BWI-1408 – Modern advanced systems and technological processes for sustainable economic development

Modulcode BWI-1408	Modern advanced systems and technological processes for sustainable economic development		
Responsible for the module	Prof. Dr.-Ing. Rafael Greszczynski		
Lecturers	Prof. Dr.-Ing. Rafael Greszczynski		
Conditions for participation	**Necessary prerequisites for participation in the module** No **Recommended prerequisites for participation in the module** No		
Bonus points	☐ Yes ☒ No Bonus points are awarded in accordance with § 9 (4) of the General Provisions. Students will be informed in good time and in an appropriate manner at the beginning of the course about the nature and type of additional work.		
Requirements for the awarding of ECTS credit points (CrP)	**Examination prerequisites** No **Examination achievements** Homework, term paper		
ECTS credit points (CrP) **3 CrP**	**Workload** 90 h	**attendance time** 16 h	**self-study** 74 h
Lehr- und Lernformen	(online) Lecture		

Short description
The module offers an interdisciplinary lecture series in English with contributions from lecturers from renowned European universities. The topics include future-oriented technologies from the field of sustainable development of modern systems, which are used in the disciplines of automation technology, electrics, mechanics, artificial intelligence and many more. Students have the opportunity to discuss technical topics in an international environment. Using practical examples, students learn how to live international cooperation and benefit from the lecturers' experience. In the process, students make their first international contacts.

Contents and qualification objectives of the module
7-8 online lectures are offered in English. The lectures offer the opportunity to participate in a moderated discussion in an international environment. Each lecture will be held by a different specialist from different universities in Poland, Czech Republic, Ukraine, Lithuania, Estonia and Germany.

Contents
The lecture topics are constantly adapted to current trends in development. Here is an excerpt of possible contents:
- Energy storage & e-transport
- Sustainable mobility
- Artificial intelligence
- Renewable energies
- Electronic circuits
- Robotics & machine vision
- CO2 footprint & energy technologies

Qualification goals and intended learning outcomes

Professional skills
Students will be able to
- analyse and evaluate sustainable energy storage systems and their application in electrical transport applications and energy networks
- recognize challenges and innovation potentials of electric vehicles in a sustainable economy and develop solutions,
- develop and evaluate modern methods for integrating renewable energies into existing energy grids

Methodological skills
Students will be able to
- break down and model complex technical systems such as energy storage systems and electric drives into comprehensible sub-components,
- implement theoretical approaches through practical applications such as the development of circuit diagrams or the programming of microcontrollers,
- evaluate and optimize technological innovations using scientific and analytical methods,
- solve interdisciplinary problems through a combination of technical, ecological and economic approaches

Social skills
The students can
- work successfully in international and interdisciplinary teams to achieve common project goals and also conduct discussions confidently in other languages,
- build up a broad and sustainable network through international cooperation and exchange with fellow students and lecturers, which will open up long-term professional and academic prospects for them,
- present and defend technical content and solutions convincingly in different cultural and linguistic contexts.

Personal skills
Students can
- adapt quickly to new technical topics and familiarize themselves with them quickly,
- recognize complex technical problems independently and develop targeted solutions,
- obtain feedback on their work and continuously improve their solutions,
- build up a personal, international network of experts that can be used for future professional and scientific projects

Applicability of the module	Compulsory elective module in all specializations of the Bachelor's degree program in Industrial Engineering and Management as well as for the degree programs in Mechanical Engineering, Mechatronics, Electrical Engineering and other related subject areas.					
Semester of study	5th and 6th semester					
Duration of the module 1 semester	**Frequency with which the module is offered** Every semester			**Language** English		
ECTS credit points (CrP) and grading	Bewertung entsprechend § 9 der Allgemeinen Bestimmungen (Teil I der Prüfungsordnung)					
Type of course according to KapVO (SWS)	☐ Lecture 0 SWS	☒ Seminar 1 SWS	☐ Exercise 0 SWS	☐ Internship 0 SWS	☐ Thesis 0 SWS	☐ BPP 0 SWS
Literature, media see script and/or moodle course						