

## THEORY OF WELDING PROCESSES

### ANNOTATION

#### TO THE CURRICULUM OF HIGHER EDUCATION INSTITUTIONS

**Specialty:** 6-05-0714-03 “Engineering and technical design and production of materials and products from them”

**Specialization:** “Equipment and technology of welding production”

	Form of higher education		
	Full-time (day)	Correspondence	Correspondence shortened
Well	2	3	3
Semester	3	3	3
Lectures, hours	50	10	10
Laboratory work, hours	34	8	8
Exam, semester	3	3	3
Total classroom hours per academic discipline	84	18	18
Independent work, hours	132	198	198
Total hours per academic discipline/credit units**	216/6	216/6	216/6

1. Brief content of the academic discipline: The essence of the welding process. The mechanism of formation of a welded joint, requirements for energy sources for welding, structure and properties of the arc, metal transfer in the welding arc, thermal non-arc heat sources, melting of the base metal, physical processes in the arc plasma, heating and melting of the consumable electrode, thermodynamic methods for analyzing metallurgical processes during welding, calculation of equilibrium constants in systems, general characteristics of metallurgical processes during fusion welding and their impact on quality, interaction of molten metal with oxygen contained in the gas phase, interaction of molten metal with slag during welding, features of crystallization of weld pool metal and formation primary structure of the weld metal, features of crystallization of the weld pool metal and the formation of the primary structure of the weld metal, weldability of steels and factors determining weldability, cold and hot cracks. 2. Результаты обучения

**Know** - welding sources of thermal energy; fundamentals of physical, metallurgical and thermal deformation processes during welding; phase and structural transformations during welding;

**Possess** - knowledge to solve theoretical and practical problems for the formation of welded joints when welding various metals and alloys; physical foundations of welding processes;

**Have the skill to** - classify welding processes according to physical, technical and technological characteristics; determine the nature and characteristics of metallurgical, thermal deformation and physical and chemical processes during welding of metals; evaluate the weldability of metals.

3. Developed competencies: – Possess the physical foundations of welding methods, knowledge for solving theoretical and practical problems of obtaining welded joints of various metals and alloys, issues of technological weldability of metals and alloys.

4. Requirements and forms of current and intermediate certification

To assess the quality of students' assimilation of educational material, including acquired competencies, ongoing certification is carried out during training sessions based on the results of tests. Interim certification of students is carried out based on the results of the current certification and provides for a test. Intermediate monitoring of academic performance is aimed at ensuring maximum efficiency of the educational process and increasing motivation to study.

Current functionality - testability - written form;

Defense of laboratory work – oral and written;

Intermediate – exam in oral and written form.