Syllabus of the educational component

UNDERGRADUATE PRACTICE

Code and name of specialty
161 – Chemical technologies and engineering

Institute
educational scientific institute of chemical technologies and engineering

Educational program
Oil, gas and solid fuel processing technologies

Department
Oil, gas and solid fuel processing technologies

Educational level
Bachelor

Type of educational component
Special (professional), Mandatory

Semester
8

Language of teaching
English

Developers



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General information

Abstract

Pre-diploma practice is an integral part of the process of training specialists of higher education after completing theoretical studies in the specialty 161 "Chemical technologies and engineering" at the National Technical University "Kharkiv Polytechnic Institute" at the department "Oil, gas and solid fuel processing technologies".

It is aimed at consolidating theoretical knowledge acquired by students of higher education during their studies, acquiring and improving their practical skills and abilities, determined by the educational and qualification characteristics of the training of specialists according to the relevant educational and professional program, and is the final stage of practical training of students of higher education.

Pre-diploma practice is designed to ensure students' familiarity with the main characteristics of real enterprises, institutions, organizations according to the specialty profile, mastering the most important practical work skills. Pre-diploma practice creates conditions that ensure that students of higher education not only consolidate theoretical positions and knowledge of special subjects, but also acquire practical skills for work in their specialty.

Purpose and tasks

The purpose of the pre-diploma internship is to consolidate and deepen the knowledge acquired by students in the process of study, to acquire practical skills in setting up and implementing practical tasks, in particular on the subject of the thesis, to gain experience in independent and organizational work in the most important areas of activity under the Chemical Technologies and Engineering educational program .

An important element of pre-diploma practice is the collection and analysis of practical and statistical materials for the performance of qualification work.

Format of classes

Independent work, practice diary, consultations. Final control - credit.

Competences

Program competencies according to the educational program:

Ability to demonstrate knowledge and understanding of basic facts, concepts, principles and theories pertaining to chemical technology and engineering.

Ability to use methods of observation, description, identification, classification of objects of chemical technology and industrial products.

Ability to use knowledge and understanding of general chemical technology, processes and apparatus of chemical industries for analysis, evaluation and design of technological processes and equipment.

Ability to process and interpret data related to chemical technology and engineering, to relate them to relevant theories.

Ability to select and use appropriate equipment, tools and methods for implementation and control of chemical production.

The ability to use computing and information technology to solve practical problems in the field of chemical engineering.

The ability to take into account the commercial and economic context when designing chemical plants.

The ability to process the results of experiments using modern statistical methods and software tools.

Skills of safe handling of chemical materials, taking into account their physical and chemical properties, including the dangers associated with their use.

Ability to draw up scientific and technical documentation in accordance with current requirements.

Learning outcomes

Program learning outcomes according to the educational program:

Ability to apply knowledge and understanding of chemistry to solve qualitative and quantitative problems in chemical engineering and technology.

Ability to demonstrate an understanding of the broad interdisciplinary context of the major.

The ability to solve complex specialized tasks and practical problems in education and professional activity based on a critical understanding of knowledge of the main theories, principles, methods and advanced achievements of chemical engineering and technologies, as well as alternative energy.

The ability to assess the influence of technological factors on the composition of the final product.

Ability to search literature, consult and critically use scientific databases and other relevant sources of information, perform modeling and analysis for the purpose of detailed study and research of engineering issues according to specialization.

The ability to correlate the results of experimental research and mathematical modeling of chemical and chemical-technological processes with relevant theories.

The ability to investigate the influence of physical and chemical factors on the properties of the object of research or design.

The ability to use modern information and communication technologies to solve the problems of chemical engineering and technologies, as well as alternative energy sources.

The ability to carry out technical and economic substantiation of chemical production, to possess methods of improving the technological process, to understand theoretical and practical approaches to the creation and management of production.

The ability to carry out and justify the choice of technological equipment, to use automated design systems for the development of a technological and equipment scheme of chemical and technological production, in particular, in the field of alternative energy resources.

The ability to convey information, ideas, problems, solutions and own experience in the field of chemical engineering to specialists and non-specialists in the state language and one of the main European languages.

Ability to follow safety procedures at the workplace.

Ability to effectively form a communication strategy.

The scope of the educational component

The total scope of the discipline is 180 hours. (6 ECTS credits): independent work – 180 hours.

Prerequisites for studying the educational component (prerequisites)

To successfully pass the course, you must have knowledge and practical skills in the following disciplines: general and inorganic chemistry, organic chemistry, analytical chemistry, physical chemistry, processes and devices of chemical technology, general chemical technology, physics and chemistry of combustible minerals, the basics of the technology of processing solid combustible minerals, basics of oil and gas processing technologies, modern methods of preparation and purification of oil and gas raw materials, basics of industry production design, technologies of production and use of steam in the processing of hydrocarbon raw materials, automotive operating materials, oil storage equipment, methods of determining the quality of oil, gas and processing products, equipment of oil and gas processing industries, technologies of carbon materials, collection and preparation of hydrocarbon raw materials, equipment of gas distribution stations, equipment for the processing of solid combustible minerals, fundamentals of scientific research, modern methods of preparation and purification of oil and gas raw materials, methods of analysis of fuel processing products, methods of utilization of industrial waste processing of hydrocarbon raw materials, processing of oil factory gases into components of motor fuels, production of motor fuels from non-traditional raw materials, technologies for the production of modified bitumen.

Features of the educational component, teaching methods and technologies

Pre-diploma practice is aimed at consolidating, systematizing and deepening the theoretical knowledge that students have acquired while studying general technical and special disciplines.

The content and sequence of the pre-diploma practice is determined and developed by the graduation department "Oil, gas and solid fuel processing technologies according to the curriculum in accordance with the educational and professional training program for higher education applicants, considered at the department meeting and approved according to the regulatory documents of the NTU "KhPI".

The pre-diploma practice of higher education students involves the study, collection, processing and systematization of materials for writing a qualification paper.

The content of pre-diploma practice is determined by the field of activity of the enterprise, organization or institution that is the base of the practice, the field of diploma research and must meet the requirements of the specialist's educational qualifications.

An important stage of the internship is the analysis and assessment of the enterprise's production and economic activity, which involves: familiarization with the rules of the internal labor regulations at the enterprise; training on labor protection and fire safety; familiarization with the technological scheme of the enterprise and technological schemes of individual production divisions of the enterprise; with the materials and raw materials used in the technologies, the products obtained; automation of production processes; the system of control of working conditions at the enterprise; auxiliary and service units that are part of the practice base, etc. Also, students can participate in research, debugging and implementation works, if they coincide with the topic of the diploma project (work). The obtained results can be used when writing a qualification paper

Tasks of pre-diploma practice:

– familiarization with the history, general structure of the enterprise and relationships between structural elements;

– study of the specific technological process and equipment of the main and auxiliary units of the enterprise;

– familiarization with issues of organization of scientific research work of the enterprise;

– acquisition of practical skills, knowledge and skills in professional work in the collective of an industrial enterprise or organization, experience in business communication and rules of professional ethics;

- acquisition by students of independent practical skills in the fields of processing fossil fuels;

– application of the knowledge gained in the training process directly within the organizational structure where practice takes place;

– study of the content of normative documents regulating the activity of an enterprise or organization;

- fostering the need to systematically update one's knowledge and creatively apply it in practical activities;

- familiarization with the nomenclature of the company's products and services, types of production, production structure, management structure, organization of technology, labor and environmental protection measures, etc.;

- familiarization with the purpose of the main and auxiliary equipment, their relationship in the technological chain;

- acquisition of skills for working with technological documentation;

- familiarization with the methods of control and management of product quality, the system of labor protection and safety technology, protection of the surrounding environment;

- familiarization with the system of interstate, state, industry standards, enterprise standards, the main regulatory documents used;

- familiarization with modern software used at the enterprise.

– collection of materials for the report and diploma project.

In accordance with the requirements of the educational and professional program, passing the internship contributes to the formation of the following competencies in students:

- communicate freely orally and in writing in the national language on professional matters.

- to be capable of social interaction;

- have the ability for interpersonal communication;

- be able to work in a team;

– consolidation, expansion, deepening and systematization of theoretical knowledge obtained during the study of general engineering, special, technological and professional disciplines;

– formation of students' professional skills, abilities, competencies and certain experience necessary for further professional activities;

– independently use theoretical knowledge and practical skills and abilities when working at water treatment and water treatment plants and enterprises (organizations);

– conduct scientific research at the modern level, perform real-life and simulation experiments, give a reasonable interpretation of the obtained results;

– master the skills and abilities of working with documentation, performing chemical-technological calculations.

As a result of the pre-diploma internship, applicants of higher education must demonstrate the following results:

knowledge:

– the structure of the enterprise (organization), its main and auxiliary links, and the structure of the enterprise (organization) management;

– technological processes of production, structures of the main and auxiliary equipment;

– occupational health and safety issues at the enterprise (in the organization);

– features of control and management of the main indicators of technological processes and issues of the use of computer equipment for the management of technological processes;

– issues of ecology and environmental protection;

– economic aspects of the company's activity, components of the production cost.

Skills:

– to develop and implement projects related to technologies and equipment of fuel processing industries;

– choose and use appropriate equipment, tools and methods when solving complex problems of chemical engineering;

– use knowledge of general laws of mechanisms and kinetics of chemical processes when designing and improving technological processes;

– collect, analyze and process the data necessary to solve the technical tasks;

– on the development and execution of technical documentation in accordance with state standards;

– use modern computer technology, specialized software to solve complex problems in the field of chemical engineering.

Experience:

– implementation of qualitative and quantitative analysis of substances of inorganic and organic origin;

– collection and analysis of raw data from the technological equipment of enterprises for the selection and justification of scientific, technical and organizational solutions;

– use of modern technical means and information technologies to solve the tasks;

– work with control and measuring devices and test equipment.

Practice structure

Practice base

Training, production and scientific divisions of the University, modern enterprises of the oil, gas and coal processing industries in Ukraine and abroad, institutes or design bureaus, scientific and technical centers that have appropriate conditions for training can be the bases for practice.

The definition of practice bases is carried out by the Department of Oil, Gas and Solid Fuel Processing Technologies of KhPI National Technical University on the basis of direct contracts with enterprises, organizations, institutions, regardless of their organizational and legal forms and forms of ownership, taking into account the possibility of future employment of students.

When training specialists under targeted contracts, the bases of practice are enterprises, organizations and institutions for which such training is carried out.

In agreement with the department "Oil, gas and solid fuel processing technologies", which organizes the internship, students can independently choose the place of internship and propose the relevant contracts for conclusion.

For students of higher education who are foreign citizens, practice bases are provided for in the relevant agreement on the training of specialists and can be located on the territory of the client countries or within Ukraine.

Graduates of higher education can undergo practice outside of Ukraine in accordance with the procedure established by current legislation and cooperation agreements concluded by the University with other institutions of higher education, scientific institutions, etc. of other states.

The University may enter into an agreement with one or several enterprises (organizations, institutions).

The main objects of practice are LLC "CHEMCONSULTING TRADE", NATURAL GAS SCIENTIFIC RESEARCH INSTITUTE (UKRNDIGAZ) BRANCH OF UKRGAZVYDOBUVANNYA JOINT STOCK COMPANY, PJSC Kharkiv Coke Plant, SE "UKHIN".

Practice guide

The organizer and head of the pre-diploma internship is the Department of "Oil, Gas and Solid Fuel Processing Technologies" of KhPI National Technical University. The production practice is carried out in accordance with the program agreed with the enterprise before the beginning of the practice.

General organizational, educational, methodological and scientific management is carried out by the head of the department "Oil, gas and solid fuel processing technologies".

Management and control over the work of students during production practice is entrusted to managers: teachers of the department "Oil, gas and solid fuel processing technologies".

In the case of an internship outside KhPI National Technical University, an internship supervisor is appointed from the university and from the relevant enterprise (organization, institution). Managers at the places of direct practice (department, workshop, production site) are appointed as the manager of practice from the enterprise (practice base).

Obligations of the acquirer

Applicants who undergo pre-diploma practice are obliged to:

- get acquainted with the internship program and the content of the work he will perform, receive documents from the internship supervisor (individual tasks, methodical recommendations, etc.);
– before the start of practice, receive advice from the head of practice on the topic of work, the procedure for drawing up all necessary documents;
- come to the enterprise according to its working hours and follow the practice schedule;
- to comply with the rules of internal procedure in force at the enterprise;
- make entries in the practice diary, record the composition and volume of work performed daily;
- to agree and submit to the head of the practice for approval the work schedule and adhere to the deadlines for its implementation;
- perform all the tasks provided for in the internship program;
- in case of lateness or omission, explain the reason, provide the necessary documents confirming it;
- at the end of the pre-diploma internship, in a timely manner, no later than a ten-day period, to protect and submit to the department a report on the internship and a diary, signed by the internship manager from the company and certified with a seal.

At the end of the diary, the internship manager from the enterprise issues an assessment and gives a stamped "production" characteristic of the intern.

During the introductory practice period, the student must:

- show high moral qualities, activity;
- strive to show their professional competence.

Students have the right to:

- for all questions that arise during practice, contact the practice managers from the university, the administration and the managers of the practice base;
- make your own proposals for improving the educational process, organization of practice;
- participate in conferences and meetings;
- to use the material and technical base of the educational institution (library, specialized offices, teaching and methodical manuals, technical means for the purpose of performing practice tasks.

Duties of the head of practice from the educational institution

The head of the pre-diploma practice on behalf of the university is obliged to:

- familiarize students with the practice program, clarify individual tasks for them in a timely manner;
- help the intern to develop a calendar schedule for industrial practice and approve it;
- to advise the intern on the issues of passing the internship, drawing up a diary and writing a report;
- monitor the implementation of the practice schedule and the quality of work;

- check the quality and sufficiency of the materials collected in practice reports, sign them and participate in commissions for the protection of reports.

The head of practice on behalf of the enterprise is obliged to:

- lead a conversation with interns about the peculiarities of the production process at the enterprise;
- provide each intern with a workplace and appoint a manager from a specific unit where the internship is carried out;
- monitor the implementation of the intern's work schedule;
- give a written description (certified by the company's seal) to each intern assigned to him.

Responsibilities of the head of the practice from the base enterprise

The head of practice from the enterprise is appointed by order of the enterprise and directly organizes and supervises the completion of practice by students in accordance with the work program of practice.

The head of the practice base must:

- to ensure timely conduct of briefings on labor protection;
- to provide methodical assistance, guidance and control over the student's performance of all work provided for in the practice program and individual assignment;
- check the practice diary, the materials of the submitted report and the completed work, make appropriate entries (marks);
- organize production tours;
- give feedback on the student's work.

Practice calendar

Week	Practice stage	Type of works
1	Consultation in an educational institution regarding the completion of practice, obtaining methodical materials for the performance of an individual task	Advice
1-3	Performance of practice tasks at the enterprise	Independent work
4	Presentation of reporting documentation	Advice
5	Compilation of a credit on production practice	Test

The topic of an individual task

The topic of the student's individual assignment corresponds to the following main areas:

– Oil processing to obtain a wide range of marketable petroleum products;
– Design of equipment for oil, coal and gas condensate processing processes;
– Methods of assessing the quality of oil, oil products (gasoline, diesel fuel), coal and gas;
– Production of alternative fuel;
– Oil sludge processing;
– Production of all types of lubricants and motor oils, additives;
– Synthesis gas production;
– Coking, gasification of coal;
– Production of graphite materials;
– Cleaning and disinfection of waste water.

In particular:

– the use of solid combustible fossils in the joint production of coke and reducing gas;
– complex processing of weakly metamorphosed coal with the production of hydrocarbons as raw materials for organic synthesis; increasing the level of qualified use of oil;
- increasing the efficiency of operation of road transport;
– development of new methods for diagnosing the quality of lubricants;
– improvement of the system of technical maintenance of the vehicle fleet of motor vehicle enterprises;
– development of chemical production automation systems;
- determination of the quality of samples of coke enriched with inorganic impurities;

– research in the field of production of carbon graphite materials;
- development of new methods for diagnosing the quality of fuels, lubricating oils, lubricants;
– activated carbon production technology;
– development of methods for predicting the quality of blast furnace coke and yield of chemical coking products;
– selection of rational schemes for the preparation of coal charges at domestic coke chemical enterprises;
– research in the field of isolation of polycyclic hydrocarbons from coal tar and synthesis of compounds with useful consumer properties based on them;
- thermochemical technologies for obtaining substitutes for oil and natural gas processing products from coal (thermolysis, gasification, semi-coking);
– new coking technologies (without capturing chemical products, formed coke);
- improvement of the production technology of obtaining coke;
– use of coke in blast furnace process;
– energy saving in coke production;
– increasing the output of light fractions from oil after hydrodynamic treatment;
– research of effective methods of decontamination of waste from coke-chemical and metallurgical industries;
- development of the theoretical foundations of technologies for the processing of oil waste from the chemical industry into motor fuels.

Literature and educational materials

Basic literature:

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Assessment and grading

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

Points are awarded according to the following ratio:
independent work: 100% of the semester grade

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": to demonstrate discipline, good manners, kindness, honesty, and responsibility. Conflict situations should be openly discussed in academic groups with a lecturer, and if it is impossible to resolve the conflict, they should be brought to the attention of the Institute's management.
Regulatory and legal documents related to the implementation of the principles of academic integrity at NTU "KhPI" are available on the website: http://blogs.kpi.kharkov.ua/v2/nv/akademichna-dobrochesnist/

Approval

Syllabus Approved by	Date, signature	Head of the department Denys MIROSHNYCHENKO
	Date, signature	Guarantor of the educational program Iryna SINKEVYCH