

## SYLLABUS 2019/2020

Level of study	Master's Course		
Course title in Ukraine	Волоконно-оптичні датчики		
Course title in English	<i>Fiber optical sensors</i>		
Course code		ECTS credits	4
Lecturer(s)	Ph.D. Krizina Tatiana Email address: tkruz@meta.ua;		

Course objectives (learning outcomes)	<p>This course aims at assimilation of physical principles of the functioning and potentialities of practical application of modern fiber-optical converters</p> <p>The students will be study the design features of some fiber-optical sensors and the principles of their production.</p> <p>The course also seeks to provide the background knowledge necessary to understand and reading of popular scientific literature.</p>
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### Prerequisites:

Knowledge	Knowledge of optic, solid state physics and semiconductor physics on the level of bachelor of physics or applied physics.
Skills	The skills 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	<p><b>W01</b> A student knows the structure and physical properties of optical fiber.</p> <p><b>W02</b> A student knows the base elements and design features of fiber optical sensors.</p> <p><b>W03</b> A student knows the physical effects used to measure various physical parameters.</p> <p><b>W04</b> A student knows the resource of fiber optical sensors application to information- measuring systems.</p>	K_W01 – K_W10

	Learning effects of the course	Relation of the learning effects to the specialization
Skills	<p><b>U01</b> A student can calculate the parameters of optical fiber.</p> <p><b>U02</b> A student understands the physical principles of fiber optical sensors functioning. A student is able to determine physical effect necessary for production of specific sensor.</p> <p><b>U03</b> A student is able to justify the inclusion of certain optical elements to schematic of optical sensor. A student can determine the optimal parameters of optical elements needed for production of specific sensor.</p> <p><b>U04</b> A student is able to understand and read popular science literature in field of information- measuring technology and optical communication.</p>	K_U01 – K_U07

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

### 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	18		16						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 % - <b>A</b> including <b>A- excellent</b> (eq. in Ukraine: відмінно (very good))</p> <p>82–89 % : <b>B</b> including <b>B – very good</b> (eq. in Ukraine: добре ( good))</p> <p>74–81 %: <b>C</b> including <b>C – good</b> (eq. in Ukraine: добре ( good))</p> <p>64–73 %: <b>D</b> including <b>D – satisfactory</b> (eq. in Ukraine: задовільно (satisfactory))</p> <p>60–63 %: <b>E</b> including <b>E – acceptable</b> (eq. in Ukraine: задовільно (satisfactory))</p> <p>&lt; 59 %: <b>F failed</b> (eq. in Ukraine: незадовільно (unsatisfactory))</p>
Criteria	<p><b>A.</b> A student knows all terms and concepts mentioned in W1-W4, U1- U4 and K1-K4. A student can work without any assistances, his/her knowledge's are creative and easily applied to decision of specific problem.</p> <p><b>B.</b> A student knows all terms and concepts mentioned in W1-W4, U1- U4 and K1-K4, yet needs a little help when decision of specific problem.</p> <p><b>C.</b> A student knows all terms and concepts mentioned in W1-W4, U1- U4 and K1-K4, however needs a help when decision of specific problem.</p> <p><b>D.</b> A student knows the most of terms and concepts mentioned in W1-W4, U1- U4 and K1-K4 and has difficulty in decision of specific problem.</p> <p><b>E.</b> A student knows only several terms and concepts mentioned in W1-W4, U1- U4 and K1-K4 and can solve only a simple problem.</p> <p><b>F.</b> 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><b>W1.</b> Optical fiber for sensors.</p> <p><b>W2.</b> Transmission the optical signal in fiber.</p> <p><b>W3.</b> Classification of optical fibers. Parameters.</p> <p><b>W4.</b> Functional elements of fiber optics.</p> <p><b>W5.</b> Radiation sources for fiber optical sensors.</p> <p><b>W6.</b> Photodetectors for fiber optical sensors.</p> <p><b>W7.</b> Physical principles of fiber optical sensors functioning.</p> <p><b>W8.</b> Sensors with fiber as optical information link.</p> <p><b>W9.</b> Optical fiber as sensitive element.</p> <p><b>W10.</b> Fiber optical sensors with fiber as sensitive element.</p>
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**Literature:**

Compulsory reading	E.Udd, William B. Spillman, Jr "Fiber Optic Sensors. An introduction for engineers and scientists" ISBN: 978-0-470-12684-4, 2011.-512p. T.Okosi, K.Okamoto et al. "Fiber Optic Sensors", Energoatomisdat, Leningrad, 1991.-256p.
Recommended reading	Gower, "Optical communication systems", Prentice-Hall, 1993.- 500 p  Lecture notes will be also provided.

**Estimation of the total working time of students:**

Contact hours	Lectures	34
	Seminars	
	Other (consultation, meetings)	21
Students' work hours (without the lecturer)	Reading books and preparation for the lectures	20
	Preparation to the seminar	
	Preparation of an individual presentation	15
	Preparation to the test	10
Total works' hours		100
ECTS credits 1 ECTS = 25 h		4