

Name of subject	Introduction to the Specialty (ECTS 6)
Subject/module code	YK1106
Science taught semester (s).	1 st semester
Responsible teacher	Khasanov Mansur Yusup ugli, assistant teacher.
Education language	Uzbek
Connection to the curriculum	Compulsory
Training hours (this including independent education)	Total hours-180. Audience Training hours - 72 Lecture training hour – 24 Practical training hour – 48 Independent education -108 hours
ECTS	6
The purpose and tasks of subject / learning outcomes	<p>The purpose of teaching the subject is to provide students with an understanding of the unique characteristics of the energy sector, key concepts related to the field, processes of electricity generation, and fundamental introductory knowledge about the energy industry.</p> <p>The objective of the subject is to teach the basic concepts of energy sources, electricity generation, transmission and distribution, as well as to provide initial knowledge on designing power supply systems for electricity consumers and to introduce the specific features of using both conventional and non-conventional energy sources.</p> <p>Learning outcomes:</p> <ol style="list-style-type: none"> 1. Students should have knowledge about the generation of electrical energy at power stations, as well as its transmission and distribution to consumers. 2. Students should understand the role of the power supply system within the overall energy system. 3. Students should have knowledge of energy sources, their types, characteristics, and areas of application. 4. Students must know the basic laws of electrical circuits. 5. Students should understand the main concepts in the energy field, the principles of designing consumer power supply systems, and the specific features of using conventional and non-conventional energy sources, as well as how to utilize them effectively. 6. Students will be able to determine electrical circuit parameters using Coulomb's, Faraday's, Ohm's, Joule–Lenz's, and Kirchhoff's laws through calculation and analysis. 7. Students will be able to study and analyze existing problems in providing consumers with uninterrupted and high-quality electrical energy, and propose preliminary solutions to those problems. 8. Students will be able to calculate current, voltage, electrical energy, efficiency (COP), and resistance of series and parallel capacitors in direct and alternating current circuits.
Course content (topics)	I. Main Theoretical Part (Lecture Sessions) Topic 1. The Role of Energy in Uzbekistan and Prospects for the Development of the Electric Power Sector. Topic 2. The Role of Energy in Technological Progress Topic 3. Processes of Utilizing Energy Resources Topic 4. Non-Renewable Energy Sources Topic 5. Unconventional Renewable Energy Sources Topic 6. Thermal Power Plant and Combined Heat and Power Plant (TPP and CHP) Topic 7. Nuclear Power Plant (NPP) and Hydroelectric Power Plant (HPP) Topic 8. Solar Power Plants (SPP)

Topic 9. Wind Power Plants (WPP)

Topic 10. The Electric Power Sector and Energy System

Topic 11. Electric Motors and Generators

Topic 12. Energy and the Environment.

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. Coulomb's Law and Problem Solving Related to It
2. Faraday's Law and Problem Solving Related to It
3. Parallel and Series Connections of Capacitors and Problem Solving Related to It. Parallel and Series Connections of Solar Modules and Problem Solving Related to It
4. Ohm's Law for a Part of an Electric Circuit and Problem Solving Related to It
5. Ohm's Law for the Entire Circuit and Problem Solving Related to It
6. Electric Current in DC Circuits and Problem Solving Related to It
7. Voltage in DC Circuits and Problem Solving Related to It
8. Electric Conductors and Problem Solving Related to It
9. Parallel and Series Connections of Resistors and Problem Solving Related to It. Parallel and Series Connections of Motors and Problem Solving Related to It
10. Kirchhoff's First Law and Problem Solving Related to It
11. Kirchhoff's Second Law and Problem Solving Related to It
12. Joule–Lenz Law and Problem Solving Related to It
13. Law of Electromagnetic Induction and Problem Solving Related to It
14. Electric Current, Electrical Power, and Efficiency (COP) and Problem Solving Related to It.
15. Alternating Current Circuits and Problem Solving Related to It

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. The Role of Energy in Uzbekistan
2. History of the Development of Electric Power in Uzbekistan
3. Prospects for the Development of the Electric Power Sector in Uzbekistan
4. The Role of Energy in Technological Progress
5. Processes of Utilizing Energy Resources
6. Coal, Oil, Natural Gas, and Nuclear Energy Reserves
7. Wind and Solar Energy Reserves
8. Hydropower Reserves
9. Energy Reserves from Tidal (Sea Wave) Movements and Other Sources

	<p>10. Operating Principles of TPPs, CHPPs, HPPs, SPPs, WPPs, and NPPs (<i>TPP – Thermal Power Plant, CHPP – Combined Heat and Power Plant, HPP – Hydroelectric Power Plant, SPP – Solar Power Plant, WPP – Wind Power Plant, NPP – Nuclear Power Plant</i>)</p> <p>11. Overview of Existing HPPs and TPPs in Uzbekistan</p> <p>12. Operating Principle of Pumped Storage Hydroelectric Power Plants (PSHPPs)</p> <p>13. Operating Principle of MHD Generators (Magnetohydrodynamic Generators)</p> <p>14. Electric Power Sector</p> <p>15. Use of Electric Energy in the National Economy</p> <p>16. Energy System</p> <p>17. Electric Motors and Generators</p> <p>18. Energy and the Environment</p> <p>19. Coulomb's Law</p> <p>20. Faraday's Law of Electromagnetic Induction</p> <p>21. Ohm's Law for a Part of an Electric Circuit</p> <p>22. Ohm's Law for the Whole Circuit</p> <p>23. Electric Current and Voltage in DC Circuits</p> <p>24. Kirchhoff's First Law</p> <p>25. Kirchhoff's Second Law</p> <p>26. Processes of Generation, Transmission, Distribution, and Consumption of Electric Energy</p> <p>27. Electrical Conductors and Their Series and Parallel Connections</p> <p>28. Understanding Current, Electric Power, and Efficiency (COP)</p> <p>29. Alternating Current Electrical Circuits</p> <p>30. Transformers and Their Operating Principles</p>
Exam form	Written
Teaching/learning and examination requirements	<p>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.</p> <p>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.</p> <p>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.</p> <p>The teacher who taught the students in this discipline is not involved in the process of conducting the exam and checking the students' answers.</p> <p>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.</p>
Scope of assessment criteria and procedure	<p>CURRENT CONTROL</p> <p>Purpose: Determining and assessing the student's level of knowledge, practical skills, and competencies on course topics.</p> <p>Instructions: The student's activity in daily classes is assessed through</p>

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. Mulukutla S. Sarma. Introduction to Electrical Engineering. 2001, Oxford University Press. - 869 p. (The Oxford series in electrical and computer engineering) 2. Karimov R.Ch., Rafiqova G.R., Usmonov E.G., Ro‘zinazarov M.R. Yo‘nalishga kirish. Ma‘ruzalar matni. –T.: ToshDTU nashriyoti. 2018. 3. Qodirov T.M., Alimov H.A. «Sanoat korxonalarining elektr ta‘minoti». O‘quv qo‘llanma. –T.: ToshDTU bosmaxonasi. 2006.						

4. Majidov T.Sh. Noan'anaviy va qayta tiklanuvchi energiya manbalari, O'quv qo'llanma. –T.: 2014.
5. Taslimov A.D., Rasulov A.N., Usmonov E.G. Elektr ta'minoti. O'quv qo'llanma. –T.: «Ilm ziyo» nashriyoti. 2012.
6. Majidov T.Sh. Noan'anaviy va qayta tiklanuvchi energiya manbalari // Toshkent. 2014.
7. John Twidell and Tony Weir. Renewable Energy Resources // Taylor and Francis Group. LONDON AND NEW YORK, 2006.
8. Renewable Energy // ICAR e-Course For B.Sc (Agriculture) and B.Tech (Agriculture)
9. Majidov T.Sh. Noan'anaviy va qayta tiklanuvchi energiya manbalari // Toshkent. 2014.
10. John Twidell and Tony Weir. Renewable Energy Resources // Taylor and Francis Group. LONDON AND NEW YORK, 2006.

Additional literature:

11. Mirziyoev SH.M. Buyuk kelajagimizni mard va olijanob xalqimiz bilan birga quramiz. - T.: "O'zbekiston" NMIU, 2017. – 488 b.
12. O'zbekiston Respublikasini yanada rivojlantirish bo'yicha Harakatlar strategiyasi to'g'risida. - T.:2017 yil 7 fevral, PF-4947-sonli Farmoni.
13. O'zbekiston Respublikasini «Energiyadan ratsional foydalanish haqidagi» qonuni 29 aprel 1997yil.
14. Афанасев В. П., Теруков Э. И., Шерченков А. А Тонкопленочные солнечные элементы на основе кремния // Санкт-Петербург. Издательство СПбГЕТУ «ЛЕТИ» 2011.

Internet resources:

15. www.lex.uz – National database of information on legal documents of the Republic of Uzbekistan.
16. www.ziynet.uz – national educational materials search site.
17. www.gov.uz – Government portal of the Republic of Uzbekistan.
18. www.google.com – international educational materials search site.
19. www.energystrategy.ru – “Energy Policy and Strategy” information portal
20. . www.twirpx.com – international educational materials search site.