS.IIi2PJO.75c9c864dbfb6274be54a7503b5e1b9e.22	2	x		x		x	x	x		x	x	x	x	
3D printing technology	RIMAMDS.IIi2PJO.a9420442277e20c671a67f6f286b2faa.22	2	x		x		x	x			x	x	x	x	
MEMS fabrication systems	RIMAMDS.IIi2PJO.1181479c360138ff3c9c888a6aaa48c3.22	2	x		x		x				x	x			
Mechatronic systems	RIMAMDS.IIi2K.b2212a1046562442ca34e164ab2fc780.22	2	x				x	x	x		x	x	x		x
Mechatronic design	RIMAMDS.IIi2K.b9b04e35dacca7185105bf5accebae6d.22	2	x		x		x				x	x	x		
Individual research project related to mechatronic design	RIMAMDS.IIi2K.fddc8b412e3fbdce845e32a9fe38f98b.22	2	x		x		x		x		x	x	x	x	
Electronics in mechatronics	RIMAMDS.IIi2K.21de89247e43b7693594928121ceed9f.22	2	x		x		x	x	x		x	x	x		
Design of composite parts	RIMAMDS.IIi4S.e235cf0f5046b57507f20a29d9225d77.22	3	x		x		x		x		x	x			
Operation and maintenance of mechatronic devices	RIMAMDS.IIi4S.0f9927bdddfabf8e869a5e0e8cdd3e70.22	3	x		x										
Embedded systems	RIMAMDS.IIi4S.228078523cb7f097ecc55879565d142c.22	3	x				x				x	x	x		
Diploma Training	RIMAMDS.IIi4K.f00878b72b1aae627be56073cdece963.22	3	x		x			x	x				x	x	
Diploma Thesis	RIMAMDS.IIi4K.e53bc1ffec52171870fc55d1cec2fa6a.22	3	x	x	x		x	x	x	x	x	x	x	x	
Project management	RIMAMDS.IIi4HS.8a38ca14dfd6a4112fda620666db2f11.22	3		x		x	x				x	x	x		
MEMS and nanotechnology	RIMAMDS.IIi4K.07b7a2f01a9cf93f1023f15453228f06.22	3	x		x		x				x	x			
Diploma Seminar	RIMAMDS.IIi4S.113e607328fe3b1feac36d5c37a13bcd.22	3	x	x	x		x	x	x	x	x	x	x	x	x
Sum (elective):			8	3	7	1	10	4	7	1	7	6	5	3	0
Sum (obligatory):			11	2	8	1	11	5	6	1	11	11	8	4	2
Sum:			19	5	15	2	21	9	13	2	18	17	13	7	2

Matrix of directional learning outcomes with related forms of classes and the method of testing

Major: Mechatronic Engineering with English as instruction language
Speciality: Mechatronic Design

2022/2023/S/IIi/IMiR/IMA/MD

Name of the module	Activity	Method of verification and assessment of learning outcomes achieved by the student in individual forms of classes and activities for the entire module	KEU references
Management engineering	Lecture	Test, Project, Scientific paper	IMA2A_W06, IMA2A_U01, IMA2A_U05
Ergonomy	Lecture	Activity during classes, Participation in a discussion, Scientific paper, Involvement in teamwork, Presentation	IMA2A_W07, IMA2A_U01, IMA2A_U08, IMA2A_K01
Company management	Lecture	Activity during classes, Test results	IMA2A_W08, IMA2A_W06, IMA2A_U02
Mechatronic system indentification	Lecture, Laboratory classes, Project classes	Execution of exercises, Execution of a project, Execution of laboratory classes, Project, Examination, Report, Test results, Completion of laboratory classes, Execution of exercises, Execution of a project, Execution of laboratory classes, Project, Examination, Report, Test results, Completion of laboratory classes, Execution of exercises, Execution of a project, Execution of laboratory classes, Project, Examination, Report, Test results, Completion of laboratory classes	IMA2A_W07, IMA2A_W01, IMA2A_U12, IMA2A_U07, IMA2A_U11, IMA2A_U01
Kinematics and dynamics of mechatronic systems	Lecture, Laboratory classes, Project classes	Execution of laboratory classes, Project, Examination, Report, Execution of laboratory classes, Report, Execution of laboratory classes, Project, Report	IMA2A_W04, IMA2A_W07, IMA2A_U02, IMA2A_U03, IMA2A_U07
Mechatronics	Lecture, Laboratory classes, Project classes	Execution of a project, Execution of laboratory classes, Examination, Engineering project, Execution of a project, Execution of laboratory classes, Engineering project, Execution of a project, Execution of laboratory classes, Engineering project	IMA2A_W04, IMA2A_U09, IMA2A_K02
Informatics in mechatronics	Lecture, Laboratory classes, Project classes	Execution of a project, Execution of laboratory classes, Test, Test results, Execution of a project, Execution of laboratory classes, Test, Test results, Execution of a project, Execution of laboratory classes, Test, Test results	IMA2A_W02, IMA2A_U09, IMA2A_U10, IMA2A_U12

Name of the module	Activity	Method of verification and assessment of learning outcomes achieved by the student in individual forms of classes and activities for the entire module	KEU references
English B2+ course - compulsory ESP course for students of SECOND-CYCLE STUDIES in MECHATRONICS with ENGLISH as the instruction language at the Faculty of Mechanical Engineering and Robotics	Foreign language classes	Activity during classes, Participation in a discussion, Execution of exercises, Test, Examination, Report, Scientific paper, Test results, Essays written during classes, Presentation	IMA2A_U05
English B2+ course - compulsory course for students of SECOND-CYCLE STUDIES	Foreign language classes	Activity during classes, Participation in a discussion, Execution of exercises, Test, Examination, Report, Scientific paper, Test results, Essays written during classes, Presentation	IMA2A_U01, IMA2A_U05
English B2+ course - compulsory course for students of SECOND-CYCLE STUDIES at the Faculty of Computer Science, Electronics and Telecommunications (Computer Science)	Foreign language classes	Activity during classes, Participation in a discussion, Execution of exercises, Test, Examination, Report, Scientific paper, Test results, Essays written during classes, Presentation	IMA2A_U01, IMA2A_U05, IMA2A_U03
Smart materials and structures	Lecture, Laboratory classes, Project classes	Execution of a project, Execution of laboratory classes, Test, Report, Activity during classes, Participation in a discussion, Execution of a project, Execution of laboratory classes, Test, Report, Involvement in teamwork, Activity during classes, Participation in a discussion, Execution of a project, Execution of laboratory classes, Test, Report, Involvement in teamwork	IMA2A_W01, IMA2A_W03, IMA2A_W04, IMA2A_W07, IMA2A_U07, IMA2A_U14, IMA2A_U01, IMA2A_U02, IMA2A_U03, IMA2A_U04, IMA2A_K01, IMA2A_K02
3D printing technology	Lecture, Laboratory classes	Execution of laboratory classes, Test, Report, Activity during classes, Participation in a discussion, Execution of laboratory classes, Report, Involvement in teamwork	IMA2A_W03, IMA2A_W04, IMA2A_W07, IMA2A_U02, IMA2A_U07, IMA2A_U10, IMA2A_U13, IMA2A_U14, IMA2A_U08, IMA2A_K01, IMA2A_K02
MEMS fabrication systems	Lecture, Laboratory classes	Test results, Completion of laboratory classes, Execution of laboratory classes, Test results, Completion of laboratory classes	IMA2A_W01, IMA2A_W07, IMA2A_U07

Name of the module	Activity	Method of verification and assessment of learning outcomes achieved by the student in individual forms of classes and activities for the entire module	KEU references
Mechatronic systems	Lecture, Project classes	Participation in a discussion, Execution of a project, Project, Examination, Presentation, Activity during classes, Participation in a discussion, Execution of a project, Project, Examination, Presentation	IMA2A_W03, IMA2A_W04, IMA2A_U02, IMA2A_U03, IMA2A_U04, IMA2A_U09, IMA2A_U10, IMA2A_U12, IMA2A_U08, IMA2A_U13, IMA2A_U14, IMA2A_U11, IMA2A_U01, IMA2A_U05, IMA2A_K01, IMA2A_K03
Mechatronic design	Lecture, Laboratory classes, Project classes	Activity during classes, Participation in a discussion, Test, Project, Examination, Report, Test, Project, Presentation, Test, Project, Presentation	IMA2A_W02, IMA2A_W04, IMA2A_W07, IMA2A_W01, IMA2A_U07, IMA2A_U10, IMA2A_U11, IMA2A_U13, IMA2A_U14, IMA2A_K01
Individual research project related to mechatronic design	Project classes	Project, Report	IMA2A_W03, IMA2A_W07, IMA2A_W01, IMA2A_U03, IMA2A_U04, IMA2A_U05, IMA2A_U07, IMA2A_U10, IMA2A_U12, IMA2A_U01, IMA2A_K02, IMA2A_K01
Electronics in mechatronics	Lecture, Laboratory classes	Execution of laboratory classes, Report, Involvement in teamwork, Completion of laboratory classes	IMA2A_W04, IMA2A_W07, IMA2A_U01, IMA2A_U02, IMA2A_U04, IMA2A_U07, IMA2A_U09, IMA2A_K01
Design of composite parts	Lecture, Laboratory classes	Activity during classes, Activity during classes, Execution of laboratory classes, Test, Engineering project	IMA2A_W01, IMA2A_W07, IMA2A_W04, IMA2A_U01, IMA2A_U07, IMA2A_U08, IMA2A_U11, IMA2A_U10, IMA2A_U14, IMA2A_U03, IMA2A_U04, IMA2A_U13
Operation and maintenance of mechatronic devices	Lecture, Laboratory classes, Seminars	Test, Presentation, Test, Presentation, Test, Presentation	IMA2A_W07, IMA2A_W03, IMA2A_W01
Embedded systems	Lecture, Laboratory classes	Execution of laboratory classes, Test results, Execution of laboratory classes, Test results	IMA2A_W02, IMA2A_U07, IMA2A_U10, IMA2A_U11, IMA2A_U13, IMA2A_K01
Diploma Training	Thesis-internship programme	Report on completion of a practical placement, Confirmation of completion of practical placement programme	IMA2A_W04, IMA2A_W07, IMA2A_U02, IMA2A_U03, IMA2A_U04, IMA2A_K01, IMA2A_K02

Name of the module	Activity	Method of verification and assessment of learning outcomes achieved by the student in individual forms of classes and activities for the entire module	KEU references
Diploma Thesis	Diploma Thesis	Diploma thesis preparation	IMA2A_W01, IMA2A_W02, IMA2A_W03, IMA2A_W04, IMA2A_W05, IMA2A_W06, IMA2A_W07, IMA2A_U01, IMA2A_U02, IMA2A_U03, IMA2A_U04, IMA2A_U05, IMA2A_U06, IMA2A_U07, IMA2A_U08, IMA2A_U09, IMA2A_U10, IMA2A_U11, IMA2A_U12, IMA2A_U13, IMA2A_U14, IMA2A_K01, IMA2A_K02
Project management	Lecture, Laboratory classes, Seminars	Activity during classes, Activity during classes, Activity during classes	IMA2A_W06, IMA2A_W08, IMA2A_U09, IMA2A_U08, IMA2A_K01
MEMS and nanotechnology	Lecture, Laboratory classes	Execution of laboratory classes, Test results, Execution of laboratory classes, Test results	IMA2A_W01, IMA2A_W07, IMA2A_U07
Diploma Seminar	Seminars	Review of a thesis, Diploma thesis preparation	IMA2A_W01, IMA2A_W02, IMA2A_W03, IMA2A_W04, IMA2A_W05, IMA2A_W06, IMA2A_W07, IMA2A_U01, IMA2A_U02, IMA2A_U03, IMA2A_U04, IMA2A_U05, IMA2A_U06, IMA2A_U07, IMA2A_U08, IMA2A_U09, IMA2A_U10, IMA2A_U11, IMA2A_U12, IMA2A_U13, IMA2A_U14, IMA2A_K01, IMA2A_K02, IMA2A_K03

ECTS credits calculations

Major: Mechatronic Engineering with English as instruction language
Specialty: Mechatronic Design

The total number of ECTS credits the student needs to obtain in the form of:

classes conducted with the direct participation of academic teachers or other persons conducting classes	61
core science classes relevant to a given major	0
practical classes, developing practical skills, including laboratory, design, practical and workshop classes	39
classes subject to choice by the student (in the amount of not less than 30% of the number of ECTS points necessary to obtain qualifications corresponding to the level of education)	59
classes in the field of humanities or social sciences - in the case of fields of study assigned to disciplines within fields other than humanities or social sciences, respectively	5
foreign language classes	2
apprenticeships	2
classes related to the academic activity conducted at the University in the discipline or disciplines to which the field of study is assigned, in the amount greater than 50% of the number of ECTS points required to complete studies at a given level, taking into account the participation of students in classes preparing to conduct scientific activity or participate in this activity (applies only to studies with a general academic profile)	72
classes shaping practical skills in the amount greater than 50% of the number of ECTS points required to complete studies at a given level (applies only to studies with a practical profile)	

Detailed rules of the implementation of the study programme estabilished by the Dean of the Faculty (the so-called Study Rules)

Major: Mechatronic Engineering with English as instruction language
Specialty: Mechatronic Design

Enrollment rules for the next semester

According to the AGH University of Science and Technology Study Regulations (can be downloaded from https://international.agh.edu.pl/).

Enrollment rules for the next semester as a part of the so-called ECTS credits debt ceiling

Students may register for the next semester if their total ECTS point deficit does not exceed the admissible amount:
2nd semester registration - 12 ECTS
3rd semester registration - 6 ECTS

ECTS credits debt ceiling

6

Organization of classes within the so-called blocks of classes (i.e. such organization of subjects or individual forms of classes that creates exceptions to the cyclical nature of classes in particular weeks of a given semester of studies)

There are no blocks of courses available

Monitoring semesters

Study rules in case of the individual organization of studies approved for a specific student

Individual studies are supervised by associate or full professors.
It is required to achieve at least 4.5 average study grade. It is recommended to possess additional achievements (like publications, activity in student associations, community service, awards).
The syllabus of individual studies is composed of modules taken from approved study syllabi and non-approved individual modules. The non-approved modules must be approved by the Faculty Council. Finally, the dean approves every individual study syllabus.

Implementation of apprenticeships including monitoring system and completion rules

The scope of the diploma training corresponds to the thesis subject. The thesis supervisor oversees the choice of the training place and scope as well as gives the training credit. It is admissible to obtain the training credit for placement completed during the study before the 3rd semester.

Rules of elective modules taking

Principles concerning choice of elective modules are stated in a Syllabus of the Master’s studies in Mechatronic Engineering.

Rules of study paths, diploma paths, specialty choice/eligibility

Choice of study speciality is carried out during registration for study prior the 1st semester. The qualification bases on the completed 1st cycle study final grade.

Rules related to the preparation of diploma projects and theses as well as the implementation of the degree granting

Process of getting Master's degree is carried out according to the AGH University of Science and Technology Study Regulations (can be downloaded from https://international.agh.edu.pl/). Students take the diploma exam, prepare and defend the degree thesis.

Principles for determining the overall evaluation of graduation (the final grade)

The general result of graduation is calculated as the sum of: 0.6 of the average of grades obtained during studies + 0.3 of the final grade of the diploma thesis and + 0.1 of the grade of the diploma exam.

Other requirements related to the implementation of the study programme resulting from the AGH UST Study Regulations or other regulations in force at the University