



Syllabus Course Program

Methods of disposal of production waste from the processing of hydrocarbon raw materials

Specialty

161 – Chemical technologies and engineering

Educational program

Oil, gas and solid fuel processing technologies

Level of education

Bachelor's level

Semester

7

Institute

SEI chemical technologies and engineering

Department

Oil, gas and solid fuel processing technologies

Course type

Selective

Language of instruction

English

Lecturers and course developers



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Candidate of technical sciences, associate professor, professor of the department "Technologies of oil, gas and solid fuel processing" of KhPI National Technical University

Author of more than 120 scientific and educational and methodological works.

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

General information

Summary

Acquisition of theoretical knowledge about the nomenclature, properties and directions of utilization of the main wastes of hydrocarbon processing industries...

Course objectives and goals

Acquaintance of students with the main properties, ecological characteristics and methods of disposal of the main waste generated during the processing of hydrocarbon raw materials..

Format of classes

Lectures, practical works, consultations. The final control is an exam.

Competencies

The ability to use the provisions and methods of fundamental sciences to solve professional problems.
Ability to use methods of observation, description, identification, classification of objects of chemical technology and industrial products

Ability to design chemical processes taking into account technical, legislative and environmental constraints.

Learning outcomes

Choose and use appropriate equipment, tools and methods for solving complex problems of chemical engineering, control and management of technological processes of chemical production..

Student workload

The total volume of the discipline is 120 hours: lectures - 32 hours, practical works - 16 hours, independent work - 72 hours.

Course prerequisites

To successfully complete the course, you must have knowledge and practical skills in the following disciplines: "General and Inorganic Chemistry", "Processes and Apparatus of Chemical Technology", "General Chemical Technology", "Fundamentals of Oil and Gas Processing Technologies", "Fundamentals of Solid Fuel Processing Technologies"

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

The training sessions of the course consist of classroom sessions (lectures, practical sessions, interviews with the teacher during the defense of test papers, consultations, exams) and independent work of students (performance of test papers, calculation tasks, preparation for their defense and exam).

The main type of classroom work is lectures, during which the teacher focuses on the study of the properties, ecological characteristics and methods of disposal of the main wastes that are generated during the production of processing of hydrocarbon raw materials.

The knowledge gained at the lectures is consolidated by students during other types of training sessions in order to transform them into knowledge and skills necessary for future practical work.

Students' independent work consists of performing control tasks, writing an essay, preparing for their defense and the exam..

Program of the course

Topics of the lectures

Topic 1 General characteristics and nomenclature of industrial waste.

Topic 2 Ways of waste generation in the production of processing of hydrocarbon raw materials.

Topic 3 Accumulated stocks and annual volume of industrial waste generation in Ukraine.

Topic 4 Impact of waste on the environment.

Topic 5 Concepts of oil sludge and acid tars.

Topic 6 Physico-chemical properties of oil sludges and acid tars.

Topic 7 Methods of preparation of oil sludges and acid tars for technological processing.

Topic 8 Use of oil sludges and acid tars in the production of fuel and lubricants.

Topic 9 Waste storage conditions

Topic 10 Safety techniques when working with industrial waste

Topic 11 Adsorbents for contact cleaning of petroleum products.

Topic 12 Modes of regeneration of spent adsorbents.

Topic 13 Physico-chemical properties of adsorbents.

Topic 14 Use of spent adsorbents in the production of building materials..

Topics of the workshops

Practical lesson 1 Determination of the suitability of industrial waste for technological processing

Practical lesson 2 Determination of physico-chemical indicators of the quality of oil sludges and acid tars

Practical lesson 3 Determination of the absorption capacity of adsorbents.

Topics of the laboratory classes

Laboratory work within the discipline is not provided.

Self-study

1. Sorting and storage of oil refining industry waste
2. Forecasting directions of technological processing of oil sludges and acid tars based on their physical and chemical properties
3. Nomenclature and methods of regeneration of spent adsorbents



Course materials and recommended reading

Basic materials:

- 1 Muhammad Shahbaz, Naim Rashid, Junaid Saleem, Hamish Mackey, Gordon McKay, Tareq Al-Ansari . A review of waste management approaches to maximise sustainable value of waste from the oil and gas industry and potential for the State of Qatar. 2022, 203 p.
2. [Suhaiza Zailani](#) Solid Waste and Landfills Management - Recent Advances. IntechOpen. 2023. 200 p.
3. Singh A., Srivastava S., Rathore D., Pant D. (Eds.) Environmental Microbiology and Biotechnology. Volume 1: Biovalorization of Solid Wastes and Wastewater Treatment. 2020. 37 p.

Assessment and grading

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

Points are awarded according to the following ratio:

- test papers: 20% of the semester grade;
- individual tasks: 60% of the semester grade;
- credit: 20% 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

Approved by

Date, signature

Head of the department
Denys MIROSHNYCHENKO

Date, signature

Guarantor of the educational
program
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