UNIVERSITY of DEBRECEN

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Name of the course:	**Methodology and tools of machinery diagnostics**
Course type:	Optional
Responsible lecturer:	Dr. Kocsis Imre
Content:	Theoretical background of machinery condition monitoring and process monitoring based on vibration diagnostics and acoustics. Preparation of tests under laboratory and field conditions. Modal analysis, requirements in test rig design. Measurement of environmental vibrations. Sensors, acquisition cards. Measurements with Matlab, LabVIEW and SPM Condmaster Ruby. Vibration signal processing using built-in functions and self-developed algorithms. Validation. Theoretical background of machinery condition monitoring and process monitoring based on thermography. Preparation of tests under laboratory and field conditions. Application of image processing techniques for infrared image analysis. Development of online machinery condition monitoring and process monitoring, systems. Diagnostics as an integrated part of digitalized production and other mechanical systems. Application of optimization and machine learning tools in technical diagnostics.
Literature:	• Tshilidzi Marwala, Condition Monitoring Using Computational Intelligence • Methods – Applications in Mechanical and Electrical Systems, Springer-Verlag London, 2012 • Seifedine Kadry: Diagnostics and Prognostics of Engineering Systems: Methods and Techniques, Engineering Science Reference, 2013 • John W. Leis: Digital Signal Processing Using Matlab for Students and Researchers, John Wiley & Sons, 2011 • Georges Oppenheim: Wavelets and their Applications, ISTE, 2007 • Robert X. Gao l Ruqiang Yan: Wavelets – Theory and Applications for Manufacturing, Springer, 2011 • Wavelet and Filter Bank Design Toolkit, Reference Manual, National Instruments • Michael Vollmer, Klaus-Peter Möllmann: Infrared Thermal Imaging –Fundamentals, Research and Applications, WILEY-VCH Verlag, 2010 • Rafael C. Gonzalez, Richard E. Woods: Digital Image Processing, Prentice-Hall, 2002