

SYLLABUS 2019/2020

Level of study	Master Course		
Course title in Ukraine	Курсова робота		
Course title in English	Term Paper		
Course code		ECTS credits	3
Lecturer(s)	Dr.Sci., prof. Trybitsyn M.; Dr.Sci., prof. Volnyanskii M.D.; Dr.Sci., prof. Moiseyenko V.M.; Ph.D., ass. Dergachov M.P. Email address: fttkaf@i.ua		

Course objectives (learning outcomes)	The subject of the course work is to obtain practical skills in drawing up a technical assignment to perform research work on the topic of a master's thesis, which should further help the student to understand the tasks of research in this work and its successful preparation for defense. Coursework provides a systematic approach for future performance scientific research by fixing such stages of scientific research as substantiation of the relevance of the chosen research direction, the formation of the purpose and objectives of the research, the subject and object of the research, research methods, drawing up a research plan.
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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	Physics analysis skills on the level of bachelor of physics or applied physics.
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 Peculiarities of the organization of scientific research at the state level. W02 Priority areas for the further development of optoelectronics in world. W03 The role of modern scientific and technical institutions and higher education institutions in development of optoelectronics industry and research in it. W04 Main stages of research in the field of active dielectrics.	K_W01 – K_W10

	Learning effects of the course	Relation of the learning effects to the specialization
Skills	U01 Select and analyze sources of information for research, conduct a patent search. U02 Justify the relevance of conducting research in favorites thematic direction. U03 Set a research goal and tasks to accomplish for it achievement. U04 To form the object and object of scientific research.	K_U01 – K_U07

	Learning effects of the course	Relation of the learning effects to the specialization
	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

Course organization:

Form of classes	Lecture (W)	Group-exercises							
		A (large group)	K (small group)		L (Lab)		S (Seminar)	P (Project)	Test
Contact hours	0							15	
Semester	2								
Language	Ukrainian								

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 developed through this process, with emphasis on how well students have understood the underlying technical and physical ideas.
The students will prepare one 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					x
W02						X		x					x
W03						X		x					x
W04						X		x	x				x
U01							X	x					x

U02							X	x					x
U03							X	x					x
U04							X	x					x
K01						X		x	x				x
K02							X	x					x
K03							X	x	x				x
K04						X	X	x					x
K05							x	x					x
K06							x	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-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. 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>C. 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>D. 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>E. 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>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. Basic principles of functional electronics;</p> <p>W2. Classification of functional and smart materials;</p> <p>W3. Characteristics of different fields of functional electronics;</p> <p>W4. Functionally active dielectrics;</p> <p>W5. Semiconductors as materials of functional electronics;</p> <p>W6. Functional and smart magnetic materials;</p> <p>W7. Functional and smart materials to optoelectronic principal schematics;</p> <p>W8. Functional and smart materials to acoustoelectronic principal schematics;</p> <p>W9. Functional and smart materials to magnetoelectronic principal schematics;</p> <p>W10. Functional and smart materials to dielectronic principal schematics;</p> <p>W11. Solid state structures as an element base of functional electronics;</p> <p>W12. Technology of synthesis of semiconductor and dielectric crystals;</p> <p>W13. Methods to obtain films and heterostructures;</p> <p>W14. Solid-phase synthesis of functionally active ceramics;</p> <p>W15. Space technology for production of functional and smart materials.</p>
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Literature:

Compulsory reading	1. Височанський Ю.М., Горват А. А., Грабар О.О. Твердотільна електроніка. Ужгород, ІВА, 2001, 388 с. 2. Уорден К. Новые интеллектуальные материалы и конструкции. М.:Техносфера, 2006. 3. Крушельницька О.В. Методологія та організація наукових досліджень: Навч. посібник. К.: Кондор, 2003. - 192 с. 4. Поплавко Ю.М. Физика диэлектриков, 1980. 5. Желудев И.С. Физика кристаллических диэлектриков, 1968.
Recommended reading	1. Пихтин А.Н. Оптическая и квантовая электроника. М., Высшая школа, 2001.

Estimation of the total working time of students:

Contact hours	Lectures	0
	Seminars	
	Other (consultation, meetings)	15
Students' work hours (without the lecturer)	Reading books and preparation for the lectures	15
	Preparation for quizzes and exercises	15
	Preparation of an individual presentation	15
	Preparation to the test	15
Total works' hours		75
ECTS credits 1 ECTS = 25 h		3