

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Hybrid vehicles		Code 1010322331010322246
Field of study Electrical Engineering	Profile of study (general academic, practical) (brak)	Year /Semester 2 / 3
Elective path/specialty Electrical and Computer Systems in	Subject offered in: Polish	Course (compulsory, elective) obligatory
Cycle of study: Second-cycle studies	Form of study (full-time, part-time) full-time	
No. of hours Lecture: - Classes: - Laboratory: - Project/seminars: 15		No. of credits 1
Status of the course in the study program (Basic, major, other) (brak)		(university-wide, from another field) (brak)
Education areas and fields of science and art technical sciences Technical sciences		ECTS distribution (number and %) 1 100% 1 100%
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_W05++] 2. knowledgeable about the energy consumption of vehicles, application of the principles of identification, using software to analyze the results of computer simulation - [K_W10++] 3. has knowledge of the design of a simple drive systems - [K_W10++]		
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_U03++] 2. Can use known methods and mathematical models, if necessary, modifying them, for the analysis of electrical systems - [K_U06++]		
Social competencies: 1. He able to think in a creative and enterprising - [K_K01++]		
Assessment methods of study outcomes		

<ul style="list-style-type: none"> - Evaluation of knowledge of current solutions in the field of hybrid vehicles, - Evaluation of ability to solve design tasks, - Discussion and evaluation of the project. 		
Course description		
<p>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.</p> <p>Update 2017: TESLA electric vehicle.</p> <p>Applied methods of education: projects - with multimedia presentations (drawings, photographs, animations) supplemented by examples given on the board, run in an interactive way, with questions to students or specific students, presenting a new topic preceded by a reminder of related content known to students from other subjects;</p>		
Basic bibliography:		
<ol style="list-style-type: none"> 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:		
<ol style="list-style-type: none"> 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 class project	15	
2. consultation on the project	4	
3. project preparation	20	
Student's workload		
Source of workload	hours	ECTS
Total workload	39	1
Contact hours	19	1
Practical activities	39	1