Mechatronic Engineering
Program update 2025

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General idea

Mechatronic engineer will never be as competent in electronics, mechanical engineering or control as graduates from dedicated programs. Let him then specialize in ***interdisciplinarity*** *understood as* ***ability to apply specialized knowledge within interdisciplinary teams***

New program structure

1st semester: *Choice of specialization path. „Core" subjects required for all the paths. Assembly of interdisciplinary teams that will be working on master projects combined from complementary master topics*

2nd semester : *Three specialization paths: Sensors and electronics, Modeling and design, Information engineering – path is aligned with individual master topic*

3rd semester: *Master thesis preparation, „soft" specialization: science or industry*

1st semester

2 ECTS - **Specialized English Course**

2 ECTS – **„Soft skills" elective subjects**

Interpersonal communication *Toolbox for assertive communication, learning constructive feedback, solving conflicts, etc.*	**Time and attention management** *Toolbox for organization of your own time – increasing efficiency and focus, learning systems for perfectionism/procrastination balance, etc.*	**Tutoring in Mechatronics** *Individual research work in cooperation with selected AGH Academic Tutors: development of critical thinking skills and problem-solving approaches*

2 ECTS – **Masters project organization** (*L. Pieczonka*)

- *Assembly of master project teams, selection of supervisors and complementary master projects (there is a possibility of working individually as well)*
- *Learning project organization methodologies, communication and task assignment, milestones, etc. – Choice of a specialization path in cooperation with the supervisor*

4 ECTS – **Generative AI usage and prompt engineering** *(E. Brzychczy)*

- *Learning ethical and efficient usage of GenAI tools and methods, with focus on text generation and editing, literature surveys, abstracting and information acquisition, including also generation of graphics*

1st semester

8 ECTS – **Mechatronic Systems** *(M. Petko)*

- *Interdisciplinary mechatronic project (e.g. „manipulator design”)*
- *Chance to field-test project management knowledge and test workflow within teams*

8 ECTS – **Signal processing applied in science and technology** *(Ł. Ambroziński)*

- *Practical usage of 1st stage engineering knowledge applied to solving various real-life problems based on literature and technical reports*
- *Learning skills for reading technical and scientific documentation for the purpose of experiment recreation*

4 ECTS – **Mechatronic pathways** *(P. Pyzik, Ł. Ambroziński)*

- *Learning different contexts of mechatronic work*
- *Meetings with representatives of industry, science and entrepreneurship (startups)*
- *Attendance to selected department seminars, laboratories related to state-of-the-art projects*
- *Organization of specialized consultations (individual, for people interested in particular topics)*

2nd semester (specialization paths)

7 ECTS – **Individual Research Project** *(in cooperation with supervisor)*

	Modeling and design	Electronics and sensors	Information engineering
5 ECTS	Mechatronic design	Analogue electronics	Informatics in Mechatronics
5 ECTS	Smart materials and structures	Microprocessor control systems	Practical data science project & engineering statistics
5 ECTS	3D printing technology	Data acquisition and wire communication systems	Operation and maintenance of mechatronic devices
5 ECTS	Kinematics and dynamics of mechatronic structures	Telemetry, Wireless and satelllite communication	Advanced AI models in engineering
3 ECTS	Design of composite parts	Embedded systems	Uncertainty analysis in engineering

3rd semester

20 ECTS – **Diploma thesis** *(in cooperation with supervisor)*

2 ECTS – **Diploma training**

1 ECTS – **Diploma seminar**

2 ECTS – **Professional presenting and documentation** *(K. Mendrok)*

- *Tools and skills necessary for professional presenting (including highlights for: business, lecture, conference, diploma presentation, etc.)*
- *Tools and skills for proffessional documentation assembly (including aestethics, requirements and software)*

	„Scientific path”	**„Industrial path”**
2 ECTS	***Scientific method and data interpretation*** *p-value, hypothesis testing, cognitive biases, experimental design*	**Company management** *Company structure, planning and scheduling, documentation for startups*
3 ECTS	**Scientific article writing** *Nature masterclass, paper structure, first self-written paper*	**Ergonomy** *learn how to design products that are easy to use*

Quality of life changes & Misc

1) *We want to have different specializations organized in different sections of the week: one path Monday – Wednesday, another Wednesday – Friday, final – 5 days but only evenings, etc. – to enable part-time work during studies*

2) *2nd semester, being entirely „specialization focused", allows for alternative learning paths: e.g. Erasmus or taking selected semesters for different specializations*

3) *Consistency in „specialization courses ECTS" allows for individual specialization path assembly, if particular master topic requires it*

A survey!