

Title:	Machinery and Equipment Diagnostics, Non-Destructive Testing (NDT)
Lecture hours:	15 (KON.)
Study period: (summer/winter)	Winter or summer
Number of credits:	4 ECTS
Assessment methods:	Reports, preparation of a presentation on a given topic,
Language of instruction:	English
Prerequisites:	Rudiments of Physics. Machine construction basics,
Course content:	Basic issues of diagnostics of machines and technical devices. Basics of construction and operation of machines and devices. Hazards occurring during the operation of machines. Methods of measuring and monitoring basic physical and mechanical quantities for diagnostic purposes. Diagnostics of mechanical, pneumatic, hydraulic and power electronic devices. Symptoms indicating wear of the machine during its operation. Diagnostic methods. Visual tests, Penetrant tests, Magnetic tests, Eddy current tests, Radiological methods, Ultrasonic methods, Testing results of wear of products, Thermal diagnostics, Vibroacoustic diagnostics, Acoustic emission.
Learning outcomes:	The results of the course will contribute in gaining knowledge about diagnostic methods. Methods and role of measurement, monitoring and data acquisition systems for diagnostic purposes. Expanding knowledge about the construction and operation of machines and devices. Knowing the hazards occurring during the operation of machines.
Name of lecturer:	Dr inż. Andrzej Trafarski
Contact (email address):	trafarski@ukw.edu.pl
Literature:	- Krzysztof Schabowicz (Ed.) Non-destructive Testing of Materials in Civil Engineering, ISBN 978-3-03921-690-1 https://doi.org/10.3390/books978-3-03921-691-8 - Scientific Problems of Machines Operation and Maintenance : tribology, reliability, terotechnology, diagnostics, safety / Polish Academy of Sciences Committee of Machine Engineering.

- B.P.C. Rao: Eddy Current Testing:Basics, Journal of Non Destructive Testing & Evaluation, vol 10 issue 3 December 2011
- W. N. Reynolds, NDE of Protective and Thermal Barrier Coatings: A Current Survey, NDT International, Vol. 20, 1987,
- Baldev Raj, T. Jayakumar and B.P.C.Rao, Non-destructive Testing and Evaluation for Structural Integrity, SADHANA, Vol. 20, 1995.
- Jayakumar, B.P.C. Rao and S. Thirunavukkarasu: Non-destructive testing methods for investigation of surfaces of materialst. Conference: Proc. International Conf on Surface Techniques (INSURE-2001)
- Mohammed Omar: Nondestructive testing methods and new applications, InTech 2012, SBN 978-953-51-0108-6
- Wowk Victor: Machinery Vibration: Measurement and Analysis, Imprint: Mcgraw Hill/Irwin Professional 1991 ISBN13 (EAN): 9780070719361
- Richard H Lyon: Machinery Noise and Diagnostics Imprint: Butterworth-Heinemann 1987 eBook ISBN: 9781483289458
- Horst Czichos Handbook of Technical Diagnostics: Fundamentals and Application to Structures and Systems ISBN-13: 978-3662507322
- Horst Czichos, Tetsuya Saito, Leslie E. Smith : Springer Handbook of Metrology and Testing (Springer Handbooks) ISBN-13: 978-3642166402
- Ram, Mangey, Davim, J. Paulo: Diagnostic Techniques in Industrial Engineering, Springer 2018
- Chander Prakash, Sunpreet Singh, J. Paulo Davim: Characterization, Testing, Measurement, and Metrology, Published October 23, 2020 by CRC Press ISBN 9780367275150
- Amiya Ranjan Mohanty, Machinery Condition Monitoring Principles and Practices, Published by CRC Press 2015, ISBN 9781138748255
- Donald E. Bently, Charles T. Hatch, Bob Grissom: Fundamentals of Rotating Machinery Diagnostics, Publisher: ASME, 2003, ISBN:0971408106
- Lin, M. J. Zuo, and K. R. Fyfe, "Mechanical fault detectionbased on the wavelet de-noising technique,"Journal of Vibra-tion and Acoustics, vol. 126, no. 1, pp. 9–16, 2004.
- Journals: Measurement, Journal of the International Measurement Confederation (IMEKO) Elsevier
- Journals: Applied Thermal Engineering, Elsevier