

Teaching practice

Educational component work program (Syllabus)

Academic discipline requirements

Level of higher education	<i>Third (educational and scientific)</i>
Discipline	13Mechanical Engineering
Specialty	133 Industrial mechanical engineering
Educational program	Industrial mechanical engineering
Status educational component	Required
Form of study	full-time (daytime)/full-time (evening)
Year of training, semester	2nd year, fall semester
Amount educational component	3(90)
Semester control/control measures	test
Class schedule	
Language of instruction	
Information about the course leader/teachers	http://intellect.cpsm.kpi.ua/profile/hdg3
Course placement	Sikorsky Platform

Academic discipline program

1. Description educational component, *its purpose, subject of study and learning outcomes*

Pedagogical practice is an integral part of the process of graduate training of Doctors of Philosophy in specialty 133 "Industrial Mechanical Engineering" and is conducted at the Department of Chemical, Polymer and Silicate Mechanical Engineering, as well as other higher educational institutions that train Doctors of Philosophy in this specialty.

According to the curriculum of specialty 133 "Industrial Mechanical Engineering", pedagogical practice refers to the cycle of professional training for the educational component for acquiring universal competencies of a researcher and conducting pedagogical practice of students is planned in the third semester.

Subject The educational component "Pedagogical Practice" is the study by postgraduate students of traditional and modern methods and pedagogical technologies for teaching the educational component of industrial mechanical engineering on issues of designing machines and devices, devices, technological processes, conducting scientific research, an independent approach to solving engineering problems; scientifically based and promising areas for increasing the productivity of equipment for the production of chemical, silicate, polymer materials and products; the main technical and economic indicators of enterprises of chemical, silicate, polymer materials and products.

The internship program includes:

- a calendar schedule that reflects the terms of the internship;
- preparation of practice documents;

- completion of safety training with mandatory registration in the company's logbook, with the progress of the internship and its tasks;
- completion of individual tasks according to the internship program;
- requirements for preparing an internship report;
- organization of report submission and more.

Goal educational component "Pedagogical Practice"

The purpose of this study The educational component is the formation of a complex of knowledge, skills and abilities in postgraduate students in the field of application of traditional and modern methods and pedagogical technologies for teaching issues on the production of chemical, silicate, polymer materials and products, scientific developments of equipment of chemical, polymer and silicate enterprises, necessary for conducting educational classes in this direction. In accordance with the goal, the training of postgraduate students in this specialty requires the formation of competence:

- Ability for abstract thinking, analysis and synthesis (ZK 01);
- Ability to work in an international context (ZK 03);
- Ability to orally and in writing present and discuss the results of scientific research and/or innovative developments in Ukrainian and English (or other) languages, deep understanding of English (or other foreign-language) scientific texts in the mechanical engineering industry (FC 02);
- Ability to carry out scientific and pedagogical activities in higher education (FC 05);
- The ability to take into account promising areas of development of energy- and resource-efficient processes, equipment and technologies for scientific research and solving engineering problems in the field of mechanical engineering, effective quantitative methods of mathematics, physics, engineering sciences, as well as appropriate computer software for solving engineering and research problems in the field of mechanical engineering (FC 07).

1.2. According to the requirements of the program of the academic discipline "Teaching practice», after mastering it, students must demonstrate the following program learning outcomes:

- Freely present and discuss research results, scientific and applied problems of mechanical engineering with specialists and non-specialists in the state and foreign languages, publish research results in scientific publications in leading international scientific journals (PRN 02);
- Formulate and test hypotheses; use appropriate evidence to substantiate conclusions, in particular, the results of theoretical analysis, experimental studies and mathematical and/or computer modeling, available literature data (PRN 03);
- Apply modern tools and technologies for searching, processing and analyzing information, in particular, statistical methods for analyzing large-scale and/or complex data, specialized databases and information systems (PRN 05);
- Apply general principles and methods of mathematics, natural and technical sciences, as well as modern methods and tools, digital technologies and specialized software to conduct research in the field of mechanical engineering (PRN 08);
- To deeply understand the general principles and methods of mechanical engineering as well as the methodology of scientific research, to apply them in one's own research in the field of industrial mechanical engineering and in teaching practice (PRN 09);

- Organize and implement the educational process in the field of industrial mechanical engineering, its scientific, educational, methodological and regulatory support, develop and teach special academic disciplines in higher education institutions (PRN 10);
- Know the fundamental principles of the theory of hydrodynamics, heat and mass transfer, and modern methods and techniques of hydrodynamic activation of technological environments (PRN 11);
- Be able to use innovative methods of activity to implement scientific research (PRN 12).

And also to ensure the formation of additional:

- skills for independent work on solving engineering problems in mechanical engineering, deepening theoretical knowledge and practical skills for working in work teams.
- to familiarize yourself with the main areas of work of the scientific and pedagogical team of the department, the work plan of the department;
- familiarize yourself with the documentation that reflects the content of professional training and requirements for future graduates (bachelors, masters): OPP, curricula;
- get acquainted with the scientific works of the department's teachers and methodological recommendations, the laboratory base of the specialized department;
- attend several classes of the department's teachers;
- draw up a plan-synopsis of one (lecture, laboratory or practical) lesson in a professionally oriented or special discipline of the specialized department, while coordinating the chosen discipline and topic with the scientific supervisor of the postgraduate work;
- conduct one lesson in the chosen discipline;
- to study and master the basic principles and approaches to patent search for analogues of technical solutions in the chosen scientific direction;
- write a scientific article and prepare a report on the topic of the postgraduate work and the results of the patent search.

As a result of studying the course, postgraduate students should:

1. Understand the essence of such theoretical concepts as educational project, project method, research activity, creative activity, educational problem, pedagogical technologies, project portfolio.
 2. Know the characteristics and purpose of the key and thematic questions of an educational project.
 3. Be able to develop a plan for an educational project.
 4. Be able to define learning goals and expected learning outcomes.
 5. Know the basic provisions of the Copyright Law.
 6. Know the measures to protect copyright in electronic publications.
 7. Be able to search for information resources for an educational project.
 8. Be able to create a list of information sources.
 9. Search for information resources on the Internet.
 10. Be able to use email.
- 2. Prerequisites and postrequisites of the educational component (place in the structural and logical scheme of training according to the relevant educational program)**

The practice consists of the following stages: studying the structure of the unit, department, laboratory, organization of production and research activities in them; studying the range of production, research tasks, the solution of which the unit is working on; studying the essence of the individual task set by the manager, studying its place and significance in the general structure of the unit's tasks;

information support for the task, work on the relevant scientific and technical literature, guiding regulatory documents, their analysis; obtaining specific results from the development of an individual task (research, dependencies, drawings, calculations, modeling, computer programs) and their analysis; evaluating the results obtained from the point of view of their implementation in production, writing a scientific publication and the possibility of their use in the further performance of the postgraduate work; choosing and substantiating the topic of the postgraduate work.

Conducting scientific research, selecting material for a postgraduate dissertation. Determining its sufficiency and reliability.

Requirements for conducting scientific research. Sequence of conducting scientific research. Experiment as an integral part of scientific research. The role of the scientist's personality in conducting research.

General information about information. Typology of scientific information and main types of publications. Features of secondary information and its search. How to work with literature correctly.

Invention and development of scientific creativity. Discoveries and inventions. Positive effect of inventions. Formula of invention. Description of inventions. Rationalization proposals.

Forms of generalization of scientific research results. Methods of summarizing and processing experimental research results. Methods of summarizing and processing experimental research results. Requirements for the design of scientific papers.

Familiarization with the plan of the professional department and the teaching staff.

Drawing up an individual plan for teaching practice.

Familiarization with the main areas of work of the specialized department, as well as with educational and methodological literature, scientific research and organizational and educational work of teachers.

Attending lectures, laboratory and practical classes conducted by the department's teachers.

Familiarization with the methodological literature and research and laboratory base of the specialized department.

Preparation of abstracts for a report for a student conference and articles on the topic of postgraduate work for publication in a scientific collection.

Drawing up a plan-synopsis of one lesson in a professionally oriented or special discipline of a specialized department.

Preparing for the lesson.

Conducting one lesson in the chosen discipline (in front of an audience of students with the invitation of other graduate students from the same department, practice supervisors from the department, as well as supervisors of their graduate theses) and its psychological and pedagogical analysis.

Analysis and systematization of the information received and one's own experience (reflected in the diary of pedagogical practice).

Formulation of the research goal and objectives for the final postgraduate thesis.

Preparation of a report on teaching practice.

3. Content of the educational component

The object of practice is educational institutions that prepare Doctors of Philosophy in specialty 133 - Industrial Mechanical Engineering, as well as the specialized department where postgraduate students study.

During the internship, the postgraduate student is permanently assigned to one of the departments of the design bureau or the laboratory of the educational institution, where he specializes in the chosen profile and research topic.

Students can take on both unpaid jobs (one or more) and paid jobs.

Working in paid jobs does not exempt a graduate student from fulfilling all requirements of the internship program and completing the individual task specified in the diary for each graduate student separately.

Targeted balance of working hours, days:

1	Preparation of internship documents, briefing on safety techniques, the progress of the internship and its tasks	0.5
2	Work at the main place of internship	1
3	Work in the technical archive	1
4	Work in the patent office and technical information office	1
5	Excursion to other departments of the unit and educational institutions	1
6	Independent work of postgraduate students on a report on the implementation of the program	0.5
7	Final processing of practice documents	2
8	Together	7

4. Educational materials and resources

Basic literature

1. P.M. Shcherban Applied Pedagogy: Teaching and Methodological Manual - Kyiv: Higher School, - 2002. - 215 p.
2. AutoLISP in the design of technological equipment [Electronic resource]: a textbook for students of the master's degree in the educational and scientific program "Engineering and computer-integrated technologies for the design of innovative industry equipment", specialty 133 "Industrial mechanical engineering" and the program "Engineering of packaging and packaging equipment", specialty 131 "Applied mechanics" / V. Yu. Shcherbyna, O. V. Gondlyakh, A. O. Chemerys, D. G. Shvachko ; Igor Sikorsky Kyiv Polytechnic Institute. - Electronic text data (1 file:). - Kyiv: Igor Sikorsky Kyiv Polytechnic Institute, 2024. - 175 p. - Title from the screen.**URI**<https://ela.kpi.ua/handle/123456789/67865>
3. Fitsula M.M. Pedagogy of higher education: Textbook. – K.: “Akademvydav”, 2006. – 352p.
4. Vasilyuk A., Pakhotsinsky R, Yakovets N. Modern educational systems: Textbook. – Nizhyn: NDPU, 2002. – 139 p.
5. V.K. Sydorenko, P.V. Dmytrenko Fundamentals of Scientific Research. Textbook. K.: RNNC "DINIT", – 2000. – 259p.
6. V.V. Kovalchuk, L.M. Moiseyev Fundamentals of Scientific Research. Textbook. K.: Publishing House "Professional", 2007.- 240p.
7. M.M. Sverdani, M.R. Sverdani Fundamentals of Scientific Research. Textbook. Chernivtsi.: "Ruta", 2006.- 352p.
8. N.M. Kushnarenko, V.K. Udalov Scientific document processing. Textbook. K.: "Znannya", 2006. - 331 p.
9. Krasilnikova H., Samsonov V., Tarelkin S. Automation of engineering and graphic works. - St. Petersburg: Peter, 2001. - 256p.

Information resources on the Internet

1. <https://studfile.net/preview/5532354/page:4/>
2. <http://ep3.nuwm.edu.ua/4741/1/V55.pdf>

3. <http://bibliograph.com.ua/spravochnik-33/36.htm>
4. <https://studfile.net/preview/5241906/page:14/>
5. https://studopedia.su/9_43580_materlali-l-virobi-z-mIneralnih-rozplavlv.html
6. <http://um.co.ua/8/8-8/8-80177.html>
7. <https://studfile.net/preview/5241906/page:27/>
8. <http://bibliograph.com.ua/spravochnik-76/>
9. *The working program of the credit module (syllabus) is in the "Campus" system, on the "Sikorsky" platform and on the website of the department (faculty);*

Educational content

5. Methodology for mastering the educational component

- to develop skills for independent work in solving engineering problems in mechanical engineering, deepening theoretical knowledge and practical skills for working in work teams.
- to familiarize yourself with the main areas of work of the scientific and pedagogical team of the department, the work plan of the department;
- familiarize yourself with the documentation that reflects the content of professional training and requirements for future graduates (bachelors, specialists, masters): OPP, curricula;
- get acquainted with the scientific works of the department's teachers and methodological recommendations, the laboratory base of the specialized department;
- attend several classes of the department's teachers;
- draw up a plan-synopsis of one (lecture, laboratory or practical) lesson in a professionally oriented or special discipline of the specialized department, while coordinating the chosen discipline and topic with the scientific supervisor of the master's thesis;
- conduct one lesson in the chosen discipline;
- to study and master the basic principles and approaches to patent search for analogues of technical solutions in the chosen scientific direction;
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As a result of studying the course, students should:

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3. Be able to develop a plan for an educational project.
4. Be able to define learning goals and expected learning outcomes.
5. Know the basic provisions of the Copyright Law.
6. Know the measures to protect copyright for electronic publications.
7. Be able to search for information resources for an educational project.
8. Be able to create a list of information sources.
9. Search for information resources on the Internet.
10. Be able to use email.
11. Be able to create a multimedia presentation.

Policy and control

6. Educational component policy

Rules for class attendance and behavior in class

Students undergo internships in design bureaus of enterprises and institutions.

Approximate time balance:

1. Organizational activities, safety briefing and introduction to the company - 1 day.
2. Familiarization with the equipment of the enterprise, the student's main workplace, visits to workshops, departments and laboratories - 4 days.
3. Completion of an individual task (work at the workplace) - 1 day.
4. Preparation of the report and preparation of the practical assessment - 1 day.

Total -7 days

Rules for assigning incentive and penalty points

- Incentive points can be awarded by the teacher exclusively for performing creative works in the discipline or for additional completion of online specialized courses with obtaining the appropriate certificate:
 - <https://www.port.ac.uk/study/courses/beng-hons-innovation-engineering>;
 - Other courses may be credited upon agreement with the instructor.
- Penalty points are not provided within the framework of the academic discipline.

Deadline and Rescheduling Policy

In the event of academic discipline arrears or any force majeure circumstances, students should contact the teacher via available (provided by the teacher) communication channels to resolve problematic issues and agree on an algorithm of actions for completion.

Academic Integrity Policy

Plagiarism and other forms of dishonest work are unacceptable. Plagiarism includes the lack of references when using printed and electronic materials, quotes, opinions of other authors. Hints and copying when writing tests, conducting classes are unacceptable; taking credit for another student; copying materials protected by the copyright system without the permission of the author of the work.

The policy and principles of academic integrity are defined in Section 3 of the Code of Honor of the National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute". More details:<https://kpi.ua/code>

Academic Conduct and Ethics Policy

Students should be tolerant, respect the opinions of others, formulate objections in a correct form, and provide constructive feedback in class.

The norms of ethical behavior of students and employees are defined in Section 2 of the Code of Honor of the National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute". More details:<https://kpi.ua/code>

7. Types of control and rating system for assessing learning outcomes (RSO)

Distribution of study time by types of classes and tasks in the educational component:

Semester	Study time		Distribution of teaching hours				Control measures		
	Loans	academic year	Lectures	Practical (seminar)	Lab work	CRC	MKR	abstract	Semester control
3	3	90	-	-	-	90	-	-	test

A student's rating for the educational component consists of the points he receives for:

A graduate student's rating for the educational component consists of the points he receives during the internship period.

Semester control test.

Rating (weighting) points system and evaluation criteria

The rating score for pedagogical practice R has two components. The first (starting R_c) characterizes the work of the postgraduate student on pedagogical practice and its result - the quality of the explanatory

note, thesis and graphic material. The second component R_z characterizes the quality of the postgraduate student's defense of the report on pedagogical practice.

The scale size of the starting component R_c is 60 points, and the protection component R_z is –40 points.

7.1 Starting component R_c :

- Timeliness of implementation of the teaching practice work schedule – 25-10 points;
- modernity and justification of decisions made – 12-7 points;
- correct application of analysis and calculation methods – 10-6 points;
- quality of design, fulfillment of requirements of regulatory documents (report, abstracts) – 6-4 points;
- quality of graphic material and compliance with standards – 7-4 points.

7.2 Component of the defense of the teaching practice report:

- quality of the report with presentation – 10-6 points;
- degree of mastery of the material – 10-5 points;
- the degree of justification of the decisions made – 10-5 points;
- ability to defend one's opinion – 10-2 points.

The rating of the maximum points of a postgraduate student R in pedagogical practice consists of two components: $R = R_c + R_z = 40+60=100$ points. If $R < 30$ points, then the student is not allowed to defend the practice.

7.3 The sum of the scores of the two components is converted to a credit score according to the rating scores R is converted according to the table:

<i>Number of points</i>	<i>Rating</i>
<i>95...100</i>	<i>perfectly</i>
<i>85...94</i>	<i>very good</i>
<i>75...84</i>	<i>good</i>
<i>65...74</i>	<i>satisfactorily</i>
<i>60...64</i>	<i>enough</i>
<i>RD < 60</i>	<i>unsatisfactorily</i>
<i>Admission conditions not met</i>	<i>not allowed</i>

8. Additional information on the educational component

Approximate list of questions that will be assessed

1. *Types of classes at the university and their structure.*
2. *Final report on teaching practice: structure and requirements.*
3. *Self-analysis of the lesson.*
4. *Requirements for preparation and conduct of classes.*
5. *Pedagogical mentoring: the role of the teacher as a mentor.*
6. *Characteristics of the student group.*

7. *Planning and conducting an educational event.*
8. *Methods of motivating students' academic activities.*
9. *The purpose and objectives of pedagogical practice.*
10. *Stages of pedagogical practice.*
11. *Documentation kept by the student during the internship.*
12. *Structure of an individual internship plan.*
13. *Characteristics of an educational institution as a base for practice.*
14. *Forms of organizing the educational process at the university.*
15. *Methods of resolving conflict situations in a group.*
16. *Pedagogical observation: purpose, methods, recording of results.*
17. *Drawing up a lesson plan-synopsis.*
18. *Modern methods of teaching technical disciplines.*
19. *Methods of activating students' cognitive activity.*
20. *Teaching aids and their use in class.*
21. *Interactive teaching methods.*
22. *Criteria for assessing student knowledge.*
23. *Psychological and pedagogical characteristics of the student.*
24. *Formation of key competencies of students.*
25. *Forms of extracurricular educational work.*
26. *Types of pedagogical control and evaluation.*
27. *Fundamentals of pedagogical ethics.*
28. *Difficulties that a student may encounter during practice and ways to overcome them.*
29. *The role of self-reflection during pedagogical practice.*
30. *Interaction between a student-intern and a teacher-methodologist.*
31. *Characteristics of pedagogical communication styles.*
32. *Requirements for the teacher's language and speech.*
33. *Training of student interns in the work of methodological associations.*
34. *The role of feedback in the learning process.*
35. *Features of conducting online lessons during practice.*
36. *Types of educational projects and their implementation.*
37. *Working with gifted students.*
38. *Collaboration with colleagues during internship.*
39. *Organization of learning space in a group.*
40. *Educational opportunities of the subject.*
41. *Design preparation for the production of a new product*
42. *A system of state standards that define the composition of the stages of DKR*
43. *Organizational and economic measures for engineering and consulting activities*
44. *Specialized services for implementing innovative processes at machine-building enterprises.*
45. *Differences between engineering and design*
46. *Requirements for an Innovator Specialist: Matchtech Engineering Recruitment Specialists*
47. *Post-project engineering*
48. *Comprehensive engineering*
49. *List the characteristics and purpose of the curriculum and thematic questions*
50. *Engineering services*

Work program educational component (syllabus):

Compiled assistant, Shvachko D.G.

Approved by the department ____KhPSM____ (minutes No. 17 dated 04.06.2025)

Agreed Methodological Commission of the Faculty of Chemical Engineering (Minutes No. 11 dated 06/27/2025)