Subject programme

1. Subject name / subject module: **Power Electronics**
2. Lecture language: English
3. The location of the subject in study plans:
   - Area or areas of the studies: **Computer Engineering and Mechatronics**
   - Degree of the studies: **1st degree studies**
   - Field or fields (implementation of effects standard): **Mechatronics**
4. Supervision of subject implementation:
   - The Institute / Another unit: **Institute of Informatics and Mechatronics**
   - The person responsible for the subject: **Szychta Leszek, prof. dr hab. inż.**
   - People cooperating in the development of the programme of the subject:
5. The number of hours and forms of teaching for individual study system and the evaluation method:

Teaching activities with the tutor																						
Mode of study	Form of classes																					Total
	...	SOW	ECTS	Laboratory work	SOW	ECTS	...	SOW	ECTS	...	SOW	ECTS	...	SOW	ECTS	...	SOW	ECTS	...	SOW	ECTS	ECTS
Full-time studies				33	42	3																3
Part-time studies																						
Credit rigor				Exam																		

6. Student workload – ECTS credits balance:
   1 ECTS credit corresponds to 25-30 hours of student work needed to achieve the expected learning outcomes including the student's own work

Activity (please specify relevant work for the subject)	**Hourly student workload (full-time studies/part-time studies)**
Participation in lectures	-
Participation in laboratory classes	33
Preparation to laboratory classes	16
Independent study of the subject	8
Preparation to an exam test	16
Participation in an exam / graded assignment	2
Total student workload (TSW)	75
ECTS credits	3
* Student's workload related to trainings	75
Student's workload in classes requiring direct participation of academic teachers	33

7. Implementation notes: recommended duration (semesters), recommended admission requirements, relations between the forms of classes:
   - Recommended admission requirements – none.
   - Recommended duration of the subject is taken from the course plan.
8. Specific learning outcomes – knowledge, skills and social competence:

Specific learning outcomes for the subject		**Form**	**Teaching method**	**Methods for testing of (checking, assessing) learning outcomes**
Outcome symbol	**Outcome description**			
Knowledge				
K_W05	**A student has basic knowledge of rectifiers and converters of power electronics to understand the complex dependencies of mechatronic systems and to apply this knowledge in practice**	**Laboratory work**	**Inquiry methods**	**Exam Student learning activities**
K_W08	**A student knows and understands selected specific issues in the field of voltage controllers and power supplies to: desighn them in automation systems**			
Skills				
K_U08	**A student is able to plan and carry out experiments, including measurements and computer simulations, interpret the obtained results and draw conclusions in the power electronics circuits**	**Laboratory work**	**Inquiry methods**	**Exam Student learning activities**

9. Assessment rules / criteria for each form of education and individual grades:

0% - 50%	ndst	**81% - 86%**	db
51% - 70%	dst	**87% - 93%**	db+
71% - 79%	dst+	**94% - 100%**	bdb

Activity	Grades	Calculation	To Final
Lab reports	dst, db, bdb, db (3,4,5,4)	arithmetic mean (3,4,5,4) * 40%	1,6
Attendance	on 80% of all classes	80% * 5 -> 4 * 10%	0,4
Exam	bdb (5)	5.0 * 50%	2,5
Final result			4,5
Grade		4,5/5 = 90%	**db+ (4,5)**

10. The learning contents with the form of the class activities on which they are carried out:

(Laboratory work)

1. Introduction;
2. Power Computations;
3. Half-Wave Rectifiers;
4. Full-Wave Rectifiers;
5. AC Voltage Controllers;
6. DC-DC Converters;
7. DC Power Supplies;
8. Inverters;
9. Resonant Converters.

11. Required teaching aids:

a. Lecture - multimedia projector.

b. Laboratory classes - specialist laboratory.

c. Exercises - a room adapted for conducting classes in the form of exercises / workshops, multimedia projector.

12. Literature:

a. Basic literature:

1. Robert W. Erickson, Dragan Maksimovic, Fundamentals of Power Electronics, KLUWER ACADEMIC PUBLISHERS, 2001

2. Muhammad H. Rashid, POWER ELECTRONICS HANDBOOK, BH, 2011

b. Supplementary literature:
Mohan Robins, Power Electronics,John Willey&Sons, 1989

13. Available educational materials divided into forms of class activities (Author's compilation of didactic materials, e-learning materials, etc.)

14. Teachers implementing particular forms of education:

Form of education	Name and surname
1. Lecture	
2. Laboratory classes	Szychta Leszek, prof. dr hab. inż.
3. Training	
4. Project classes	
5. Workshop classes	
6. Simulation game	
7. Language classes	