WELDING WITH CONCENTRATED ENERGY FLOWS
COURSE SYLLABUS ADSTRACT

6-05-0714-03 Engineering and technical design and production of materials and products made from them
(Speciality code and name)

Equipment and technology for welding production
(concentration)

	STUDY MODE		
	full-time	part-time	part-time (shortened program)
Year	**4**	**4**	**4**
Semester	7	8	7
Lectures, hours	16	4	4
Laboratory classes (seminars), hours	16	4	4
Pass/fail, semester	7	8	7
Contact hours	32	8	8
Independent study, hours	76	100	100
Total course duration in hours / credit units	108/3		

1. Course outline.

The purpose of teaching this course is to enable students to acquire and master knowledge and skills in the physical principles of welding with concentrated energy flows and their use in the production of welded structures from metallic and non-metallic materials.

2. Course learning.

Upon completion of the course, students will be expected to

know:

– the physical nature and technological characteristics of welding with concentrated energy flows;

– patterns and characteristics of changes in the structure and properties of materials being joined (metals and alloys, various types of ceramics, plastics, etc.)

– welding technology for various metals and alloys;

– basic operating diagrams of welding equipment, fixtures, and tooling;

– methods for determining process parameters for various welding methods.

be able to:

– compile a literature review in the research area;

– determine the physical, mechanical, and operational properties of the materials and products being created;

– select base and welding materials for the fabrication of welded structures using concentrated energy beam welding;

– select welding methods and welding conditions for welded joints of various designs;

– evaluate the technical and economic feasibility of using specific concentrated energy beam welding methods.

to prossess a skill:

– methods for measuring the defining process parameters of concentrated energy welding using modern equipment in accordance with state standards;

– application of methods for activating the contact surfaces of the workpieces being joined;

– application of methods for calculating efficient welding modes using concentrated energy flows.

3. Competencies.

Understand the theoretical foundations of laser, plasma, and electron beam welding technologies. Be able to select a joint design, determine the welding method, and develop a welding process.

4. Requirements and forms of midcourse evaluation and summative assessment.

To assess students' mastery of the educational material, including acquired competencies, ongoing assessments are conducted during classes based on the completion and defense of laboratory assignments. Interim assessments are conducted based on the results of ongoing assessments and include a credit assessment.

Early assessments consist of oral defenses of laboratory assignments. Interim assessments consist of a credit assessment, both oral and written.