SYLLABUS 2017/2018

Level of study	Master's Course

Course title in Ukraine	Елементи оптоелектроніки та інтегральної оптики		
Course title in English	*Elements of optoelectronics and integrated optics*		
Course code		ECTS credits	5
Lecturer(s)	Dr.Sci., prof. Klymenko Victor Vasyl'ovych Email address: klimenkonn@yandex.ru		

Course objectives (learning outcomes)	This course aims at assimilation of physical principles of the functioning and potentialities of practical application of optoelectronics and integrated optics. The students will study the design features of optoelectronics and integrated optics and the principles of their production. The course also seeks to provide the background knowledge necessary to understand and reading of scientific and technical literature.

Prerequisites:

Knowledge	Knowledge of mathematics and physics on the level of bachelor in physics or applied physics, knowledge of physical optics, solid state physics and semiconductor physics.
Skills	Mathematical and physical skills on the level of bachelor in physics or applied physics
Courses completed	The bachelor in 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 structure and physical properties of light-emitting diodes and semiconductor lasers. **W02** A student knows the base elements and design features of photodetectors. **W03** A student knows the physical effects used to measure various physical parameters. **W04** A student knows the resource of optoelectronics and integrated optics application to information-measuring systems.	W01 – W10

	Learning effects of the course	Relation of the learning effects to the specialization
Skills	**U01** A student can calculate the parameters of light-emitting diodes and semiconductor lasers. **U02** A student understands the physical principles of photodetectors functioning. **U03** A student can determine the optimal parameters of optical elements needed for production of integrated optics. **U04** A student is able to understand and read the popular science and technical literature in field of information- measuring technology and optical communication.	U01 – U07

	Learning effects of the course	Relation of the learning effects to the specialization
Social skills	**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.	K01 – K06

Course organization:

Form of classes	Lecture (W)	Group-exercises									
		A (large group)		K (small group)		L (Lab)		S (Seminar)		P (Project)		E (Exam)	
Contact hours	16			18								1	
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 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	Other
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	
K03							x	x	x			x	
K04							x	x				x	
K05							x	x				x	
K06							x	x				x	

Assessment criteria:

Grades	The grading scale will be as follows: 90 – 100 % - **A** including **A**- **excellent** (eq. in Ukraine:відмінно (very good)) 82–89 % : **B** including **B** – **very good** (eq. in Ukraine: добре (good)) 74–81 %: **C** including **C** - **good** (eq. in Ukraine: добре (good)) 64–73 %: **D** including **D** – **satisfactory** (eq. in Ukraine: задовільно (satisfactory)) 60–63 %: **E** including **E** – **acceptable** (eq. in Ukraine: задовільно (satisfactory)) < 59 %: **F failded** (eq. in Ukraine: незадовільно (unsatisfactory))
Criteria	**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. **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. **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. **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. **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. **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.

Course content (topic list):

Topics	**W1.** Incoherent light sources **W2.** Solid-state light sources **W3.** Principle of electroluminescence **W4.** Inorganic light-emitting diodes. Organic LEDs **W5.** Semiconductor lasers. Resonator types and modern active materials **W6.** Double-heterostructure lasers **W7.** Edge-emitting laser diodes with horizontal resonators **W8.** Photo detectors **W9.** Metal-semiconductor photodiodes **W10.** Charge transfer detectors.

Literature:

Compulsory reading	Robert G. Hunsperger “Integrated Optics” Springer-Verlag, 1984 А.Н.Пихтин Оптическая и квантовая электроника М., Высшая школа, 2001
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 (Lab)	
	Other (consultation, meetings)	26
Students’ work hours (without the lecturer)	Reading books and preparation for the lectures	30
	Preparation for quizzes and exercises	5
	Preparation of an individual presentation	10
	Preparation to the exam	20
Total works’ hours		125
ECTS credits 1 ECTS = 25 h		5