Name of subject	OIL AND GAS ENGINEERING (ECTS 4)
Subject/module code	NGI3504
Science taught semester (s).	3st and 5nd semesters
Responsible teacher	Tashmatov Norpulat Umarqulovich, dotsent
Education language	Uzbek
Connection to the curriculum	Elective
Training hours (this including independent education)	**Total hours-120.** **Audience Training hours - 48.** Lecture training hour – 24 Practical training hour – 24 **Independent education -72 hours**
ECTS	4
The purpose and tasks of subject / learning outcomes	**The purpose of teaching science -** The aim of the course is to develop students' theoretical knowledge and practical skills in the design, calculation, construction, installation, technical operation and safe management of systems for transporting gas, oil and petroleum products through pipelines and for storing them in gas and oil depots. It also involves familiarizing students with the structure of gas and oil pipelines, hydraulic operating regimes, pump and compressor stations, tanks, process equipment, automation and control systems, and preparing them to apply modern, energy-efficient and environmentally safe technologies **The task of science is to** - To study the physical and mechanical properties of gas, oil and petroleum products and their effect on pipeline transport. - To study the classification, structure and process schemes of gas and oil pipelines. - To master the basic principles and regulatory requirements for the design of gas and oil pipelines. - To teach the calculation of pipe diameter, throughput capacity, pressure losses and hydraulic regimes. - To study the structure, operating principle and selection methods of pump and compressor stations. - To develop skills in selecting and applying fittings, shut-off and control, measuring and protective devices in gas and oil pipelines. - To study the technologies of underground and above-ground laying of gas and oil pipelines. - To master the methods of corrosion protection, technical diagnostics and monitoring of pipelines. - To familiarize students with gas and oil depots, tanks and their main process equipment. - To study the methods of reducing losses during storage at gas and oil depots. - To teach the requirements for ensuring accident, fire and explosion safety at gas and oil pipelines and depots. - To master the methods of ensuring the energy efficiency and environmental safety of gas and oil transport. **Learning outcomes:** 1. Knows the structure, operating principle and technological processes of systems for transporting and storing gas, oil and petroleum products. 2. Can determine and analyse the hydraulic, technological and structural parameters of gas and oil pipelines. 3. Acquires the competence to select the pipe diameter, operating pressure, throughput capacity and other main technical parameters.

	4. Can select pump and compressor stations on the basis of technological requirements. 5. Acquires the competence to select the type, capacity, number and process scheme of gas and oil depots and tanks.
Course content (topics)	**I. Main Theoretical Part (Lecture Sessions)** **Topic 1:**"Oil and gas engineering" – objectives of the course, its links with other disciplines, its current state and future prospects. **Topic** 2.Characteristics of oil. **Topic** 3.Properties of natural gases. **Topic** 4.Methods of prospecting for and extracting energy resources **Topic** 5.Structure and classification of oil and gas pipeline systems. **Topic** 6.Measurement of energy resource consumption. **Topic** 7.Conventional gas transmission systems **Topic** 8.Storage of energy resources **Topic** 9.Selection of the location and site of oil and gas storage depots **Topic** 10.Delivery of oil and petroleum products **Topic** 11.Tanks for gas and petroleum products. **Topic** 12.Selection of the optimal route **II. Practical training instructions and recommendations** The teacher's preparation for a practical training session begins with the study of preliminary documents (curriculum, thematic plan, etc.) and ends with the development of a lesson plan. The teacher should have an idea of the goals and objectives of the practical training session, the amount of work that each student must perform. Methodological guidelines are the main methodological document of the teacher in preparing and conducting practical training sessions. The purpose of the practical training session is to understand the theory, acquire skills. It is to consciously apply it in educational and professional activities, and to develop the ability to confidently form one's own point of view. **The following topics are recommended for practical training:** 1. Determination of the main physical parameters of oil 2. Determination of the main physical parameters of gas 3. Main process calculations for oil depots 4. Operation of gas and oil pipelines 5. Calculation of gas withdrawal from an underground gas storage facility 6. Cleaning of gas and oil pipelines during operation 7. Elimination of accidents in gas pipelines 8. Hydraulic calculation of pipelines at oil depots 9. Determination of seasonal irregularity of gas demand 10. Process calculations for trunk gas pipelines 11. Selection of the optimal diameter of gas pipelines 12. Hydraulic calculation of gas and oil pipelines **III. Independent learning and independent work.** Independent learning competence serves to support students' independent self-development and increase the effectiveness of professional activities. Students perform independent work on their mobile devices under the guidance of a teacher in a traditional or electronic form. **Recommended topics for independent study:** 1. Function, classification and structure of gas and oil pipelines and their role in the modern transport system 2. Process schemes and main structural elements of trunk gas pipelines 3. Structure and operating principle of trunk oil and petroleum product

	pipelines 4. Physical and mechanical properties of natural gas and oil and their effect on pipeline transport 5. Selection of pipe diameter, pressure and throughput capacity in the design of gas and oil pipelines 6. Hydraulic calculation of gas pipelines and methods of determining pressure losses 7. Hydraulic calculation of oil pipelines, hydraulic resistances and pressure losses 8. Structure, function and operating principle of compressor stations on trunk gas pipelines 9. Structure and process equipment of pump stations on trunk oil pipelines 10. Application of fittings, shut-off and control and protective devices in gas and oil pipelines 11. Technologies for underground and above-ground laying of gas and oil pipelines 12. Modern methods of corrosion protection of gas and oil pipelines and cathodic protection 13. Technical diagnostics and monitoring of gas and oil pipelines and leak detection methods 14. Accidents in gas and oil pipelines, their causes and methods of eliminating them 15. Automation, telemechanics and SCADA monitoring systems in gas and oil pipelines 16. Function, classification, process schemes and main equipment of gas and oil depots 17. Types, design and selection principles of tanks for storing oil and petroleum products 18. Tanks for storing liquefied gas, their structural and operational characteristics 19. Calculation, selection and arrangement of the tank farm at oil depots 20. Evaporation of oil and petroleum products in tanks and methods of reducing product losses 21. Use of pumps, compressors, measuring and control devices at gas and oil depots 22. Fire and explosion safety systems at gas and oil depots 23. Environmental safety of gas and oil pipelines and depots and environmental protection 24. Use of energy-efficient and digital technologies in gas and oil transport systems
Exam form	Written
Teaching/learning and examination requirements	Complete mastery of theoretical and methodological concepts and practical knowledge of the discipline, the ability to correctly reflect the results of analysis, independently reason about the processes being studied and carry out tasks in the current, intermediate forms of control and independent work, pass written work on the final control. When drawing up final exam questions, deviations from the content of the discipline program are not allowed. The bank of final exam questions for each discipline is discussed at the meeting and approved by the head of the department. No later than 1 week before the start of the final control, tickets signed by the head of the department, enclosed in an envelope, are sealed by the Dean’s office and opened 5 minutes before the start of the exam in the presence of students. Final exam duration is 80 minutes. Answers to final exam questions are recorded in copybooks with the seal

	of the Dean’s office. After completion of the final work, the work is immediately encrypted by a representative of the Dean’s office, and the copybooks are handed over to the commission for verification. From the moment of completion of the final exam, a period of 72 hours is allotted for checking and posting the results on the electronic platform. The teacher who taught the students in this discipline is not involved in the process of conducting the exam and checking the students' answers. Student(s) who are dissatisfied with the final exam results may submit a written or oral appeal within 24 hours of the publication of the final exam results. Complaints submitted after 24 hours from the publication of the final exam results will not be accepted.
Scope of assessment criteria and procedure	CURRENT CONTROL Purpose: Determining and assessing the student's level of knowledge, practical skills, and competencies on course topics. Instructions: The student's activity in daily classes is assessed through the student's mastery of course topics, as well as constructively interpreting and analyzing the educational material, developing module-specific skills, acquiring practical skills (in terms of quality and the specified number) and competencies, solving problem situations aimed at applying professional practical skills, working in a team, preparing presentations, etc. Current control form: Activity in lessons Preparing educational materials Working with sources within the subject Using educational technologies Working in a team Preparing presentations Working with projects. MIDTERM CONTROL Purpose: Assessing the student's knowledge and practical skills and level of mastery of lecture material after completing the relevant section of the course. Form and procedure of intermediate control: Midterm examination is held during the semester during the training sessions after the completion of the relevant module of the curriculum of the subject. Midterm examination is held once in written form within the framework of this subject. Midterm examination questions cover all topics of the subject. INDEPENDENT LEARNING Purpose: Independent learning is aimed at fully covering the content of this course, expanding the theoretical knowledge acquired, and establishing independent learning activities for students. Form and procedure of independent education: independent work assignments are completed in the form of an educational project, presentation, case study, problem solving, information search, digest, colloquium, essay, article, abstract, etc. Completed assignments for independent study are placed in the electronic system and checked based on the anti-plagiarism program and evaluated by the subject teacher. In this case, the uniqueness of the completed assignment should not be less than 60%, otherwise the assignment will not be accepted for assessment. The number of independent work assignments, depending on the nature of the subject, should not be less than 3 for one subject (module). Independent work assignments account for 60% of the points allocated for current and intermediate control. FINAL CONTROL Purpose: The final examination is held at the end of the semester to determine the level of mastery of the student's theoretical knowledge and practical skills in the relevant subject. The final examination is held at a specified time according to the examination schedule created by the Registrar's Office on the electronic platform.

	Requirements: The student must have passed the current control, intermediate control and independent learning assignments by the deadline for the final control type in the relevant subject. A student who has not passed the current control, intermediate control and independent learning assignments, as well as who has received a score in the range of "0-29.9" for these assignments and control types, is not included in the final control type. Also, a student who has missed 25 percent or more of the classroom hours allocated to a subject without a reason is excluded from this subject and is not included in the final control type and is considered not to have mastered the relevant credits in this subject. A student who has not passed or was not included in the final control type and has received a score in the range of "0-29.9" for this type of control is considered to be an academic debtor. Final control form: The final examination in this subject will be conducted in written form. If the final examination is conducted in written form, the requirements for assessment must also be reflected.

Criteria for assessing student knowledge

5 grade	100 points		Assessment criteria
5	90-100	Excellent	When a student is considered to be able to make independent conclusions and decisions, think creatively, observe independently, apply the knowledge he has gained in practice, understand, know, express, and narrate the essence of the subject, and have an idea about the subject.
4	70-89,9	Good	When the student is considered to be able to observe independently, apply the knowledge he has gained in practice, understand, know, express, and narrate the essence of the subject, and has an idea about the subject.
3	60-69,9	Satisfactory	When the student is found to be able to apply the knowledge he has gained in practice, understands, knows, can express, and narrate the essence of the subject, and has an idea about the subject.
2	0-59,9	Unsatisfactory	When it is determined that the student has not mastered the science program, does not understand the essence of the subject, and does not have an idea about the science.

Course assessment criteria and procedure

Assessment type	Total points allocated	Control (task) form	Distribution of points	Qualifying score
Current assessment	30 points	System tasks	20 points (divided by the number of tasks)	18 points
		Student activity (in seminars, practical, laboratory classes)	10 points	
Midterm assessment	20 points	Supervision: Written work	10 points	12 points
		System tasks	10 points (divided by the number	

				of tasks)	
	Final assessment	50 points	Written assignment (5 questions)	50 points (10 points per question)	30 points
	* Note: 60% of the points allocated for current and intermediate control are allocated to independent work assignments. Independent work assignments are evaluated as system assignments through the electronic platform.				

Recommended Literature

Main literature:

1. N.U.Toshmatov. Gas and Oil Pipelines and Gas and Oil Depots. Textbook. Jizzakh, 2023. 134 p.
2. N.U.Toshmatov. Heat and Gas Supply Systems. Textbook. Tashkent, 2021. 174 p.
3. Aymatov R., Boboyev S., Alibekov J. Gas Supply. Textbook. Jizzakh, 2003. 170 p.
4. B.A.Aliev, M.D.Buranov. Transport and Storage of Oil, Petroleum Products and Gas. TSTU. Tashkent, 2006. Study guide

Additional literatures

5. Rashidov Yu.K. Heat and Gas Supply and Ventilation. Textbook. Tashkent, 2009
6. Ionin A.A. Gas Supply. 4th ed. Moscow, Stroyizdat, 1988. 439 p.
7. Rashidov Yu.K. Gas Supply. TIACE, 2000, 79 p.
8. Shadrina A.B. Construction and Operation of Gas and Oil Pipelines and Gas and Oil Storage Facilities. Nedra, 2012
9. Aliev R.A., Belousov V.D., Nemudrov A.G., Yufin V.A., Yakovlev E.I. Pipeline Transport of Oil and Gas. Textbook for higher education institutions. 2nd edition, 1988

Internet resources:

www.gov.uz – Government portal of the Republic of Uzbekistan.
www.lex.uz – National database of legislation of the Republic of Uzbekistan.
www.mc.uz Ministry of Construction and Housing and Communal Services of the Republic of Uzbekistan
www.ZiyoNet.uz
www.setkov-psk.perm.ru
www.twirpx.com
www.energystrategy.ru – Information portal "Energy Policy and Strategy"

№	Name of the HEI	QS	THE	Topic name in this syllabus	Additional topics introduced on the basis of the TOP 300 educational programme	Links:
1	City University of Hong Kong (ranked 63rd) based on the course "Heating, Gas Supply, Ventilation and Air Conditioning Engineering"	**63**	**106**	**Topic 5**. Structure, classification and main process schemes of oil and gas pipeline systems.	**Develop the fundamental principles of two-phase heat transfer.**	https://www.cityu.edu.hk/catalogue/ug/202223/course/MNE4130.pdf
				Topic 8. Storage of energy resources. Gas depots: types, design, process equipment and safe operation.	Develop the problem-solving skills essential to good engineering practice of two-phase heat transfer in real-world applications.	