

Óbuda University Bánki Donát Faculty of Mechanical and Safety Engineering		Insitute of Mechatronics and Vehicle Engineering			
Subject title and code:		Mechatronic's System Diagnostics - BMXMDE6BNE			Credits: 3
Full-time study		2024/2025 ac. 2. semester year			
The course is available at:		mechatronical engineering			
Supervised by:		Dr. Szabó József Zoltán		Instructors: Dr. Dömötör Ferenc, Dr. Szabó József Zoltán	
Prerequisite (neptun code):					
Weekly number of lessons					
Lecture: 2		Group seminar:		Lab: Consultation:	
Way of assessment: Exam (Written)					
Online consultation (in case it's required): ... (BBB link)					
Edu. goal: <i>Students have to learn the modern diagnostic methods, used in operation of machines and mechatronic systems and the instruments, and their applications</i>					
Schedule					
Education week		Topics			
1.		General introduction about the details of the subject and the requirements. Basics. Value reduction processes of the systems of mechatronics. The most common faults in mechatronics, typical ways of failures			
2.		Basics of maintenance and diagnostics – part I. Traditional maintenance strategies, and ways of operation. Run to failure, planned preventive maintenance, condition monitoring based maintenance strategies. Modern maintenance philosophies: RCM, TPM, TQM, RBI.			
3.		Theory of vibration – part I. Understanding vibrations. Damped and undamped vibrations. Time of period, frequency, amplitude and phase, time signal and frequency spectrum. Understanding FFT Fast Fourier Transformation.			
4.		Theory of vibration – part II. Processing of vibration signals. Instruments of vibration measurements. Faults monitored by vibration diagnostics. Application of FFT in the diagnostics. Measurement practices using vibration analyser and VIBROTESTER test rig.			
5.		In situ balancing of rotating machinery. Basics of theory and practical applications, using VIBROTESTER test rig.			
6.		Understanding shaft alignment. Theory and application. Misalignment in practice using the tool COMBI-LASER on the test rig VIBROTESTER			
7.		1st WRITTEN TEST – condition of acceptance (and part of exam)			
8.		Theory of electromagnetic waves. Methods of non destructive testing (NDT), like X-Ray, isotope radiation. Theory and practical applications. Understanding endoscopy. Theory and practice. Case histories			
9.		Teaching break 17.04.			
10.		Teaching break 24.04.			
11.		Teaching break 01.05.			
12.		The role of thermography in diagnostics. Understanding non contacting temperature measurements. Theory of thermovision. Examples of practical application			
13.		Understanding noise diagnostics. Theory of sound. Noise measurement techniques with practical examples of application. Motor current analysis. Oil, and wear check.			
14.		2nd WRITTEN TEST – condition of acceptance (and part of exam)			
Mid-semester requirements					
Test		Assignment to be submitted		Lab measurement	
amount	dates	amount	deadlines	amount	dates
2	7. and 14.				
<i>According to the TVSZ attendance of group seminars and lab exercises are mandatory.</i>					
Other requirements for participation in sessions not covered by the regulations and restrictions on substitutions:					

Test		Assignment to be submitted		Lab measurement	
maximum points available	minimum score required to pass /test	maximum points available	minimum score required to pass / assignment	maximum points available	minimum score required to pass /lab
100points	60points	...points	...points	...points	...points

Total number of points achievable in semester: ...points				
Grading thresholds	satisfactory 60 choose	average 72 choose	good 83 choose	excellent 94 choose
<p>Other evaluation criteria:</p> <p>During the period of lectures tasks can be repaired/corrected at dates/time shown above by students, participating on more than 60% of lectures and laboratory exercises.</p> <p>Acceptance shall be provided to the students, passing both written tests at least at “satisfactory” level, and made up his tasks if being absent with a good reason during the time of tests.</p> <p>A recommended note can be given to a student passing both written tests at least at a level of medium (3) during the normal occasions of tests. No recommended note can be given for a successful passing during the reparation/correction time.</p> <p>Unacceptable note shall be given to the student missing from more than 40% of the lectures, or not passing the written tests neither during normal, nor reparation/correction time, or both tests are unacceptable.</p>				
Receive a signature denied entry:				
Required references: [1.] Learning Materials of the lectures, and Videos in Moodle system				
Recommended references: [1.] Scheffer-P.Girdhar: Practical Machinery Vibration Analysis & Predictive Maintenance , Verlag: Newnes 2004)				
[2.] R.Keith Mobley: Vibration fundamentals (Newnes 2000)				
Quality assurance methods of the subject:				

Things, that are not included, can be found within the regulations of Óbuda University.