Course “Design of optical devices and components”

Field of study: Optical engineering
Course level: Master
Specialization: 200400.68

	Hours						
Semester	**Workload**	**Lectures**	**Practical work**	**Lab.**	**Seminar**	**Independent studies**	**Tests**
Autumn	180	17	17	34	56	56	Exam

Abstract

Discipline covers a range of issues related to the principles of design of optical devices. Basic working methods of the development of optical instruments in the modern production are considered. The focus is on the design and development of device units. The effective work in CAD systems is also considered.

Study of the subject produces the following **competencies:** ability to carry out effectively the implementation of a circuit and instrumentation solutions for the selected task of optical engineering; ability to analyze the design and construction of an optical device, synthesize new versions based on knowledge of the physical principles of operation of systems and components, including design and technology requirements for the device, individual blocks and components; ability to make out the results of the project activities in accordance with the requirements of the standards

Goals and Objectives of the Course

knowledge of the design development features of the optical device, depending on its purpose and the conditions of the device operation;

abilities to work out the design components of optical devices, to develop a software and other support for the automation of the design process;

skills in the area of the modern production of the design documentation and automation design documentation.

Course prerequisites:

The necessary conditions for studying the discipline are: knowledge of higher mathematics, physics, basic geometric optics, basic engineering, computer science, the ability to develop algorithms, skills to work with a PC and products for computer-aided design of optical systems.

Course structure

Volume of the course: 5.0 ECTS credits, 180 hours

Chapter	Types of activities					Total in hours
	Lectures	Practical work	Laboratory work	Seminar	Independent studies	
Workflow optical devices	2	4	8	13	13	40
Basic requirements for the optical and opto-electronic devices	6	4	8	13	13	44
The arrangement of optoelectronic devices	7	4	8	13	13	45
Application of CAD systems in an optical instrument making	2	5	10	17	17	51
Total:	**17**	**17**	**34**	**56**	**56**	**180**

Lectures

Hours	Theme
2	Workflow optical devices
2	Basic requirements for the optical and opto-electronic devices
2	The calculation and selection of basic parameters of optical devices
2	The arrangement of optoelectronic devices
4	Features of the design of optical and opto-mechanical components of optoelectronic devices
3	Features of the calculation and selection of the optical devices
2	Application of CAD systems in an optical instrument making

Laboratory Work

Hours	Theme
4	Evaluation of ergonomic and aesthetical indicators of quality optical device
4	Development of drawings for optical components and options for mounting it
5	Development of routing device assembly site
4	Development of the construction unit of the radiation source with the LED technology example
5	Development of working sketches of the optical device elements

Practical work

Hours	Theme
4	Elaborate TOR
4	Development of technical proposals
5	Quality rating element optical device for accuracy and conjugation. Calculation of tolerances and fits on the dimensions of the optical device elements
4	The choice of materials in order to take into account the weight and metal

Independent studies

- Preparing for laboratory works
- Writing reports
- Home work

Assessment Methods

- Test;
- Laboratory work;
- Home tasks
- Personal skills of a student are estimated;
- Exam