

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
Study to the program connection	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	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. 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. Learning outcomes: 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 - 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>) - Overview of Existing HPPs and TPPs in Uzbekistan - Operating Principle of Pumped Storage Hydroelectric Power Plants (PSHPPs) - Operating Principle of MHD Generators (Magnetohydrodynamic Generators) - Electric Power Sector - Use of Electric Energy in the National Economy - Energy System - Electric Motors and Generators - Energy and the Environment - Coulomb's Law - Faraday's Law of Electromagnetic Induction - Ohm's Law for a Part of an Electric Circuit - Ohm's Law for the Whole Circuit - Electric Current and Voltage in DC Circuits - Kirchhoff's First Law - Kirchhoff's Second Law - Processes of Generation, Transmission, Distribution, and Consumption of Electric Energy - Electrical Conductors and Their Series and Parallel Connections - Understanding Current, Electric Power, and Efficiency (COP) - Alternating Current Electrical Circuits - Transformers and Their Operating Principles
Student assessment	Assessment of student knowledge is based on the mastery of the learning material during the semester and final control (tests, assignments, written and oral work results). During the course of Introduction to the Specialty, students are evaluated on a 100-point system. Of these, 50 points are allocated to the current and intermediate results (60% of 50 points are current control, independent study and 40% are intermediate control), and 50 points are allocated to the final control results. Students whose total score of current and intermediate points is less than 30 points are not admitted to the final control exam. A student who scores 30 or more points in the final control is considered to have mastered the subject.
Requirements for exams	The student must have fully mastered the theoretical and practical concepts of the subject, be able to correctly reflect the results of the analysis. The student must have completed the tasks given in the current and intermediate forms of independent work, assessment. At the same time, he must have received the necessary points from the current, intermediate, independent education and final tests in the relevant subject within the specified time. A student who has not submitted current control, intermediate control and independent education tasks, as well as who has scored less than 30 points on these tasks and types of control, will not be included in the final type of control. Also, a student who has missed 25 or more percent of the classroom hours allocated to the subject without an excuse will be expelled from this subject, will not be allowed to take the final exam and will be considered as not having mastered the relevant credits in this subject. A student who fails the final exam or scores less than 30 points on this type of exam is considered academically indebted..
Recommended Literature	Main literature: 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.energystategy.ru – “Energy Policy and Strategy” information portal
20. . www.twirpx.com – international educational materials search site.