

## SYLLABUS

### Course description

Course code	Course	<b>PODSTAWY DIAGNOSTYKI TECHNICZNEJ</b>		
MB/O/I/ST/B1.13		<b>FUNDAMENTALS OF TECHNICAL DIAGNOSTICS</b>		
Language of instruction	English			
Academic year	2023/2024			
<b>field of study:</b>	Mechanical Engineering			
<b>field of specialization:</b>	All			
Educational level	first-cycle studies			
Education profile	General academic			
Mode of study	full-time studies			
Semester(s)	4			
Affiliation with a group of classes	Core subjects			
Course status	Obligatory			
Types of classes, instruction hours, ECTS credits	Types of classes	Number of instruction hours	Number of ECTS credits	
	Lecture	15 [h]	3 ECTS	
	Computational classes	[h]		
	Laboratory classes	30 [h]		
Linkage of the course	with the education profile	related to scientific activity in the discipline of mechanical engineering, to which the field of study is assigned		3 ECTS
	with qualifications	it is used to acquire engineering competences by the student		3 ECTS
	with science discipline	mechanical engineering		3 ECTS
Form of teaching	Traditional – classes organized at the University /classes conducted using online learning methods and techniques			
Prerequisites	No formal requirements			
Department	Faculty of Mechanical Engineering			
Coordinator	Assoc. prof. Krzysztof Górski, PhD.			
The website of the basic organizational unit	<a href="https://wm.uniwersytetradom.pl/">https://wm.uniwersytetradom.pl/</a>			
E-mail address, phone number of the coordinator	<a href="mailto:krzysztof.gorski@uthrad.pl">krzysztof.gorski@uthrad.pl</a> , (48) 361-76-58			

**LEARNING OUTCOMES, CURRICULUM CONTENT, TEACHING CLASSES, VERIFICATION OF LEARNING OUTCOMES**

Learning Objective:	Providing students with the fundamental knowledge in the field of technical diagnostics. Developing the right skills in the practical activity of an engineer dealing with the maintenance and repair of vehicles
Curriculum Content:	<p>LECTURE:</p> <ol style="list-style-type: none"> <li>1. Introduction to the course, presentation of the syllabus, scope of the classes, literature, rules for passing the subject.</li> <li>2. Basic definitions and concepts of technical diagnostics. Diagnostic states of a technical object.</li> <li>3. Physical aspects of diagnostics: causes of wear of machine parts, their limit states and failures.</li> <li>4. Sources of information on the state of fitness of a technical object. The vehicle as an example of a complex technical object in terms of its diagnostics.</li> <li>5. Diagnostic methodology in research and workshop practice.</li> <li>6. Summary of the lecture and preparation for the exam</li> </ol> <p>LABORATORY CLASSES:</p> <ol style="list-style-type: none"> <li>1. Introductory classes, familiarizing students with the health, safety and fire regulations, discussion of the subject content, familiarization with the guidelines for preparing reports.</li> <li>2. Combustion engine as a diagnostic object.</li> <li>3. Checking the technical condition of the batteries.</li> <li>4. Acoustic emission in diagnostics of technical objects.</li> <li>5. Diagnostics of machine and vehicle operating fluids.</li> <li>6. Practical application of diagnostic interfaces in vehicle and machine testing.</li> <li>7. Diagnostics of brake systems</li> <li>8. Passing the laboratory</li> </ol>
Didactic (educational) methods:	Lecture with the use of multimedia techniques with elements of discussion, practical exercises in the laboratory
Course assessment type, the criteria for assessing the achieved learning outcomes, and the method of calculating the final grade:	Lecture - assessment of the written exam. Laboratory - the average of partial grades from written tests verifying the student's preparation for laboratory exercises. Receipt of reports from laboratory exercises

Learning outcomes for the course in relation to the field of study learning outcomes and the type of classes				Methods of verifying learning outcomes	
Learning outcome number	Description of the learning outcomes for the course (PEU) A student who has passed the course ( <b>W</b> ) knows and understands / ( <b>U</b> ) can / ( <b>K</b> ) is ready to:	Field of study learning outcome (KEU)	Types of classes	Form of verification (credits)	Methods of testing and assessment
W1	A student knows what are the development trends in the field of vehicle operation and what are the processes of wear and tear of technical objects.	K_WG10	Lecture	Written exam	Test
U1	A student is able to perform diagnostic tests of selected objects, selects appropriate technical means for this purpose.	K_UW07	Laboratory	Written	Entrance test, laboratory report
U2	A student is able to select the appropriate engineering materials to ensure the correct operation of the vehicle.	K_UW09	Laboratory	Written	Entrance test, laboratory report
K1	A student is able to organize the work of a team performing a specific task.	K_KK02	Lecture/Laboratory	observation	Verbal evaluation

Literature and teaching aids

- [1] Horst Czichos. Handbook of Technical Diagnostics. Fundamentals and Application to Structures and Systems. Springer Berlin, Heidelberg 2013. <https://doi.org/10.1007/978-3-642-25850-3>
- [2] Tom Denton. Advanced Automotive Fault Diagnosis. Automotive Technology: Vehicle Maintenance and Repair. CRC Press 2016.
- [3] Keith McCord. Automotive Diagnostic Systems. Understanding OBD I and OBD II. CarTech 2011.
- [4] Tom Denton. Advanced Automotive Fault Diagnosis. Elsevier Butterworth-Heinemann 2006. [https://www.academia.edu/36113790/Advanced\\_Automotive\\_Fault\\_Diagnosis\\_2nd\\_Ed\\_Malestrom\\_](https://www.academia.edu/36113790/Advanced_Automotive_Fault_Diagnosis_2nd_Ed_Malestrom_)
- [5] Heinz Heisler. Advanced Vehicle Technology. Elsevier Butterworth-Heinemann 2002.
- [6] Hebda M., Niziński S., Pelec H.: Podstawy diagnostyki pojazdów mechanicznych. WKiŁ, Warszawa 1980.
- [7] Sitek K.: Diagnostyka Samochodowa. Wydawnictwo „Auto” 2006
- [8] Michlarski R. (red.): Diagnostyka maszyn roboczych. ITE. Radom 2004
- [9] Uzdowski M., Abramek K., Garczyński K.: Eksploatacja techniczna i naprawa. Pojazdy samochodowe. WKiŁ 2003
- [10] Niziński S., Michalski R.: Diagnostyka obiektów technicznych. Wydawnictwo Instytutu Eksploatacji. Warszawa-Sulejówek-Olsztyn-Radom 2002.
- [11] Cempel Cz.: Wibroakustyka stosowana. Skrypt Politechniki Poznańskiej. Poznań 1996.
- [12] Lotko W. (red.): Wybrane zagadnienia diagnostyki pojazdów. Wydawnictwo Politechniki Radomskiej. Radom 2007
- [13] Lotko W.: Laboratorium diagnostyki pojazdów. Wydawnictwo Politechniki Radomskiej. Radom 2007
- [14] Flamisch O.: Diagnostyka samochodu. WKiŁ. Warszawa 1980.
- [15] Trzeciak J.: Badania samochodów. WKiŁ. Warszawa 2002
- [16] Bocheński C.: Badania kontrolne samochodów. WKiŁ. Warszawa 2002
- [17] Górski K.: Laboratorium komputerowego wspomaganie diagnostyki pojazdów. Wydawnictwo Politechniki Radomskiej. Radom 2010
- [18] K. Górski: Laboratorium komputerowego wspomaganie diagnostyki pojazdów. Wydawnictwo Politechniki Radomskiej. Radom 2010
- [19] K. Górski: Badania, diagnostyka i warunki dopuszczenia do ruchu pojazdów samochodowych. Wydawnictwo Politechniki Radomskiej. Radom 2008
- [20] Gawlik S., Sikora Z., Tabor A.: Vademecum diagnosty – pytania i odpowiedzi. Wydawnictwo Politechniki Krakowskiej, Kraków 2006
- [21] Mazurek St., Merkisz J.: Tachografy cyfrowe. Wydawnictwo ITS, Warszawa 2006
- [22] Sitek K.: Stacje Kontroli Pojazdów - normy prawne badań technicznych 2007/6. Poradnik serwisowy 6/2007. Wydawnictwo „Instalator Polski”
- [23] Lotko W.: Wybrane zagadnienia z diagnostyki pojazdów. Wydawnictwo Politechniki Radomskiej. Radom 2004
- [24] Lotko W.: Laboratorium pojazdów samochodowych. Wydawnictwo Politechniki Radomskiej. Radom 2007
- [25] Orzełowski S.: Naprawa i obsługa pojazdów samochodowych. WSiP. Warszawa 2007 r
- [26] Rozporządzenie Ministra Infrastruktury z dnia 1 lutego 2005 r. szczegółowych późniejszymi zmianami w sprawie szczegółowych wymagań w stosunku do stacji przeprowadzających badania techniczne pojazdów (Dz.U.2005.25.209 z późniejszymi zmianami)
- [27] Rozporządzenie Ministra Infrastruktury z dnia 31 grudnia 2002 r. w sprawie warunków technicznych pojazdów oraz zakresu ich niezbędnego wyposażenia (Dz. U. z 2003 r. Nr 32, poz. 262 z późniejszymi zmianami)

Student workload required to achieve the assumed learning outcomes – the balance of ECTS credits

Attendance, participation	Student workload [h].		
	Other contact hours (IGK)	Student's self-study hours Classes without a teacher (ZBN)	Classes
Participation in ... lectures	X	X	15 [h]
Participation in .... classes/laboratory classes	X	X	30 [h]
Meeting with teachers during their duty hours	10 [h]	X	X
Preparation for lectures/classes/.... , Preparation for ... credit / exam	X	20 [h]	X
Total student workload	10 [h] / 0,4 ECTS	20[h]/ 0,8 ECTS	45 [h] / 1,8 ECTS
ECTS credits for the course	70 h/3 ECTS		

Additional information, comments

In the case of students with special needs, including disabilities, and chronic illnesses, the methods and forms of verification of learning outcomes specified above (in the syllabus) are adapted to the individual needs of these students, as appropriate.

Detailed rules and forms of support for students with special needs, including those with disabilities and chronically ill, during classes, credits, and exams are specified in: University Regulations (Regulamin Studiów Uniwersytetu Technologiczno-Humanistycznego w Radomiu), Study Regulations (Zasady Studiowania), and Procedure for Ensuring Accessibility of the Educational Process to Students with Special Needs, Including Those with Disabilities and Chronically ill (Procedura dotycząca zapewnienia dostępności procesu kształcenia studentom ze szczególnymi potrzebami, w tym: z niepełnosprawnością, przewlekle chorych).