Course title:	Mechanical engineering vs. progress and development of scientific research
Course title in Polish:	Inżynieria mechaniczna a postęp w kontekście rozwoju badań naukowych
Course for discipline:	Mechanical Engineering

Semester:	4	**Status of course:**	faculty	**Language:**	english
Academic year:	2026/27	**Catalog number:**	157/2025/26		

Coordinator of course:	Marek Gaworski
Lecturer od course:	Marek Gaworski
Executing unit:	Institute of Mechanical Engineering
Ordering unit:	Doctoral School SGGW
Assumptions, goals and description of the course:	The aim of the course will be to inspire students to identify various forms of progress in mechanical engineering, which translate into the ability to generate a methodical approach to planning and developing scientific and research activities. Progress in mechanical engineering will be presented in an interdisciplinary approach, taking into account the perspectives of integrating mechanical engineering with other scientific disciplines in the field of research tasks undertaken. Detailed considerations regarding progress and innovation in mechanical engineering will be considered on the example of activities undertaken in plant and animal production on farms, as well as in the production environment of farms. Examples of indicators identifying technical and technological progress in agricultural production will be presented, as well as other comparative indicators generated as a result of scientific research. This knowledge will be a premise in the process of improving students' skills in the field of developing their own indicators contributing to the development of knowledge in the area covered by the topic of the doctoral thesis.
Didactic form, number of hours:	Lecture/seminar, 15 hrs/semester
Teaching methods:	The lecture topics are the basis for solving problem issues. Examples of innovative and progressive solutions in production systems will be presented, which can be used to solve some tasks independently by students, deepened by discussions and consultations.
Limit of people in the group:	15

Learning outcomes

KNOWLEDGE - the graduate knows and understands:	**SKILLS - the graduate is able to:**	**COMPETENCES - the graduate is ready to:**
To the extent enabling to revise the existing pradigms in the field/discipline - the world achievments, gathering theoretical background as well as general and selected detailed issues	Carry out critical assessment of the scientific research findings and expert activities and their contribution to the knowledge development in the field/discipline	Critically evaluate the achievments in the field/discipline represented
Major general development trends in the field/discipline		Recognise knowledge in solving cognitive and practical problems characteristic for the area of research (field/discipline) and in an interdisciplinary aspect
		Support the ethos of scientific circles and conduct independent research

The method of verification of learning outcomes:	The course will be assessed based on a written examination, including the knowledge presented during lectures on the identification and implementation of various forms of progress in agricultural production systems operated by mechanical engineering tools.
Form of documentation of achieved learning outcomes:	The order of implementation of the course, taking into account the rules of attendance at classes and other organizational issues, meets the requirements set by the detailed Study Regulations of the Warsaw University of Life Sciences (SGGW).
Elements and weights of the final grade:	Written exam result - 90%; activity during classes - 10%
Place of the course:	A room at the disposal of the Doctoral School SGGW, with multimedia equipment.

Basic and supplementary literature

Casper, S., van Waarden, F. (eds.) 2005. Innovation and institutions: A multidisciplinary review of the study of innovation systems. Gaworski, M.
2021. Implementation of technical and technological progress in dairy production. Processes, 9(12), 2103. Helmold, M., Samara, W.
2019. Progress in performance management. Springer International Publishing.

Comments:	

Estimated number of hours of work of the doctoral student necessary to achieve the assumed learning outcomes:	15

Leraning outcomes reference to the second degree characteristics of the National Qualification Framework (level 8) covering doctoral competences:

Symbol:	**Learning outcomes:**	**8 level NQF**
SD1_KW01	To the extent enabling to revise the existing pradigms in the field/discipline - the world achievments, gathering theoretical background as well as general and selected detailed issues	P8S_WG
SD1_KW02	Major general development trends in the field/discipline	P8S_WG
SD1_KU05	Carry out critical assessment of the scientific research findings and expert activities and their contribution to the knowledge development in the field/discipline	P8S_UW
SD1_KK01	Critically evaluate the achievments in the field/discipline represented	P8S_KK
SD1_KK03	Recognise knowledge in solving cognitive and practical problems characteristic for the area of research (field/discipline) and in an interdisciplinary aspect	P8S_KK
SD1_KK08	Support the ethos of scientific circles and conduct independent research	P8S_KR