STUDY MODULE DESCRIPTION FORM

Name of the module/subject	Code
Elective course II	**1010315431010320078**

Field of study	Profile of study (general academic, practical)	Year /Semester
Power Engineering	**(brak)**	**2 / 3**
Elective path/specialty	Subject offered in:	Course (compulsory, elective)
Sustainable Energy Development	**Polish**	**obligatory**

Cycle of study:	Form of study (full-time,part-time)
Second-cycle studies	**part-time**

No. of hours	No. of credits
Lecture: **9** Classes: **-** Laboratory: **-** Project/seminars: **-**	**1**

Status of the course in the study program (Basic, major, other)	(university-wide, from another field)
(brak)	**(brak)**

Education areas and fields of science and art	ECTS distribution (number and %)
technical sciences	**100 1%**
Technical sciences	**100 1%**

Responsible for subject / lecturer:

dr inż. Leszek Kasprzyk
email: Leszek.Kasprzyk@put.poznan.pl
tel. 616652659
Faculty of Electrical Engineering
ul. Piotrowo 3A 60-965 Poznań

Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	Basic knowledge of the basics of electrical engineering, electrical machines and electric energy storage.
2	**Skills**	The ability to interpret the messages delivered and effective training in a field related to electric vehicles and hybrid.
3	**Social competencies**	It is aware of the need for further learning.

Assumptions and objectives of the course:

To acquaint students with popular groups and solutions electric and hybrid vehicles. Presentation of the latest trends in the automotive field. Discussion of the currently used electrical energy storage in vehicles.

Study outcomes and reference to the educational results for a field of study

Knowledge:

1. has ordered knowledge in the field of drive systems for use in hybrid and electric vehicles, taking into account their impact on the environment - [K_W07+]
2. knowledgeable about the energy consumption of vehicles, application of the principles of identification, using software to analyze the results of computer simulation - [K_W19+]

Skills:

1. Can develop a detailed documentation of the results of the experiment, the design task, or research, is able to prepare the development of a discussion of these results - [K_U08+]
2. able to use known methods and mathematical models, if necessary, modifying them, to analyze the technical and economic - [K_U14+]

Social competencies:

1. He able to think in a creative and enterprising - [K_K01+]
2. identifies and resolves dilemmas related to ecology, economy and energy security - [K_K02++]

Assessment methods of study outcomes

- evaluation of knowledge of current solutions in the field of hybrid vehicles,
- evaluation test.

Course description

History of motor vehicles, the current statistics on the transportation and automotive industries in the world. Types of motors used in hybrid vehicles. Electrical energy storage used in motor vehicles. The issue of energy consumption of vehicles. The parameters of popular electric and hybrid cars.

Basic bibliography:

1. Herner A., Riehl H. J.: Elektrotechnika i elektronika w pojazdach samochodowych, WKiŁ, Warszawa 2003
2. Praca zbiorowa: Mikroelektronika w pojazdach. Informator techniczny BOSCH, WKiŁ, Warszawa 2002
3. Jastrzębska G.: Odnawialne źródła energii i pojazdy proekologiczne, WNT, Warszawa 2009

Additional bibliography:

1. Denton T.: Automobile electrical and electronic systems, Arnold, London 2000
2. Larminie J., Lowry J.: Electric vehicle technology. Explained, Wiley, West Sussex 2003

Result of average student's workload

Activity	Time (working hours)
1. participation in lecture	9
2. consultation	4
3. preparation for a test	15

Student's workload

Source of workload	hours	ECTS
Total workload	28	1
Contact hours	13	1
Practical activities	0	0