

Study program: Electrical and Computing Engineering – Module: Remote Control			
Type and level of studies: Master studies (second level of studies)			
Course unit: Monitoring and Process Visualisation			
Teacher in charge: Nebojsa Mitrovic			
Language of instruction: English			
ECTS: 6			
Prerequisites: -			
Semester: Winter			
Course unit objective			
- ability of process sensing and process monitoring			
- skills in infrared thermovision & image analysis			
Learning outcomes of Course unit			
<ul style="list-style-type: none"> • ability for process sensing and monitoring • capability of predicting both sensor test and field performance and quantifying the effects of component variations • skills at infrared thermovision & image analysis • capability to use intelligent process visualizations software packages 			
Course unit contents			
<i>Theoretical classes</i>			
<p>Most current processes can no longer be planned or managed by linear or sequential structures. Traditional management as well as tools and methods based on clock work principles and linear mechanisms of cause and effect often turn out to be ineffective. This leads to new challenges and the need for new behaviors and new ways of acting. The modular approach to teaching engineering often raises an important question: do students understand and appreciate the contributions of these modules in the context of designing and operating of processes on an industrial scale? This course is planned to give basic knowledge in understanding the processes. The planned aims are the following:</p> <ul style="list-style-type: none"> • Comprehensive overview of data acquisition for the new generation of smart and quasi-smart sensors. • physical characteristics of smart sensors • process visualization • introduction to the analysis and design of infrared and electro-optical (EO) imaging systems • thermovision & image analysis • infrared thermovision diagnostic method for process monitoring and visualization 			
<i>Practical classes</i>			
Laboratory and computer sessions, case study			
Literature			
[1] Nikolay V. Kirianaki, Sergey Y. Yurish, Nestor O. Shpak, Vadim P. Deynega, Data Acquisition and Signal Processing for Smart Sensors, J. Wiley (2002)			
[2] Introduction to Infrared and Electro-Optical Systems, Technology & Engineering - Artech House (1999)			
[3] Xavier P.V.Maldague, “Theory and Practice of Infrared Technology for Nondestructive Testing”, John Wiley & Sons			
Number of active teaching hours			Other classes
Lectures: 2	<i>Practice:</i> 2	<i>Other forms of classes:</i> Mentoring system	
Teaching methods: consultations, practical classes - infrared thermovision process monitoring and visualization			
Examination methods (maximum 100 points)			
Exam prerequisites	No. of points:	Final exam	No. of points:
Student’s activity during lectures	5	oral examination	25
Practical classes	15	written examination	25
Seminars/homework	30	
Project			
Grading system			
Grade	No. of points	Description	
10	91-100	Excellent	
9	81-90	Exceptionally good	
8	71-80	Very good	
7	61-70	Good	
6	51-60	Passing	
5	less than 50	Failing	