STUDY COURSE DESCRIPTION FORM	
Name of the course	Code
Mechanical engineering in the era of Industry 4.0	
Name of the doctoral school	Year /Semester
Poznan University of Technology Doctoral School	**….**
Specialty/Discipline	Type (obligatory, elective):
Mechanical engineering	**elective**
No. of hours	No. of credits
Lectures: **4** Classes: **-** Laboratories: **-** Seminars: **-**	**1**

Cycle of study:	**Form of study:**	**Assessment:** (written exam, presentation, etc.)
Third-cycle studies (Polish Qualifications Framework level eight)	Full-time	Presentation

Responsible for the course/lecturer:

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Piotrowo Street 3, 60-965 Poznan, Poland

Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge:** key developmental trends in industry
2	**Skills:** Use the knowledge from different branches of science to creatively identify, formulate and to innovatively solve complex problems
3	**Social competencies:** critically evaluate their own contribution to the development of a given scientific discipline

Objectives of the course: Acquiring knowledge on the impact of selected information technologies on the development of tools and methods of mechanical engineering in production systems in Industry 4.0

Educational results (Study outcomes)

Knowledge:		
P8S_WG	General knowledge about production systems, application of technological machines, organization of production systems, functioning of measuring systems	**SzD_W01**
P8S_WG	Knowledge of basic technologies and Industry 4.0 distinguishing systems	**SzD_W01**
P8S_WK	Knowledge on the application of information technologies of Industry 4.0 in mechanical technologies and in production systems	**SzD_W07**
Skills:		
P8S_UW	Implementing the knowledge from information technologies in mechanical engineering systems	**SzD_U01**

Social competencies:		
P8S_KO	Strengthening awareness of the need for cooperation between various scientific disciplines	**SzD_K06**

Compulsory literature:

Hamrol A., Gawlik J., Sładek J., Mechanical Engineering for Industry 4.0, Management and Production Engineering Review - 2019, vol. 10, no. 3

Additional literature:

Alcaer V., Cruz-Machado V., Scanning the Industry 4.0: A Literature Review on Technologies for Manufacturing Systems, Engineering Science and Technology, vol. 22, 2019

COURSE DESCRIPTION

	General issues	**Specific issues**	**No. of hours**
1	Cyber Physical Space in the market and within an enterprise	• Relations between mechanical engineering and other areas of engineering and business activity	0.5
2	Product design	• Integration of CAD/CAM/CAE systems • Implementation of KBE in design process	1
3	Digital models	• „Digital twin" concept • Idea of Virtual Reality (VR) and Augmented Reality (AR)	0.5
4	Technologies, tools and machine tools	• Additive manufacturing • Intelligent cutting tools • Intelligent machine tools • Reconfigurable RSP production systems	1
5	Measurement techniques and systems	• In-process metrology • Simulation methods for measuring the accuracy of measurement	1

Assessment methods of educational results

Presentation

STUDENT'S WORKLOAD

Activity	**Hours**
Participation in lectures, classes, seminars and laboratories	4
Contact hours with lecturers	4
Self-study	12
Exam	-
TOTAL	**20**
TOTAL NUMBER OF ECTS POINTS FOR THE COURSE	1