

Fa name	Metrology and standardization. 4 ECTS
Subject/module code	MS 1404
Science teachable semesters	4 semester
Attached teacher	Muxammadiyev Baxtiyar Saparovich, teacher, Murodova Aziza, assistant.
Education language	Uzbek
Science type	Compulsory
Study hours (including independent learning)	Total hours - 120 . Auditory training hours -48. Lecture training hours - 24 Laboratory training hours - 12 Practical training hours - 12 Independent education - 72 hour
ECTS	4
Science goals and objectives / learning outcomes	The goal of teaching science is to form and develop logical thinking and technological thinking in students, to teach them to clearly state their opinions and conclusions in a well-founded manner, and to include them in the content of science. The task of science. Within the framework of the issues to be addressed in the process of mastering the subject "Metrology and Standardization", the bachelor: - should know the types of measurements and test methods for evaluation; types of measurement systems developed in enterprises, their differences; types of audits and their procedures; procedures and stages of standardization of quality systems; procedures for inspection and control of standardization regulatory documents systems and the selection and use of international standards for specific conditions in these activities; - the student must have the skills to understand the requirements of the standards used in standardization; to organize the measurement system on a technical and economic basis based on the specifics of the product production technology; to understand and calculate production modes in the standardization of the measurement system; to correctly identify the objects of the system of regulatory documents taking into account technological parameters; It is important for students to master the subject of "Metrology and Standardization" to use advanced and modern teaching methods and introduce new information and pedagogical technologies. Learning outcomes: 1. "Metrology " and standardization " science studies its development, history and prospects. 2. "Metrology " and standardization " describes the concepts of science 3. "Metrology" and standardization " can apply qualitative and quantitative methods of science 4. "Metrology" and standardization " the basic standards of science describes and can explain the difference between 5. "Metrology" and standardization " can analyze the properties of science. 6. "Metrology" and standardization " the basic laws and rules of science can explain. 7. "Metrology" and standardization " one of the sciences how many methods hand takes . 8. "Metrology" and standardization " can analyze the use of science in the field.
Course content (themes)	I. Home theoretical part (Lecture) Subject 1: Introduction. Goals and objectives of the subject of

metrology and standard-ing. System for ensuring the unity of measurements.Greenll economy policy as well as its main laws.

Subject 2: Size of size. Uses in the field of Metrology-ladigan basic terms and definitions.

Subject 3: The main task of Metrological provision. Concept in terms of Metrological supply, its functions. The main goals of Metrological supply.

Subject 4: Comparison of measuring instruments.Greenll economy policy.

Subject 5: Stages of development of regulatory documents. Uzbek-kiston state system of standardization. Production of standards for "technical regulation".

Subject 6: Staying of international, regional, interstate, foreign regulatory documents. International Organization for Standardization / ISO/MEK/MOZM/.

Subject 7: Categories of Standards and their types. Technical aspect-from regulation,the concept of technical regulation.

Subject 8: Basic Laws and regulations of standardization. Standard-the essence of the law on the ingu.

Subject 9: State control over standards and measuring instruments. State Metrological examination and control application Sox and objects.

Subject 10: Preference aspects of standardization. Specific features of the standards. Standardization system.

Subject 11: Methods of standardization. Bar code of goods produced in the Respublika of Uzbekistan. Greenll in the transition to the economy, to ensure energy efficiency.

Subject 12: International organizations on standardization. State Metrological service.

II. Guidelines and recommendations for organizing laboratory exercises.

In laboratory classes, students develop practical skills and competencies in conducting experiments, calculating and drawing tables and graphs. The recommended topics are selected based on opportunities and conditions.

Suggested topics for laboratory work:

1. Sound level meters for the device elements.
2. Ultrasound for the index of the thickness of metal and plastics. (Lee focusing 332) the device element.
3. Detektor defects of ultrasound, ct-yelementlari PLUS 9008 device.
4. Scales laboratory(VL)mg stones checking.
5. Betonni whose special wireless temperature measuring device.
6. Yelementlari moisture meters for the device.

III. Practical lessonfor ulot guidelines and recommendations.

The practical training of teachers to the initial preparation of documents (curriculum, plan a theme and others) start to learn from the developments with the conclusion of the lesson is completed. O‘qitish be applied mashg‘ulot the goals and objectives of each student must have an idea about the volume of work that you perform toe‘lish need.

Methodological ko‘rsatma o‘the chamber of practical qitish mashg‘preparation and ulot o‘- check-in passengers from the main methodological document.

The purpose of practical training to understand the theory, skills is to be able to. Educational and professional activities in it consciously apply their viewpoint consists of the formation of reliable boosting ability.

Recommended practical topics :

	1. Metrology in the field of used basic terms and definitions of the essence. 2. Metrological provision main purpose. 3. O'lvov instruments metrological characteristics. 4. Standardization of the system about the basic information in place. 5. Standards and measurement of the means over state control in the importance of. 6. Standards approval and state listedyxati from the transfer procedure. IV. Independent study and independent work. Independent independent kompetensiya education students of self-development help and will serve to increase the effectiveness of professional activities. The traditional form of teacher leadership in the mobile device independent students or their work in electronic form shall perform. Recommended topics for independent study: 1. Learn the basic concepts and definitions of metrology. 2. Measurement types. 3. The standard, their types, procedures development, and to learn the rules of registration and order confirmation. 4. Learn the methods of standardization. 5. The study of certification schemes. 6. Standardization and coding of the information about the product. 7. The international organization for standardization and metrology. 8. Metrology and metrological supply 9. Description of modern measuring instruments and their 10. Due to the assessment of measurement uncertainty. 11. Review and ensure that the etalon one measure. 12. Technical regulations and to work them out 13. The role and importance of standards in quality management 14. Sertifikatlashtirish and its legal-normative supply. 15. Sertifikatlashtirish work in and out of place.
Student assessment	Assessment of student knowledge is based on the mastery of teaching materials (tests, assignments, written and oral work results) during the semester and during the final examination. During the course, students are assessed on a 5-point system (electronic platform 100 points). The electronic platform is 100 points - 50 points are allocated for current control, independent learning and intermediate control (60% of 50 points are JN, MT and 40% ON), and 50 points are allocated for the final control result. 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. Electronic platform " Metrology" and In the third semester of the subject " Standardization ", the current, independent study, intermediate and final control points are distributed as follows.
Exam requirements	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	Basic literature: 1. Badalov N.J. Metrology and standardization. Darislik. 2023. 303 pp. 2. Ismatullaev P.R., Matyakubova P.M., Turaev SH.A. Metrology, standardization and certification. Textbook. "Lisson-press", Tashkent, 2015. -423b. 3. Abduvaliev A.A., Latipov V.B., Umarov A.S. I Dr. Osnovi standartizatsii, metrologii, sertifikatsii I Upravlenie kachestvom. - T.: NIISMS 2007. - 555 P. 4. Ismatullaev P.R., Kodirova SH.A. Fundamentals of Metrology. Tutorial. Tashkent," Tafakkur " publishing house 2012. -304 PP. 5. Ismatullayev P.R. et al. Metrology, standardization and certification. Textbook. Tashkent, 2001, -360b. Additional literature: 1. Abduvaliev A.A. et al. "Fundamentals of standardization, metrology, certification and quality management" Tashkent, NIISPS, 2007. 2. Goncharov A.A., Kopylov V.D. Metrology, standardization and certification. The training manual. 2nd edition stereotype. Moscow: Publishing center "Academy", 2005.B. 3. B.Mukhammadiyev . A.Abdurakhmanov. Textbook on "Construction of measuring instruments " 2023. 4. A.Abdurakhmanov. Measurement uncertainty in science and technology textbook 2022. 5. Nazarov V.N., Karabegov M.A., Mammadov R.K. Fundamentals of metrology and technical regulation. Textbook. - St. Petersburg: St. Petersburg State University ITMO, 2008. – 110 P. 6. Dimov Yu. M. Metrology, standardization and certification: textbook. Publishing house "Peter", St. Petersburg, 2013. 496 P. 7. Ismatullayev P. R., Kadyrova SH. A., Umarova N. S. Methodological indication for the passage of practical training in the subject of Metrology, standardization and certification. DTO 2013. 8. Abduvaliev A. A., Latypov V. B., Umarov A. S. Alimov M. N., Khakimov O.SH., Hwang W. I. Standardization, Metrology, certification, quality. - Tashkent: SMSITI, 2008. Tutorial "fundamentals of Metrology". 9. Abduvaliev A. A., Latipov V. B., Umarov A. S. Alimov M. N., Khakimov O.SH., Shaozimov U. X. Metrology and standardization. - T.: 10. Shaozimov U. X. Metrology and standardization. - T."Science and technology", 2019. 204. Internet sources: 1. http://www.gov.uz -Official website of the Government of the Republic of Uzbekistan. 2. http://www.lex.uz -National database of legislative acts of the Republic of Uzbekistan 3. http://www.standart.uz -Özstandart agency 4. http://www.smsiti.uz -Scientific Research Institute of Standardization, Metrology and certification 5. http://www.easc.org.by -Interstate Council for Standardization, Metrology and Certification of the Commonwealth of Independent States. 6. http://www.ziyonet.uz – Education portal

