

## SYLLABUS 2017/2018

Level of study	Master's Course
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Course title in Ukraine	Твердотільні системи відображення інформації		
Course title in English	<i>Solid state display systems</i>		
Course code		ECTS credits	5
Lecturer(s)	Ph.D. Krizina Tatiana Email address: tkruz@meta.ua;		

Course objectives (learning outcomes)	<p>This course aims to get acquainted with physical principles to creating of video and television systems, with development tendency of the technological and element base of modern devices of transmission and display of optical information.</p> <p>The students will be study the principles of the work and the structure of television systems, particularities the transmission of the optical image, the forming of the video signal, the solid state converters of the optical image.</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	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 physical principles of converting the optical image to an electrical signal.</p> <p><b>W02</b> A student knows the principles of function and structure of modern television systems, the physical basis of the television image formation, specifics of video signal transmission.</p> <p><b>W03</b> A student knows the function principles, the structure, the main characteristics, the control methods solid-state converters of optical image.</p> <p><b>W04</b> A student knows the advantages of solid-state converters of optical image as compared with electron-ray devices.</p>	W01 – W10
Skills	<p><b>U01</b> A student understands the principles functioning of modern screens in television systems.</p> <p><b>U02</b> A student understands the physical principles of converting the optical image to an electrical signal by solid-state converters.</p> <p><b>U03</b> A student is able to compare the parameters of solid-state converters of optical image and electron-ray devices.</p> <p><b>U04</b> A student is able to understand and read the popular science literature in field of information- measuring technology and optical communication.</p>	U01 – 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.	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	34		34		34		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 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	assignment (essay)	Oral exam	Written exam	Other
W01								x				x	
W02								x	x			x	
W03								x	x			x	
W04								x				x	
U01							x	x				x	
U02							x	x				x	
U03							x	x				x	

U04							x	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				x	
K06							x	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> The physical basis for the formation of the television image.</p> <p><b>W2.</b> Formation of the video signal by electron-ray tube.</p> <p><b>W3.</b> Television picture tube.</p> <p><b>W4.</b> Television scanning and complete video signal.</p> <p><b>W5.</b> Principles of operation and the specific of color television system.</p> <p><b>W6.</b> Methods of transmission of the full color image signal.</p> <p><b>W7.</b> Physical principles of charge coupled. Charge-Coupled Devices (CCD).</p> <p><b>W8.</b> Shift register with charge coupled. Methods and efficiency of charge transfer.</p> <p><b>W9.</b> CMOS (complementary metal oxide semiconductor) matrix.</p> <p><b>W10.</b> Application of CCD and CMOS to modern video equipment.</p> <p><b>W11.</b> Physical principles of optical image display by modern screen.</p>
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**Literature:**

Compulsory reading	<p>"Television" edited Dzhakoniya V.E.- Moscow, 2007- 618 p.</p> <p>F.P.Press "Formirovanie video on CCD", Radio and communication, Moscow - 1981.- 180 p.</p>
Recommended reading	<p>L.I.Khromov and el. "Solid state TV: Television systems with variable parameters in the charge-coupled device and microprocessors", Radio and communication, Moscow 1986.-184 p.</p> <p>Lecture notes will be also provided.</p>

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

Contact hours	Lectures	68
	Seminars	34
	Other (consultation, meetings)	8
Students' work hours (without the lecturer)	Reading books and preparation for the lectures	
	Preparation to the seminar	5
	Preparation of an individual presentation	5
	Preparation to the exam	10
Total works' hours		130
ECTS credits 1 ECTS = 25 h		5