

COURSE DESCRIPTION CARD

Faculty of Electrical Engineering									
Field of study	Electrical and Electronics Engineering							Degree level and programme type	Bachelor's degree
Specialization/ diploma path	-							Study profile	-
Course name	Instrumentation and Measurements							Course code	IS-FEE-10047S
								Course type	elective
Forms and number of hours of tuition	L	C	LC	P	SW	FW	S	Semester	summer
	15		30					No. of ECTS credits	5
Entry requirements	-								
Course objectives	To understand the basic working principles of electrical and electronic measuring instruments. To receive the skills to managing and operating analogue and digital instruments for a particular application. To learn the ways of presenting and interpreting results. To calculate the uncertainty of the direct and indirect single and multiple measurements.								
Course content	Introduction to metrology and measuring instruments; errors and uncertainties; instrument transformers and their applications; resistance, voltage and current measurements; power and energy measurements; impedance measurement; frequency measurement; analog-to-digital converters; digital oscilloscope.								
Teaching methods	lecture, laboratory classes								
Assessment method	lecture - written exam; laboratory classes- evaluation of written report, assessment of preparation to do exercises, evaluation of completing a measurement task.								
Symbol of learning outcome	Learning outcomes							Reference to the learning outcomes for the field of study	
L01	interprets the results of measurements and presents them in an appropriate form								
L02	performs proper measurements of electrical quantities								
L03	calculates limiting errors and uncertainties								
L04	applies appropriate methods to measure basic electrical quantities								
L05	implements and operates appropriate equipment in a measuring experiment								
Symbol of learning outcome	Methods of assessing the learning outcomes							Type of tuition during which the outcome is assessed	
L01	passing short tests before laboratory classes, making a report, passing an exam							L, LC	
L02	making a report about laboratory exercise, completing a measurement task							LC	
L03	making a report, passing an exam							L,LC	

L04	evaluation of completing a measurement task, passing an exam	L,LC	
L05	evaluation of completing a measurement task, making a report	LC	
Student workload (in hours)		No. of hours	
Calculation	lecture attendance	15	
	participation in classes, laboratory classes, etc.	30	
	preparation for classes, laboratory classes, projects, seminars, etc.	30	
	working on projects, reports, etc.	20	
	participation in student-teacher sessions related to the classes/seminar/project	10	
	implementation of project tasks	0	
	preparation for and participation in exams/tests	20	
	TOTAL:		125
Quantitative indicators		HOURS	No. of ECTS credits
Student workload – activities that require direct teacher participation		57	2
Student workload – practical activities		90	3
Basic references	1. Carr J. J.: Elements of electronic Instrumentation and Measurement. Pearson Education, 2003. 2. Bentley J.: Principles of Measurements Systems. Pearson Education, 2005. 3. Doebelin E. O.: Measurement systems: Application and design, 5th edition. McGraw- Hill, 2003. 4. Sydenham P., Thorn R.: Handbook of Measuring Systems Design. Jon Wiley & Sons, Ltd., 2005		
Supplementary references	1. Webster J. G.: The measurement, instrumentation, and sensors handbook. CRC Press LLC 1999. 2. Potter R.W.: The art of measurement. Theory and Practice. Prentice Hall PTR 2000. 3. Webster J. G., Eren H. : Measurement, instrumentation, and sensors handbook : spatial, mechanical, thermal, and radiation measurement. CRC/Taylor & Francis, 2014. 4. JCGM - Joint Committee of Guides in Metrology, Evaluation of measurement data – Guide to the expression of uncertainty in measurement, 2008.		
Organisational unit conducting the course	Department of Electrotechnics, Power Electronics and Power Engineering	Date of issuing the programme	
Author of the programme	Jaroslav Makal, Ph.D.	20.01.2020	

L – lecture, C – classes, LC – laboratory classes, P – project, SW – specialization workshop, FW - field work, S – seminar