



CURRICULUM

of

“MECHATRONIC SYSTEMS”

Professional Field:

5.1. Mechanical Engineering

Educational Degree:

Bachelor

Professional qualification:

Mechanical Engineer

Training Duration:

4 years

Form of Education:

Full time

The training is executed in English

I. WEEKS OF ATTENDANCE:

Number of Weeks										
Course Year	Weeks of Study	Exam Sessions	Practical Training	Industrial Training	Specialized Practical Training	Pre-graduation Practice	Diploma Project	State Exam	Holydays	Total
I	30	9	-	-	-	-	-	-	13	52
II	30	9	-	3	-	-	-	-	10	52
III	30	9	-	-	3	-	-	-	10	52
IV	25	7	-	-	-	2	7	3	8	52

II. COURSE DESIGN:

ECTS subject code **T MEH №**

- **T** – type of course: **B** for BEng, **M** for MEng;
- **MEHS** – “Mechatronic Systems”;
- **№** – subsequent number of the subject;

lectures (L), tutorials (Tut), labs (Lab), Auditorium Total (AT), Self Study (SS) weekly;

exam (E), continuous assessment (CA), semester project (SP) / semester assignment (course work) (SA)

No	Subject	Week load						Assessment				ECTS code	ECTS credits
		L	Tut	Lab	AT	SS	Total	E	CA	SP	SA		

SEMESTER I

1	Introduction to specialty	1	0	0	1	1	2					BMEHS01	0
2	Mathematics Part I	3	2	0	5	6	11	1				BMEHS02	7
3	Theory of Electrical Engineering	3	2	0	5	6	11	1				BMEHS03	7
4	Physics	2	0	1	3	5	8	1				BMEHS04	5
5	Fundamentals of Design and CAD Part I	2	0	2	4	4	8	1			1	BMEHS05	5
6	Computing (Programming 1)	2	0	2	4	6	10		1		1	BMEHS06	6
7	Foreign Language	0	0	(2)	(2)	(2)	(4)		1*			BMEHS07	0
8	Sports	0	(3)	0	(3)	(3)	(3)					BMEHS08	0
	Total	13	4	5	22	28	50	4	1	0	2		30

SEMESTER II

9	Mathematics Part II	3	2	0	5	6	11	1				BMEHS09	7
10	Microprocessor Devices	2	0	1	3	6	9	1				BMEHS10	5
11	Semiconductor Elements	2	0	1	3	6	9	1				BMEHS11	5
12	Fundamentals of Design and CAD Part II	2	0	2	4	7	11	1			1	BMEHS12	7
13	Computing (Programming 2)	2	0	2	4	6	10		1		1	BMEHS13	6
14	Foreign Language	0	0	(2)	(2)	(2)	(4)		1*			BMEHS14	0
15	Sports	0	(3)	0	(3)	(3)						BMEHS15	0
	Total	11	2	6	19	31	50	4	2	0	2		30

* - the subject “Foreign Language” provides one semester assignment during the academic year

SEMESTER III

16	Material Science	2	0	2	4	5	9	1				BMEHS16	6
17	Mechanics	2	2	0	4	6	10	1			1	BMEHS17	6
18	Machine Elements I	2	0	2	4	5	9		1			BMEHS18	6
19	Databases	2	0	2	4	5	9	1				BMEHS19	6
20	Strength of Materials	2	2	0	4	5	9	1				BMEHS20	6
21	Foreign Language	0	0	(2)	(2)	(2)	(4)		1*			BMEHS21	0
22	Sports	0	(3)	0	(3)							BMEHS22	0
	Total	10	4	6	20	26	50	4	1	0	1		30

No	Subject	Week load						Assessment				ECTS code	ECTS credits
		L	Tut	Lab	AT	SS	Total	E	CA	SP	SA		

SEMESTER IV

23	Hydraulic and pneumatic fluid power	3	0	2	5	6	11		1			BMEHS23	6
24	Digital Electronics	2	0	2	4	6	10	1				BMEHS24	6
25	Machine Elements II	2	1	1	4	6	10	1		1		BMEHS25	6
26	Electrical engineering	2	0	2	4	5	9	1			1	BMEHS26	6
27	Theory of Mechanisms and Machines	2	1	1	4	6	10	1				BMEHS27	6
28	Foreign Language	0	0	(2)	(2)	(2)	(4)		1*			BMEHS28	0
29	Sports	0	(3)	0	(3)							BMEHS29	0
	Total	11	2	8	21	29	50	4	2	1	1		30

* - the subject "Foreign Language" provides one semester assignment during the academic year

SEMESTER V

30	Basics of the Mechatronic Systems Design Process	2	0	2	4	5	9	1				BMEHS30	5
31	Engineering Metrology	2	0	2	4	5	9	1				BMEHS31	5
32	Programming Frameworks	2	0	2	4	4	8	1				BMEHS32	5
33	Design of electronic devices	2	0	2	4	5	9	1		1		BMEHS33	5
34	Measurement and Control Engineering	2	0	1	3	3	6		1			BMEHS34	5
35	Principles of Optical Engineering	2	0	2	4	5	9		1		1	BMEHS35	5
	Total	12	0	11	23	27	50	4	2	1	1		30

SEMESTER VI

36	Technology of Micro electromechanical systems	2	0	2	4	7	11		1			BMEHS36	5
37	Automation of Discrete Production Engineering	2	0	2	4	7	11	1				BMEHS37	5
38	Sensors and Actuators	2	0	1	3	5	8	1				BMEHS38	5
39	Micro electromechanical systems (MEMS)	3	0	2	5	7	12	1				BMEHS39	6
40	Electronics	2	0	1	3	5	8		1		1	BMEHS40	5
41	Engineering Design Part I (positions 34, 35,37,38,39)	0	0	(3)	(3)					1		BMEHS41	4
	Total	11	0	8	19	31	50	3	2	1	1		30

SEMESTER VII

42	Electronic Regulating and Controlling Devices and Systems	2	0	2	4	7	11		1			BMEHS42	6
43	Modeling and Simulation of Mechatronic Systems	2	0	2	4	6	10	1			1	BMEHS43	5
44	Optional subject 1	2	0	2	4	6	10	1				BMEHS44	5
45	Optional subject 2	2	0	1	3	6	9	1				BMEHS45	5
46	Synthesis, Kinematics and Dynamics of Robots	2	0	2	4	6	10	1				BMEHS46	5
47	Engineering Design Part 2 (pos. 44, 45)	0	0	(3)						1		BMEHS47	4
	Total	10	0	9	19	31	50	4	1	1	1		30

No	Subject	Week load						Assessment				ECTS code	ECTS credits
		L	Tut	Lab	AT	SS	Total	E	CA	SP	SA		

SEMESTER VIII – 10 weeks

48	Reliability and Diagnostics of Mechatronic Systems	2	0	2	4	5	9	1				BMEHS48	3
49	Intelligent Manufacturing Systems	2	0	2	4	5	9	1				BMEHS49	3
50	Business Ethics	2	2	0	4	5	9		1			BMEHS50	3
51	Technical Legislation, Standardization and Quality Management	2	1	0	3	4	7		1			BMEHS51	3
52	Optional subject 3	2	0	1	3	5	8		1		1	BMEHS52	3
53	Optional subject 4	2	0	1	3	5	8		1		1	BMEHS53	3
54	Pre-Diploma Project	0	0	(3)	0	(3)				1		BMEHS54	2
	Diploma Project	Diploma Thesis										BMEHS55	10
	Total	12	3	6	21	29	50	2	4	1	2		30

NOTES:

- The optional subjects (pos. N 44, 45, 52 and 53) are yearly updated and subsequently approved by the Faculty Council of the Faculty of Mechanical Engineering.
- Engineering Design Part 1 (pos. 34, 35, 37, 38, 39) and Part 2 (pos. 44, 45) are optional subjects and relate to the subject topics shown with numbers.
- Semester VIII's duration covers 10 academic weeks and 7 weeks of writing the diploma project.
- Students do one semester assignment choosing from subjects in pos. 52 or 53.

III. MAIN PARAMETERS OF THE CURRICULUM

1. **Training duration: 4 years, 8 semesters.**

2. **Auditorium workload according to the curriculum:**

Total: 2355 h, of them:

Lectures: **1290 h;**

Seminars: **210 h;**

Labs: **855 h.**

3. **Total number of the subject positions: 54**

3.1. Compulsory: 39

3.2. Optional: 4

3.3 Foreign language: 4

3.4 Sports: 4

4. **Assessment:**

4.1. **Exams:** 29

4.2. **Continuous Assessments:** 15

4.3. **Semester Projects:** 5

4.4. **Semester Assignments:** 11

5. **Practice: 8 weeks.**

DEAN of Faculty of Mechanical Engineering:

/Assoc. Prof. L. Dimitrov/

Accepted by the FC of the FME on 17.11.2009/Protocol No 3.

Confirmed by the AC of TU Sofia on...16.12.2009/Protocol No 11.

LIST OF GROUPS OF OPTIONAL SUBJECTS

FOR SUBJECTS 46, 47, 53, 54 ONE OF THE FOLLOWING MUST BE CHOSEN:

Group of optional subjects: *ROBOTIC DEVICES*

- 44. Industrial Robots
- 45. Programming and Diagnostics for Industrial Robots
- 52. Modeling and Simulation of Robotic Systems
- 53. Implementation and Maintenance of Industrial Robots

Group of optional subjects: *FINE AND MICROMECHANICS DEVICES*

- 44. Optoelectronic and Laser Devices
- 45. Medical Equipment
- 52. Measuring Devices
- 53. Office Equipment

DEAN of Faculty of Mechanical Engineering:
/Assoc. Prof. L. Dimitrov/

Accepted by the FC of the FME on 21.09.2010/Protocol No 1.