

STUDY MODULE DESCRIPTION FORM		
Name of the module/subject Basics of Reliability		Code 1010624171010610431
Field of study Mechanical Engineering	Profile of study (general academic, practical) (brak)	Year /Semester 4 / 7
Elective path/specialty Internal Combustion Engines	Subject offered in: Polish	Course (compulsory, elective) obligatory
Cycle of study: First-cycle studies	Form of study (full-time, part-time) part-time	
No. of hours Lecture: 12 Classes: - Laboratory: - Project/seminars: -		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		ECTS distribution (number and %) 1 100%
Responsible for subject / lecturer: Prof. dr hab. ing Nadolny Karol email: karol.nadolny@put.poznan.pl tel. +4861 665 2219 Faculty of Machines and Transportation 3 Piotrowo street, 60-965 Poznan, Poland		
Prerequisites in terms of knowledge, skills and social competencies:		
1	Knowledge	Student has knowledge of mechanics, strength of probability and mathematical statistics.
2	Skills	Able to perform basic calculations in the field of probability theory and mathematical statistics.
3	Social competencies	Understanding of the need for lifelong learning.
Assumptions and objectives of the course: Become acquainted with the fundamental methods design of reliability at the stage of designing, testing and evaluation reliability assessment in operation of the machines and processes.		
Study outcomes and reference to the educational results for a field of study		
Knowledge: 1. Has knowledge about the processes of destruction elements, objects and systems. Knows the mathematical models describing the intensity changes of reliability during operation in terms of population. Student has knowledge of the mathematical models of forecasting the reliability in operation. - [K1A_W24]		
Skills: 1. Can estimate the reliability of real technical objects. - [K1A_U07]		
Social competencies: 1. Recognizes the importance of reliable operation of the technical facilities for performance of their functions in terms of social. - [K1A_K01]		
Assessment methods of study outcomes		
Written test		
Course description		

Reliability as a measure of product quality. Basic definitions descriptive and evaluative . The development of the science of reliability. The characteristics of how organizations use technical objects. Objects renewable and non-renewable. A description of the destruction of the elements, objects and technical systems. Definitions of physical failure. (catastrophic) and contractual failure. (parametric). The concept intensity the failure. Mathematical models describe the intensity changes of reliability - population-based approach. Some probabilistic and statistical methods for estimating the reliability of indicators to assess changes technical systems. Elementary and composed structures of reliability. Introduction to describe the structural reliability of complex objects ? systems. Planning of reliability researches. Examples of estimating the reliability of the real technical objects.

Basic bibliography:

1. Poradnik niezawodności. T 1. pod red. J. Migdalskiego, Wyd. WEMA, Warszawa 1982r.
2. Poradnik niezawodności. T 2. pod red. J. Migdalskiego, Wyd. WEMA, Warszawa 1996r.
3. Szopa T. Niezawodność i bezpieczeństwo. W: ?Podstawy konstrukcji maszyn? pod red. M. Dityrycha. tom 1. PWN Warszawa 1999r.
4. Nadolny K., Tribologia kół zębatych. Zagadnienia trwałości i niezawodności. Biblioteka Problemów Eksploatacji. Wyd. Instytut Technologii Eksploatacji, Radom, 1999r
5. Podstawy modelowania niezawodności materiałów eksploatacyjnych.pod red.K.Nadolnego, Biblioteka Problemów Eksploatacji. Wyd. Instytut Technologii Eksploatacji, Radom, 1999r
6. Szopa T., Niezawodność i bezpieczeństwo. Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa, 2009.

Additional bibliography:

1. Warszyński M., Niezawodność w obliczeniach konstrukcyjnych. PWN. Warszawa 1988r.
2. Radkowski S., Podstawy bezpiecznej techniki. Oficyna Wydawnicza Pol. Warszawskiej, Warszawa 2003.
3. Bobrowski D., Modele i metody matematyczne teorii niezawodności w przykładach i zadaniach, WNT, Warszawa, 1985r.

Result of average student's workload

Activity	Time (working hours)	
1. Participation in the lecture	15	
2. Consultation	1	
3. Exam Preparation Exam Preparation	7	
4. Participation in the exam	2	
Student's workload		
Source of workload	hours	ECTS
Total workload	25	1
Contact hours	18	1
Practical activities	0	0