



## Syllabus of the educational component

Program of educational discipline

### Pre-graduation practice

**Specialty**

131 – Applied mechanics

**Educational program**

131 – Applied mechanics

**Level of education**

Master's degree

**Institute**

NNI of Mechanical Engineering and Transport

**Department**

Foundry production (142)

**Course type**

Special (professional) training, Mandatory

**Semester**

3

**Language of instruction**

Ukrainian, English

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### Lecturers and course developers

**Tatiana Viktorivna Berlizeva**

[Tatiana.Berlizieva@khpi.edu.ua](mailto:Tatiana.Berlizieva@khpi.edu.ua)

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 art products", "Furnaces of foundry workshops".

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

**Oleg Viktorovych Akimov**

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Doctor of technical sciences, professor, head of the department of foundry production of NTU "KhPI"

Work experience - 37 years. Author and co-author of more than 200 scientific and methodical publications. Courses: "Certification and metrological quality assurance", "Modern technologies in applied mechanics" and others.

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

### General information

**Summary**

Pre-diploma practice allows students to familiarize themselves with modern technological processes and machine designs, their calculation and design methods for practical application in further work in the technological and design bureau, to study the current level and trends in the development of technology and design of foundry equipment.

During practice, students get acquainted with the modernization and development of individual elements of existing technological, transport and auxiliary equipment.

## Course objectives and goals

Consolidate and deepen the knowledge obtained at the institute, supplement it with new summaries of advanced technology, equipment and automation of foundry production.

To acquire the initial practical experience necessary for independent engineering activities in the development of technological processes and the design of devices, equipment and machines, the economics of foundry production.

To gain experience of independent work in the profession and the ability to solve engineering problems in organizing the production of castings in various branches of the national economy; deepen and consolidate theoretical knowledge, supplement it with new summaries of new technology, automation and organization of modern production. Pre-diploma practice is the final stage of the engineer formation process, an effective means of labor education.

## Format of classes

Independent work, consultations. Final control - credit.

## Competencies

GC3. Ability to use information and communication technologies

GC7. Ability to communicate in a foreign language.

GC8. Ability to learn and master modern knowledge.

FC2. The ability to critically analyze and forecast performance parameters of new and existing mechanical structures, machines, materials and engineering production processes based on knowledge and use of modern analytical and/or computerized methods and techniques.

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

LR3 Apply automation systems for research, design and construction work, technological preparation and engineering analysis in mechanical engineering.

LR 4 Use modern methods of optimizing the parameters of technical systems by means of system analysis, mathematical and computer modeling, in particular under the conditions of incomplete and contradictory information.

LR 9 Organize the work of the group when completing tasks, complex projects, scientific research, understand the work of others, give clear instructions.

LR 10 Search for necessary information in scientific and technical literature, electronic databases and other sources, assimilate, evaluate and analyze this information.

LR 12 Demonstrate the ability to perform modeling, static and dynamic analyzes of structures, mechanisms, materials and processes at the design stage using modern computer systems.

LR 17 Demonstrate knowledge of the organization, functioning, technical and software support of information and measurement computerized systems in scientific research of mechanical systems and processes.

## Student workload

The total volume of the discipline is 450 hours. (15 ECTS credits): independent work - 450 hours.

## Course prerequisites

Prerequisites for studying the discipline - mastering the courses "Fundamentals of scientific research", "Modern technologies in applied mechanics", "Working processes of modern productions", "Modeling and design of processes, products, equipment", "Certification and metrological quality assurance".

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

Features of the discipline:- practical orientation of education, orientation to real technologies of manufacturing castings and construction of foundry machines;- individual approach to work tasks taking

into account the subject of pre-diploma works;- mastering of modern scientific equipment and research software tools;- free access to scientific and technical laboratories, centers and workshops.

Teaching methods: - independent pre-diploma work; - consulting with the manager; - working with scientific and technical literature and databases; -take part in an excursion to other procurement shops and to areas of mechanical processing and assembly of manufactured products; take part in the development of a new casting technology or the development of the design of a casting machine in accordance with the thesis; complete an individual task on NDRS.

Learning technologies: - use of Internet resources; - work in laboratories using measuring equipment and procurement shops; - computer modeling and data processing; - visualization of research results...

## **Program of the course**

### **Topics of lectures**

### **Topics of the workshops**

### **Topics of the laboratory classes**

### **Self-study**

Review of scientific and technical literature,documentation, reference literature, catalogs, materials of technical departmentsby research topic.

Scientific and technical descriptions of the researched equipment and technological processes must be compiled.

The ability to choose the most optimal variant of the technological process of manufacturing castings, a more rational method of solving an engineering problem; carry out technical and economic calculations of foundry equipment; analyze the obtained results from the point of view of the effectiveness of their solution, design the device; comply with labor protection requirements.

Select the necessary materials for the development and implementation of a diploma project by specialty.

Study of the right and duties of a craftsman and design engineer in production.

Drawing up a report based on the results of the work.

Preparation of the report for the final conference.

## **Course materials and recommended reading**

### **Basic literature**

- 1.Rudenko P. O. Designing technological processes in mechanical engineering: teaching. help K.: Higher school, 2013
2. Zbozhna O. M.; Basics of technology: a study guide Kyiv: Kondor, 2011. - 498 p.
3. Ponomarenko O.I. Management of foundry systems and processes Monograph / O.I. Ponomarenko, T.V. Lysenko, A.L. Stanovskyi, O.I. Shinsky - Kharkiv: Textbook of NTU "KhPI". - 2012. - 368 p.
4. Ponomarenko O.I. Optimization of technological solutions for foundry workshops. - Kharkiv: NTU "KhPI". - 2007. -320 p.
5. Ponomarenko O.I. Automated design of forming and rod machines [text]: training. manual / O.I. Ponomarenko, I.I. Gunko, S.V. Porohnia, N.S. Yevtushenko. - Kharkiv: NTU "KhPI", 2014. - 256 p.
6. Taran B.P. Foundry alloys. Kh.: NTU "KhPI", 2009. - 336 p.
7. Sumtsov V.P. Foundry shop equipment. - K.: Vipol, 1993. - 552p
8. Taran B.P. Fundamentals of the theory of foundry alloys. – KhDPU, 2010. – 200 p.
9. Taran B.P. Foundry alloys: teaching. manual. - Kh.: NTU "KhPI", 2012.

### **Additional literature**

- 1.Holofaev A.M. Design of foundry technology./ A.M. Holofaev, Yu.V. Kryvolapchuk. – Luhansk: Department of SNU named after Dalya, 2004. – 296 p.
2. Dyomin D.O. Technical means of automation in foundry production. Electronic lecture notes, 2000

3. Design of foundry workshops / G.E. Fedorov, M.M. Yamshynskiy, V.G. Mogylatenko, I.M. Guriya, I.O. Shynskiy. - K.: NTUU "KPI", 2011. -Part 1. - 588 p.

4. Design of foundry shops / G.E. Fedorov, M.M. Yamshynskiy, V.G. Mogylatenko, I.M. Guriya, I.O. Shynskiy. - K.: NTUU "KPI", 2011. - Part 2. - 316 p.

## Assessment and grading

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

The quality of the report design (completeness of the presentation of the material, compliance of the report structure with the requirements, quality of illustrations and applications) - 20 points.  
Defense of practice results (quality of report and presentation, answers to questions) - 40 points.  
The manager's assessment of the practice base (performance of practice tasks, initiative, creative approach, compliance with safety rules) - 40 points.  
The final grade is calculated based on the sum of points received

### 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<br>(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

Approved by

22.08.2023  
Date, signature



Head of the department  
Oleg AKIMOV

22.08.2023  
Date, signature



Guarantor of the educational program  
Oleksandr SHELKOVY