

Master of Science in Mechatronics Engineering

Profile of the Study Program

The Engineering Faculty at GIU offers a vivid environment for research and teaching. An excellent national and international faculty is committed to a curriculum with a broad spectrum of courses in Mechatronics Engineering. It aims at providing academic excellence through an interdisciplinary education in the fields of Robotics, Autonomous Systems, Sensor Technology, and Renewable Energy with the aim to prepare graduate students for careers in industry, academia and research (local, regional and global).

The study program Master of Science in Mechatronics Engineering contributes to the university's mission of providing an anchor for cooperation with German partners and partner universities abroad through research-oriented professorships and contemporary study programs, thus opening new possibilities for knowledge transfer, students exchange, making significant contributions to international cooperation between science and industry. The overall study program objectives are to graduate scientists and engineers who:

- Have broad knowledge in both the theoretical and the practical skills of mechatronics as an interdisciplinary field
- Integrate fundamental and advanced knowledge to solve complex interdisciplinary problems in mechatronics field
- Have the abilities to conduct independent innovative research. This includes the ability to formulate research questions, design scientific experiments or scientific simulation, provide a simulation of the problem or build mathematical models.
- Analyze and document results as well as apply and communicate the results reflecting knowledge depth of the research in mechatronics field
- Work independently as well as collaboratively within interdisciplinary teams to undertake interdisciplinary research, and be prepared to be team leaders
- Demonstrate competitive professional advancement with the option to pursue higher graduate degrees and engage in advanced research in areas of their interest within the industry, research centers, and academia both in the local and global environment

The qualification goals of the graduate study program in Mechatronics are:

- Identifying opportunities to streamline operations or workflows through automation or integration with other systems
- Designing and testing prototypes of mechatronic devices for internal use of the organization

- Designing and testing product prototypes with the intent of selling to a consumer
- Troubleshooting and supporting various mechatronic systems and devices that exist within the organization
- Developing computer-driven systems and controls for use within the organization, such as a warehouse control system (WCS), enterprise resource planning (ERP) systems, and various sensing and control systems
- Conducting feasibility studies to understand the potential return on investment (ROI) of various mechatronic solutions and implementing these solutions successfully
- Conducting modelling, simulation and analysis of engineering systems.
- Demonstrate that she/he can perform a scientific task independently using scientific methods
- Practicing continuous knowledge enhancement with a view to lifelong learning.
- Communicate a specified research task and analyze achieved results, discuss and draw conclusions.
- Be employed upon graduation in positions that utilize their advanced engineering education or enter PhD programs in engineering to further refine their skills.

The teaching methods include a balanced mix between research-oriented projects and practical tasks. After finalizing the courses, the students write their thesis under the supervision of a PhD holder. Interdisciplinary research and collaboration with partner universities are strongly encouraged. The highest quality standards are enforced to ensure the research produced has a clear scientific value. All teaching and research activities in this program are conducted using the English language.

The target group of the study program are mainly students from abroad who seek German university education provided in English language. The Faculty offers also a double degree program in cooperation with the Mechatronics Engineering department of the German University in Cairo.

Curriculum

First Semester

	Code	No.	Name	SWH ¹			ECTS
				L ²	E ³	P ⁴	
1	MCTR	M102	Robotics	2	2	0	6
2	MCTR	M103	Advanced Mechatronics Engineering	2	2	0	7
3	ELCT	M103	Sensor Technology	2	2	0	5
4	HUMA	M101	Legislation, Contracts & Engineering Ethics	2	0	0	2
5	XXXX	xxx	Elective 1	2	2	0	5
6	XXXX	xxx	Elective 2	2	2	0	5
Total				12	10	0	30

Second Semester

	Code	No.	Name	SWH			ECTS
				L	E	P	
1	MCTR	M202	Autonomous Systems	2	2	0	6
2	HUMA	M202	Project Management	2	2	0	4
3	XXXX	xxxx	Elective 1	2	2	0	5
4	XXXX	xxxx	Elective 2	2	2	0	5
5	XXXX	xxxx	Elective 3	2	2	0	5
6	XXXX	xxxx	Elective 4	2	2	0	5
Total				12	12	0	30

Third Semester

	Code	No.	Name	Hours	ECTS
1	MCTR	M301	Master Thesis	6 Months	30

Electives are to be selected from updated list per semester.

¹ SWH = Semester Week Hours

² L = Lecture

³ E = Exercise

⁴ P = Practical Course