

SYLLABUS 2019/2020

Level of study	Master's Course		
Course title in Ukraine	Практикум з мікрохвильових вимірювань		
Course title in English	Practical training in microwave measurements		
Course code		ECTS credits	4
Lecturer(s)	PhD. Volodymyr Ryabchy Email address: pkrdnu@ukr.net;		

Course objectives (learning outcomes)	Course aims at providing representation about methods of measuring the parameters of microwave devices, methods and means of measurement of microwave signals parameters, modern microwave measuring equipment.
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Prerequisites:

Knowledge	Knowledge of signal and circuit theory, electromagnetic theory on the level of bachelor of physics or applied physics.
Skills	The skills to use the physics conceptions for practical applications.
Courses completed	The bachelor of physics or applied physics.

Learning effects:

	Learning effects of the course	Relation of the learning effects to the specialization
Knowledge	W01 A student knows the methods of measuring parameters of microwave devices, W02 A student knows the methods and tools of measuring the parameters of microwave signals W03 A student knows the modern microwave measuring equipment. Principles of operation and characteristics W04 A student knows methods for estimating the accuracy of measurements	K_W01 – K_W04

	Learning effects of the course	Relation of the learning effects to the specialization
Skills	U01 A student can carry out measurement of parameters of microwave devices and signals U02 A student can design schemes and circuits for microwave measurements U03 A student is able to analyze the results of measurement to estimate the accuracy of experimental results and identify sources of measurement errors and minimize their effects U04 A student is able to understand and read popular science literature in field of microwave measurement.	K_U01 – K_U04

Social skills	Learning effects of the course	Relation of the learning effects to the specialization
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	K01. A student has the creativity and the ability to conceptual thinking. K02 A student is able to present and justify the personal point of view. K03 A student is able to use the information technologies for the communication with the scientific community. K04 A student is aimed to expand personal knowledge and skills. K05 A student has the legal erudition. K06 A student concerned about the environmental safety of physical experiment.	K_K01 – K_K06
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Course organization:

Form of classes	Lecture (W)	Group-exercises							
		A (large group)	K (small group)		L (Lab)		S (Seminar)	P (Project)	T. (Test)
Contact hours					32				Credit with a grade
Semester	1								
Language	English, Ukrainian, Russian								

Teaching methods:

Classes will be performed in tutorial system on a weekly basis using multimedia presentation and internet in a form of the lectures open for discussion and questions.
In-class exercises are designed to probe knowledge with emphasis on how well students have understood the underlying topics of course.
The students will prepare two of individual presentation.

Assessment methods:

	E – learning	Didactic games	Classes in schools	Field classes	Laboratory tasks	Individual project	Group project	Discussion participation	Student's presentation	written assignment (essay)	Oral exam	Written exam	Test
W01								x					x
W02								x	x				x
W03								x					x
W04								x	x				x
U01							x	x					x
U02							x	x					x
U03							x	x					x
U04							x	x					x
K01								x	x				x

K02							x	x	x				x
K03							x	x	x				x
K04							x	x	x				x
K05							x						x
K06							x						x

Assessment criteria:

Grades	<p>The grading scale will be as follows:</p> <p>90 – 100 % - A including A- excellent (eq. in Ukraine: відмінно (very good))</p> <p>82–89 % : B including B – very good (eq. in Ukraine: добре (good))</p> <p>74–81 %: C including C - good (eq. in Ukraine: добре (good))</p> <p>64–73 %: D including D – satisfactory (eq. in Ukraine: задовільно (satisfactory))</p> <p>60–63 %: E including E – acceptable (eq. in Ukraine: задовільно (satisfactory))</p> <p>< 59 %: F failed (eq. in Ukraine: незадовільно (unsatisfactory))</p>
Criteria	<p>A. A student knows all terms and concepts mentioned in W1-W4, U1- U4 and K1-K6. A student can work without any assistances, his/her knowledge's are creative and easily applied to decision of specific problem.</p> <p>B. A student knows all terms and concepts mentioned in W1-W4, U1- U4 and K1-K6, yet needs a little help when decision of specific problem.</p> <p>C. A student knows all terms and concepts mentioned in W1-W4, U1- U4 and K1-K6, however needs a help when decision of specific problem.</p> <p>D. A student knows the most of terms and concepts mentioned in W1-W4, U1- U4 and K1-K6 and has difficulty in decision of specific problem.</p> <p>E. A student knows only several terms and concepts mentioned in W1-W4, U1- U4 and K1-K6 and can solve only a simple problem.</p> <p>F. A student does not know most of terms and concepts mentioned in W1-W4, he/she did not reach the satisfactory level of knowledge this course.</p>

Course content (topic list):

Topics	<p>W1. Microwave power measurement.</p> <p>W2. Measuring the frequency in the microwave range using resonant frequency meter.</p> <p>W3. Measuring the frequency in the microwave range using electronic counting frequency meters.</p> <p>W4. Measurement of quality factor of microwave resonator.</p> <p>W5. Measurement of the permittivity by free space method.</p> <p>W6. Permittivity measurement by short circuit – no-load method.</p> <p>W7. Measuring the complex permittivity by resonance method.</p> <p>W8. Measuring the characteristics and parameters of microstrip radiating elements and antenna arrays based on them.</p>
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Literature:

Compulsory reading	
Recommended reading	

Estimation of the total working time of students:

Contact hours	Lectures	32
	Seminars	
	Other (consultation, meetings)	18
Students' work hours (without the lecturer)	Reading books and preparation for the lectures	15
	Preparation to the seminar	
	Preparation of an individual presentation	15
	Preparation to the test	20
Total works' hours		100
ECTS credits 1 ECTS = 25 h		4