**Kazakh National University al-farabi**

**Faculty of Chemistry and Chemical Technology**

**Department of analytical, colloid chemistry and technology of rare elements**

**Dean of the Faculty**

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**H.S. Tassibekov**

**« « \_\_\_\_\_\_\_\_\_\_ 2018.**

**SYLLABUS**

**Fall semester 2019-2020 academic year**

**Academic Course Information**

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Discipline code | Discipline name | | Type | Hours per week | | | | Credits | | ECTS |
| Lec. | Pract. | | Lab. |
| SMC | Standardisation, metrology, certification | | ОК | 1 | 1 | | 0 | 2 | | 5 |
| Lecturer | | Tastanbekov Dias Bakhytzhanovich | | | | Office hours | | | Scheduled | |
| e-mail | | E-mail: tastanbekovdb@gmail.com | | | |
| Phone | | Телефон: 8-705-9833885 | | | | Room # 211, 233 | | |  | |
| Assistant | |  | | | | Office hours | | |  | |
| e-mail | |  | | | |
| Phone | |  | | | | Room # | | |  | |

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| Academic Course Presentation | **Type of course :** Basic professional modules, module 5 “Physical chemistry”, a required component.  **The purpose of the course:** as a result of training, students must demonstrate knowledge of: the State system for ensuring the uniformity of measurements of the Republic of Kazakhstan, methods for ensuring the uniformity of measurements, knowledge of the basics of standardization and certification of goods, processes and services; the ability to use the mathematical apparatus of statistics in organizing an experiment and processing experimental data, to choose and use measuring instruments correctly; ability to apply: certification systems and rules, regulatory documents on standardization and certification of works, products and services; ability to solve problems of increasing the accuracy of chemical analysis of various objects. |
| Prerequisites | Higher mathematics (probability theory, differential and integral calculus), physics, analytical chemistry (physico-chemical methods of analysis), basic software (Microsoft Excel / Google Sheets) |
| Post requisites | General chemical technology, Colloid chemistry and interfacial processes, Basic processes and apparatuses of chemical industries. |
| Sources: | **Literature**:  1. В.М. Клевлеев, Ю.П. Попов, И.А. Кузнецова, Метрология, стандартизация, сертификация. Москва: ФОРУМ-ИНФРА-М, 2003  2. Аскаров Е.С. Стандартизация, метрология и сертификация. Алматы: Экономика, 2011.  -321 с.  3. Долгова Н.Д. Методические рекомендации к семинарским занятиям по дисциплине  «Метрология, стандартизация и сертификация».Алматы: Қазақ университеті, 2015.- 148  с.  4. Димов Ю.В. Метрология, стандартизация и сертификация. М.-Санкт-петербург, 2010 г.  5. Радкевия Я.М., Схиртладзе А.Г. и др. Метрология, стандартизация, сертификация.  6. Гончаров А.А., Копылов В.Д. Метрология, стандартизация, сертификация.  7. Лифиц М.М. Метрология, стандартизация, сертификация.  **Links:** iso.org , fao.org , fda.gov , insta-cert.net , asean.org, |
| Academic policy of the course in the context of university values | **The rules of academic behavior:** compulsory attendance at classes, inadmissibility of lateness, absence is estimated at 0 points. Obligatory observance of the deadlines for the completion and delivery of tasks (according to the CDS, milestones, control, etc.). In case of violation of the deadlines, the completed task is evaluated taking into account the deduction of penalty points.  **Academic values:** independent fulfillment of all tasks, the inadmissibility of plagiarism, forgery, the use of cheat sheets, cheating at all stages of knowledge control, deceiving the teacher and disrespect for him. |
| Grading and Certification Policy | **Criteria assessment:** assessment of learning outcomes in relation to the purpose of the course, verification of the formation of knowledge and skills according to competencies.  Summative assessment: activity of work in the audience, assessment of the completed assignment of the CDS, tests, RK. |

**Course content implementation calendar:**

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| --- | --- | --- | --- |
| **Week** | **Topic Title** | **Number of hours** | **Maximum score** |
| 1 | Lecture 1. The subject and tasks of metrology. | 1 |  |
| Workshop 1. Types of errors. Types of distributions. | 1 | 15 |
| Self-study 1. Possible sources of errors and way of preventing. |  | 5 |
| 2 | Lecture 2. Basic formulas: arithmetic mean, geometric mean, variance, normal distribution, histogram, types of deviations from the normal distribution. | 1 |  |
| Workshop 2. Metrological Glossary: basic terms and their definitions. | 1 | 20 |
| 3 | Lecture 3. The concept of the model of comparison. Types of standards. Genealogy of standards. Tolerance, uniformity of measurements. | 1 |  |
| Workshop 3. Quartile, interquartile range, span diagram (dispersion, box), degree of variability. | 1 | 20 |
| 4 | Lecture 4. Accuracy and reliability. Units of measurement. | 1 |  |
| Workshop 4. Unit conversion. | 1 | 15 |
| Self-study 2. Types of distribution: Fisher, Student. Poisson, χ2. |  | 5 |
| 5 | Lecture 5. Geometric concepts of accuracy: roundness, cylindricity, curvature, plane, positioning, straightness, concentricity, shape, symmetry, parallelism, perpendicularity, angularity of the rounded sector, radial beats, conicity, full beating. | 1 |  |
| Workshop 5. Measurement tools: vernier caliper and micrometer. Calibration: TDS meter and pH meter. | 1 | 20 |
| Midterm Examination 1 |  | 100 |
| 6 | Lecture 6. Product testing: quality confirmation, types of measurements, measuring instruments. The regulatory framework of metrological support. Accreditation of metrological services. | 1 |  |
| Workshop 6. Types of product tests on the example of a case: biodegradable implant. Metrological supervision and control. | 1 | 20 |
| 7 | Lecture 7. The essence of standardization and its components. State system of standardization. Types of standardization and standards. State, producer, consumer. | 1 |  |
| Workshop 7. Information support in the field of standardization. Classifiers. Bodies implementing industrial safety regulation. | 1 | 15 |
| Self-study 3. Comparative table of classifiers. |  | 5 |
| 8 | Lecture 8. Normative documents on standardization. Structure of standards. Copyright of the developer of the standard. Standardization abroad: USA, UK, France, Germany, Japan. | 1 |  |
| Workshop 8. Specifications. Building regulations. The main standards of the state system of standardization. | 1 | 15 |
| Self-study 4. Codex Alimentarius |  | 5 |
| 9 | Lecture 9. International organizations for standardization: ISO, IEC, FAO, WHO. Regional standardization organizations: CEN, CENELEC, ETSI, INSTA, ASEAN, in the CIS. | 1 |  |
| Workshop 9. International quality standards: 9000, 14000, EN45000 | 1 | 20 |
| 10 | Lecture 10. Prioritization of international standardization. Features of the application of standards abroad. Harmonization of standards. | 1 |  |
| Workshop 10. Motivation for developing standards. The order of development, updating and cancellation. | 1 | 20 |
| Midterm Examination 2 |  | 100 |
| 11 | Lecture 11. Organization of certification processes. The legislative framework for certification. | 1 |  |
| Workshop 11. Certification system. Bodies and organizations involved in certification. | 1 | 20 |
| 12 | Lecture 12. Methodological basis of certification. | 1 |  |
| Workshop 12. Structure of certification processes. | 1 | 10 |
| Self-study 5. Certification of cosmetological product. |  | 10 |
| 13 | Lecture 13. Fields of application and objects of certification. | 1 |  |
| Workshop 13. Certification of the production quality system. | 1 | 15 |
| Self-study 6. Kaizen in industry |  | 5 |
| 14 | Lecture 14. Economic aspects of certification. Rules of payment for certification work. | 1 |  |
| Workshop 14. Payment for mandatory certification of products and services. | 1 | 10 |
| Self-study 7. Regulations and prices for domestic air purifier certification. |  | 10 |
| 15 | Lecture 15. European conformity assessment methods. | 1 |  |
| Workshop 15. Promising objectives of certification. | 1 | 20 |
| Midterm Examination 3 |  | 100 |
| Exam |  | 100 |

Lecturer \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Tastanbekov D.B.

Head Department \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Galeeva A.K.

Chairman of the methodological

Bureau of the faculty \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Mangazbaeva R.A.