Національний технічний університет України
«КИЇВСЬКИЙ ПОЛІТЕХНІЧНИЙ ІНСТИТУТ
імені ІГОРЯ СІКОРСЬКОГО»

Machines and devices of chemical and oil refining industries

Pre-diploma practice

Working program of the academic discipline (Syllabus)

Details of the academic discipline

Level of higher education	***Second (master's)***
Branch of knowledge	*13 Mechanical engineering*
Specialty	*133 Industrial engineering*
Educational program	*Computer-integrated technologies of chemical engineering equipment design*
Discipline status	*Mandatory*
Form of education	*daytime*
Year of training, semester	*2nd year, autumn semester*
Scope of the discipline	*6 credits*
Semester control/ control measures	*Test*
Lessons schedule	*http://rozklad.kpi.ua/Schedules/ScheduleGroupSelection.aspx*
Language of teaching	*Ukrainian*
Information about head of the course / teachers	*Supervisors of master's degrees*
Placement of the course	https://ci.kpi.ua/uk/syllabuses-bac-disciplines/#place

Purpose and tasks of practice

Description of the educational discipline, its purpose, subject of study and learning outcomes
The purpose of the educational discipline.

The purpose of the educational discipline is to form students' competence:

- *Ability to generate new ideas (creativity).*
- *Ability to think systematically.*
- *Ability to achieve set goals.*
- *Abilityapply professional knowledge to conceptualize engineering solutions;*
- *Abilityprepare raw data for the selection and justification of scientific, technical and organizational decisions;*
- *Abilityuse knowledge to analyze engineering products, processes and methods; the ability to choose and apply appropriate analytical methods and mathematical modeling methods;*
- *Abilityprovide modeling of technical objects and technological processes using standard packages and means of automation of engineering calculations, conduct experiments according to specified methods with processing and analysis of results;*

1.2. The main tasks of the academic discipline.
After mastering the academic discipline, students must demonstrate the following learning outcomes:

- *knowledge of the structure and production programs of the workshop, KB, department, laboratory; peculiarities of the technological process, design and construction or scientific research works, regularities of calculation, design, operation, repair of the main technological equipment; technical and economic indicators of work of the shop, department, KB of the laboratory; measures on safety technology, labor protection, fire-fighting equipment, production ecology.*

1. Organization of practice

1. The head of the institution of professional preliminary higher education is responsible for organizing and conducting practical training of applicants of professional preliminary higher education. Measures related to the organization of practical training are determined by the orders of the head of the vocational pre-higher education institution.

2. The general organization of practice and control over its conduct in the educational institution is carried out by the head of practice of the educational institution (deputy director or head of educational and industrial practice), who is appointed by order of the head of the institution of vocational pre-higher education.

3. Educational and methodical guidance and implementation of the practical training program are provided by the responsible cyclical commissions, which are determined by the order of the head of the vocational pre-higher education institution.

4. Direct supervision of practices of students of professional preliminary higher education is carried out by practice supervisors from the educational institution, who are determined by the order of the head of the professional preliminary higher education institution, and (except for practice in the structural divisions of the professional preliminary higher education institution) practice supervisors from the practice base, who are determined by the management of the practice bases, respectively to the agreement on conducting practical training for students of professional preliminary higher education.

5. Pedagogical and scientific-pedagogical workers of the vocational pre-higher education institution are involved in the management of practice from the educational institution. Experienced employees of the responsible cycle commissions are given preference when appointing practice managers from the educational institution. The task of the head of practice from the educational institution is determined by the Regulation on the organization of the educational process in the institution of vocational pre-higher education, and his authority on the basis of practice is determined by the contract on practical training of students of vocational pre-higher education.

6. The rights and responsibilities of practice managers from the practice base are determined by the contract on conducting practical training for students of professional preliminary higher education.

7. The institution of vocational pre-university education provides the students of vocational pre-university education with places of practice in accordance with the educational and professional programs and agreements on the practical training of the vocational pre-university education recipients. In the case of practice in a structural unit of a vocational pre-higher education institution, the duty to ensure safe and harmless working conditions rests with the head of the educational institution. During the course of practical training, it is forbidden to use the work of students of professional preliminary higher education for purposes not provided for in the educational and professional program.

8. Applicants of professional preliminary higher education can undergo practical training through on-the-job training in the process of performing official duties. An educational institution can count practical training in the order of recognition of learning outcomes determined by the educational and professional program, which were obtained during the student's work during the course of the course or before it began.

9. The duration of working hours of a professional preliminary higher education student during educational practices should not exceed 36 academic hours per week, during industrial practices - the duration of the working day, taking into account the age of the students in accordance with the legislation. During practice, students are fully subject to the internal work schedule of the practice base.

10. During the educational practice, the academic group can be divided into subgroups of at least 8 people.

11. Practical training of vocational pre-higher education students with special educational needs is carried out taking into account their individual needs and capabilities.

2. Content of the academic discipline

Section 1. Safety techniques and labor protection

Topic 1.1. Safety equipment and occupational health and safety at the practice facility
Topic 1.2. Safety equipment and labor protection in the unit
Topic 1.3. Safety techniques and occupational health and safety at workplaces
Topic 1.4. Study of the ecological foundations of environmental protection

Section 2. General information about the object of practice

Topic 2.1. Study of the work of the main structural divisions, the organization of their production and research activities
Topic 2.2. Studying the specifics of work and the range of production, scientific and research tasks, the solution of which is being worked on by a separate structural unit
Topic 2.3.Study of technical and economic indicators of the unit's work efficiency
Chapter 3. Work on an individual task
Topic 3.1. Preparation and study of materials for an individual task
Topic 3.2. Carrying out clarifying laboratory studies
Topic 3.3. Processing and generalization of experimental research results
Topic 3.4. Checking the provisions of mathematical and physical modeling and the scientific novelty of the proposed solutions
Topic 3.5. Conclusions and recommendations regarding the method of calculating processes and equipment of the chosen scientific direction

3. Individual tasks

Individual tasks are determined by the head of practice depending on the topic of the master's thesis and must take into account the specifics of the topic.
A. List of the theoretical part:
1 Purpose and field of use of the installation
1.1 Description of the technological process
1.2 Selection of the type of installation, devices, their place in the technological scheme
- device 1
- device 2
2 Technical characteristics of the main devices of the installation
3 Description and justification of the selected device design
3.1 Design and principle of operation of devices, main components and parts
- device 1

- device 2
3.2 Comparison of the main indicators of the developed apparatus designs with analogues
- device 1
- device 2
3.3 Selection of materials for apparatus design elements
3.4 Patent review of the designs of the main equipment of the installation
- device 1
- device 2
4 Calculations confirming the performance and reliability of structures
4.1 Parametric calculation of the device 1
4.2 Results of computer modeling of interaction processes in the device, a simulation experiment confirming the proposed modernization
4.3 Calculations for strength and stability 1
4.4 Parametric calculation of the device 2
4.5 Calculations for the strength and stability of apparatus 2 (The total number of calculations for strength and stability is at least 6 for two apparatuses)

B. List of graphic material:
installation schematic diagram - A1,
automatic control scheme - A1,
assembly drawing of device 1,
units and parts of the apparatus 1 - 1...2 A1 format,
assembly drawing of the device 2,
units and parts of the device 2 — 1...2 A1 formats,

illustration of the technical idea of the patent, results of computer modeling of interaction processes in the device, simulation experiment confirming the proposed modernization - 2...3 A1 formats.

4. Educational materials and resources

3.1 Basic

1. *Methodical instructions for the completion of the report on pre-diploma practice of the educational and qualification level "MASTER" for students studying in the field of training 6.050503 Mechanical engineering, specialty 8.05050315 "Equipment of chemical production and construction materials enterprises": [Electronic resource]: / NTUU "KPI"; structure. A.R. Stepaniuk - Kyiv: NTUU "KPI", 2014. - 21 p.(Full text, pdf, 0.65 Mb)*
2. *V.V. Kovalchuk, L.M. Moiseev. Basics of scientific research: Education. manual. – K.: VD "Professional", 2007. – 240 p.*
3. *V.K. Sydorenko, P.V. Dmytrenko. Basics of scientific research: Education. manual. – K.: RNNC "DINIT", 2000. – 259 p.*
4. *Vasylyuk A., Pakhotsynskyi R., Yakovets N. Modern educational systems: Education. manual. - Nizhin: NDPU, 2002. - 139 p.*
5. *DSTU 2777–94 Heat exchange during boiling and condensation. Terms and definitions.*
6. *Sverdan M.M., Sverdan M.R. Basics of scientific research: Education. manual. – Chernivtsi: Ruta, 2006. – 352 p.*
7. *Kushnarenko N.M., Udalov V.K. Scientific processing of documents: Textbook. - K.: Znannia, 2006. - 331 p.*

Educational content

5. Independent work of student

Independent work is 100% study of the credit module, which includes preparation for the credit. The main task of students' independent work is to deepen their worldview and scientific knowledge in the directions by searching for the necessary information, forming perseverance and creative search in the formation of working hypotheses for the intensification of transfer processes.

Policy and control

6. Policy of academic discipline (educational component)

Rules for assigning incentive and penalty points

- *incentive points can be awarded by the teacher exclusively for the performance of creative works and working hypotheses.*
  But their sum cannot exceed 25% of the rating scale.
- *Penalty points are not provided within the academic discipline.*

Policy of deadlines and rescheduling

In case of academic debts arising from the academic discipline or any force majeure circumstances, graduate students should contact the teacher to coordinate the algorithm of actions related to solving existing problems.

Policy of academic integrity

Plagiarism and other forms of dishonest work are unacceptable. Plagiarism refers to the absence of references when using printed and electronic materials, quotes, opinions of other authors. Inadmissible tips and write-offs during writing tests, conducting classes.
The policy and principles of academic integrity are defined in Chapter 3 of the Code of Honor of the National Technical University of Ukraine "Ihor Sikorsky Kyiv Polytechnic Institute". More details:https://kpi.ua/code

Policy of academic behavior and ethics

Graduate students must be tolerant, respect the opinion of others, formulate objections in the correct form, adequately support feedback during classes.
Standards of ethical behavior of students and employees are defined in Chapter 2 of the Code of Honor of the National Technical University of Ukraine "Ihor Sikorskyi Kyiv Polytechnic Institute". More details:https://kpi.ua/code

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

Distribution of study time by types of classes and tasks in the discipline according to the working study plan:

Semester	Training time		Distribution of study hours				Control measures		
	Credits	Acad. hours	Lectures	Practical	Lab. do	SRS	MKR	RR	Semester control
10	6	270	-	-	–	270	-	–	test

The student's rating in the discipline consists of the points he receives for:
Work on the report and assessment.

Semester control is credit.

System of rating (weighted) points and evaluation criteria

The system of rating points and evaluation criteria:

Report execution and report protection

R =20+80 = 100 points

The maximum number of points is 100. To receive credit from the credit module "automatically" you need to have a rating of at least 60 points.

A necessary condition for admission to credit is a rating of at least 40% of the rating scale (R), i.e. 40 points.

Students who scored a rating of less than 0.6 R during the semester, as well as those who want to improve the overall rating, complete a credit test. At the same time, all the points they received during the semester are cancelled. Test tasks contain questions that refer to different sections of the credit module. The list of assessment questions is given in Chapter 9.

To obtain a passing grade, the sum of all rating points R received during the semester is converted according to the table:

Scores	***Rating***
95...100	*perfectly*
85...94	*very good*
75...84	*fine*
65...74	*satisfactorily*
60...64	*enough*
RD<60	*unsatisfactorily*
Admission conditions not met	*not allowed*

Working program of the academic discipline (syllabus):
Compiled by Roman Sachko, senior lecturer of the Department of the National Academy of Sciences, candidate of technical sciences
Approved by the Department of the Academy of Medical Sciences (protocol No. 19 dated May 17, 2023)
Agreed by the Methodical Commission of the faculty (protocol No. 10 dated 05/26/2023)