Mechatronics, 2. cycle master study programme

1 General description of the programme

The second cycle program mechatronics is a university two years program with several subjects which can be divided into three main groups. In the first group are basic science subjects, in the second group specific engineering subjects and in the third group non-technical subjects. The program provides in the second year a specific subject Project where students are motivated for solving real mechatronic tasks on relatively high level. These projects works are normally extended into the master thesis. The university master program Mechatronics "weights" 120 ECTS.

2 Short description of the study modules

The program has no modules.

3 General learning outcomes and competencies of the students

- a critical awareness of the forefront of mechatronics;
- the ability to solve problems in mechatronics that are unfamiliar, incompletely defined, and have competing specifications;
- the ability to formulate and solve problems in new and emerging areas of mechatronics;
- an ability to use creativity to develop new and original ideas and methods;
- an ability to use their engineering judgment to work with complexity, technical uncertainty and incomplete information;
- the ability to identify, locate and obtain required data;
- the ability to critically evaluate data and draw conclusions;
- the comprehensive understanding of applicable techniques and methods, and of their limitations;
- a knowledge of the non-technical implication of engineering practice;
- function effective as leader of a team that may be composed of different disciplines and level.

4 The main subject-specific learning outcomes and competencies of the students

The main subject-specific competencies that can be obtained by the master study programme of Mechatronics.

- the ability to design the most complex mechatronic systems, machines and plants.
- the ability to organise the design and control of a complex mechatronic process,
- the ability to apply innovative methods in problem solving,
- the ability for interdisciplinary understand the activities in the production systems
- the in-depth knowledge and understanding of the principles of mechatronics and its disciplines.
- the ability to solve specific mechatronics problems in new emerging areas,
- the ability to develop methods and tools for modelling, optimization and simulation of mechatronic systems.

5 General curriculum

The second cycle study programme of Mechatronics is divided into the following parts:

Part	Part of study	Duration	ECTS credits
1	Courses	4 semesters	90
2	Project work	1 semester	6
3	Master work	1 semester	24
Total:		**2 years**	**120**

6 Detailed curriculum

1. year

Subject	1st semester			Cont. hours	Individ. work	Hours	ECTS
	L	S	T				
Selected topics in Mathematics	45	15	15	75	105	180	6
Multibody dynamics	45	0	30	75	105	180	6
Mechatronics Systems	45	10	20	75	105	180	6
Power Electronics	45	0	30	75	105	180	6
Robotic Systems	45	0	30	75	105	180	6
Together semester:	225	25	125	375	525	900	30

Subject	2nd semester			Cont. hours	Individ. work	Hours	ECTS
	L	S	T				
Advanced Technological Systems	30	15	15	60	120	180	6
Systematic Mechanical Designing	30	15	15	60	120	180	6
Remote Control Systems	45	0	30	75	105	180	6
Intelligent Control Techniques in Mechatronics	45	0	30	75	105	180	6
Elective Subject FEECS 1*	45	0	30	75	105	180	6
Together semester:	195	30	120	345	555	900	30
Together year:	**420**	**55**	**245**	**720**	**1080**	**1800**	**60**

2. year

Subject	3rd semester			Cont. hours	Individ. work	Hours	ECTS
	L	S	T				
Embedded Systems	45	0	30	75	105	180	6
Servosystems	30	15	30	75	105	180	6
Elective Subject FME 1**	45	0	30	75	105	180	6
Elective Subject FEECS 2***	30	0	30	60	120	180	6
Project	0	90	0	90	90	180	6
Together semester:	150	105	120	375	525	900	30

Subject	4th semester				Cont. hours	Individ. work	Hours	ECTS
	L	S	T	K				
Elective Subject FME 2****	30	0	10	0	40	140	180	6
Master's Thesis	0	0	0	30	30	690	720	24
Together semester:	30	0	10	30	70	830	900	30
Together year:	**180**	**105**	**130**	**30**	**445**	**1355**	**1800**	**60**
Together 2 years:	**600**	**160**	**375**	**30**	**1165**	**2435**	**3600**	**120**

L – lectures, S – seminar; T – tutorial; K- konsultation

ELECTIVE SUBJECTS

* Elective Subject FEECS 1 (Faculty of Electrical Engineering and Computer Science):

Subject	2nd semester			Cont. hours	Individ. work	Hours	ECTS
	L	S	T				
Sensor Systems	45	0	30	75	105	180	6
Modelling and Control of Electromechanical Systems	45	0	30	75	105	180	6

** Elective Subject FME 1** (Faculty of Mechanical Engineering):

Subject	3rd semester			Cont. hours	Individ. work	Hours	ECTS
	L	S	T				
Advanced Machining and Forming Systems	45	0	30	75	105	180	6
Integrated Manufacturing Systems	45	10	20	75	105	180	6
Goal Driven Product Development	45	10	20	75	105	180	6

*** Elective Subject FEECS 2 (Faculty of Electrical Engineering and Computer Science):

Subject	3rd semester			Cont. hours	Individ. work	Hours	ECTS
	L	S	T				
Machine Vision	30	0	30	60	120	180	6
Nanorobotics	45	0	30	75	105	180	6

**** Elective Subject FME 2 (Faculty of Mechanical Engineering):

Subject	4th semester			Cont. hours	Individ. work	Hours	ECTS
	L	S	T				
Virtual Engineering Systems	30	10	20	60	120	180	6
Mechatronic Control and Servo Systems	20	5	15	40	140	180	6
Modelling of Dynamical Systems	30	0	10	40	140	180	6