



Syllabus of the educational component

Program of educational discipline

Alloys for artistic and jewelry molding

Specialty

131 – Applied mechanics

Institute

NNI of Mechanical Engineering and Transport

Educational program

Applied mechanics. Computerized foundry production. Artistic and jewelry Lithuania

Department

Foundry production (142)

Level of education

Bachelor
Master's degree
Doctor of philosophy

Course type

Special (professional), Elective

Semester

2

Language of teaching

Ukrainian, English

Lecturers and course developers



Tatiana Viktorivna Berlizieva

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Candidate of Technical Sciences, Associate Professor of the Department of Foundry Production of NTU "KhPI"

Work experience - 10 years. Author and co-author of more than 60 scientific and methodical publications. Courses: "Design of foundry workshops and sites", "Finishing operations in the production of castings", "Alloys for artistic and jewelry casting", "Finishing of cast artistic products", "Furnaces of foundry workshops".

[Learn more about the teacher on the department's website](#)

General information

Summary

The course "Alloys for artistic and jewelry casting" develops knowledge in modern materials for the manufacture of jewelry: precious metals and alloys, molding mixtures, jewelry model waxes, rubber materials, etc. Allows you to navigate the modern variety of technological equipment for jewelry casting. Develop jewelry manufacturing technology and select technological equipment for the production of specific jewelry or art products that are made by casting methods. And also analyze possible defects in the production of jewelry and art products and prevent their occurrence.

Course objectives and goals

To form the knowledge of future specialists in the field of artistic and jewelry casting technology, which is basic for the ability to develop technological processes of manufacturing jewelry by casting methods, namely: the main properties of precious metals and alloys for the manufacture of jewelry; basics of technological processes of jewelry manufacturing; casting methods and the main types of technological equipment used in jewelry casting, its characteristics, structure and

work schemes; basic methods of finishing operations of processing cast jewelry; the basics of modern resource-saving technologies of casting jewelry with precious stones. .

Format of classes

Lectures, independent work, consultations. Abstract. Final control - credit.

Competencies

GC1. Ability to identify, pose and solve engineering and technical and scientific and applied problems
GC2. Ability to make informed decisions.
GC3. Ability to use information and communication technologies.
GC4. Ability to generate new ideas (creativity).
GC7. Ability to communicate in a foreign language.
GC8. Ability to learn and master modern knowledge.
FC4. The ability to critically analyze problems in education, professional and research activities at the level of the latest achievements of engineering sciences and at the boundaries of subject areas.
FC8. The ability to generate new ideas and the ability to substantiate new innovative projects and promote them on the market.
FC10. The ability to clearly and unambiguously convey one's own conclusions, knowledge and explanations to specialists and non-specialists, in particular, in the process of teaching. Ability to understand the work of others, give and receive clear instructions.

Learning outcomes

LR1 Apply specialized conceptual knowledge of the latest methods and techniques of design, analysis and research of structures, machines and/or processes in the field of mechanical engineering and related fields of knowledge.
LR5 Independently set and solve problems of an innovative nature, argue and defend the obtained results and decisions.
LR8 Master modern knowledge, technologies, tools and methods, in particular through independent study of specialized literature, participation in scientific, technical and educational events.
LR10 Search for necessary information in scientific and technical literature, electronic databases and other sources, assimilate, evaluate and analyze this information
LR16 Demonstrate knowledge and understanding of the basics of production process organization:
..

Student workload

The total volume of the discipline is 90 hours. (3 credits ECTS): lectures – 32 hours, independent work – 58 hours.

Course prerequisites

To successfully complete the course, you must have knowledge and practical skills from the following disciplines: "Working processes of modern productions", "Additive technologies in foundry production".

Features of the course, teaching and learning methods, and technologies

Lectures are conducted interactively using multimedia technologies.
Study materials are available to students through OneNote Class Notebook. .

Program of the course

Topics of lectures

Topic 1. Introduction

The state and prospects for the development of foundry production.

Topic 2. Varieties of samples used for artistic and jewelry alloys

Spool, metric and carat samples. test marks. Screening supervision. Methods of determining samples

Topic 3. Platinum and metals of the platinum group

Basic chemical, physical, mechanical and technological properties, areas of application plans

Topic 4. Silver alloys

Silver: basic chemical, physical, mechanical and technological properties, classification, labeling and areas of application

Topic 5. Gold alloys

Basic chemical, physical, mechanical and technological properties, classification, labeling and fields of application. The influence of alloying elements, impurities and gases on the properties of gold alloys.

Topic 6. Copper-based alloys

Classification, labeling and areas of use. Basic chemical, physical, mechanical and technological properties. Diagram of the phase equilibrium of the Cu-Ni system and its main physical and chemical characteristics

Topic 7. Melchior and nickel silver alloys

Composition, structure, main properties, areas of application.

Topic 8. Kuniali alloys

Composition, structure, main properties, areas of application.

Topic 9. Classification of jewelry stones

The main properties of jewelry stones . Physico-chemical and mineralogical properties . Cutting of jewelry stones . Characteristics of precious jewelry stones

Topic 10. Rubber molds .

The main types of rubber for the production of press forms . Vulcanizers for making molds . Production of molds from various types of rubber . Production of molds from raw natural rubber gum. Production of molds from liquid two-component silicone rubber . Cutting of rubber molds . Defects of rubber molds

Topic 11. Production of wax models

The main types of waxes for making wax models of jewelry casting . Injectors for making wax models . Technological operations of manufacturing wax models using injectors . Defects of wax models .

Topic 12. Production of foundry molds

The main components of molding mixtures for jewelry casting. Choice of mold mass for jewelry casting . Molds for jewelry casting . Technology of preparation of molding mixtures

Topics of the workshops

Practical classes within the discipline are not provided

Topics of the laboratory classes

Laboratory works within the discipline are not provided .

Self-study

The course involves the completion of an essay. Students are also recommended additional materials for independent study and analysis .

Course materials and recommended reading

Basic literature

1. Taran B.P. Fundamentals of the theory of foundry alloys. – KhDPU, 2010. – 200 p.
2. Taran B.P. Foundry alloys: teaching manual. - Kh.: NTU "KhPI", 2012.
3. Ivanova L. A Development of artistic and jewelry casting. - Odesa: ONPI, 2003. - 155 p.

Additional literature

1. Yu.O. Stepanov Technology of foundry production. Special species of Lithuania: a textbook. - K.: ISDO, 2013 – 287 p.

Assessment and grading

Criteria for assessment of student performance, and the final score structure

100% of the final grade consists of assessment results in the form of credit (40%) and current assessment (60%).

Assessment : written assignment (2 questions from theories) and an oral report.

Current evaluation : 2 modular control and calculation task (20% each).

Grading scale

| Total points | National | ECTS |
|--------------|--|------|
| 90–100 | Excellent | A |
| 82–89 | Good | B |
| 75–81 | Good | C |
| 64–74 | Satisfactory | D |
| 60–63 | Satisfactory | E |
| 35–59 | Unsatisfactory (requires additional learning) | FX |
| 1–34 | Unsatisfactory (requires repetition of the course) | F |

Norms of academic integrity and course policy

The student must adhere to the "Code of Ethics of Academic Relations and Integrity of NTU "KhPI": show discipline, education, benevolence, honesty, responsibility. Conflict situations should be openly discussed in study groups with the teacher, and if it is impossible to resolve the conflict, it should be brought to the attention of the employees of the institute's directorate.

Regulatory and legal support for the implementation of the principles of academic integrity of NTU "KhPI" is posted on the website: <http://blogs.kpi.kharkov.ua/v2/nv/akademichna-dobrochesnist/>

Approval

Syllabus agreed

22.08.2023



Head of Department
Oleg AKIMOV

22.08.2023



Guarantor of the educational program
Olexander SHELKOVYI