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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Course Title-Course Code: Chromatographic Methods  CHEM 426 | | | | | | | | | | | Name of the Programme: Chemistry | | | | | | | | | | | | | | |
| Semester | | Teaching Methods | | | | | | | | | | | | | | | | | Credits | | | | | | |
| Lecture | | Recite | | Lab. | |  | |  | | | | Other | | | Total | | Credit | | | **ECTS Credit** | | | |
| 7-8 | | 42 | |  | |  | |  | |  | | | | 30 | | | 72 | | 2 | | | 3 | | | |
| Language | | Turkish | | | | | | | | | | | | | | | | | | | | | | | |
| Compulsory / Elective | | Selective | | | | | | | | | | | | | | | | | | | | | | | |
| Prerequisites | | No | | | | | | | | | | | | | | | | | | | | | | | |
| Course Contents | | Defination of , Chromatography, Adsorption Chromatography, Partitation Chromatography, Jel permition Chromatography, Ion exchange Chromatography, Thin layer Chromatography , paper Chromatography , Gass Chromatography, Thin layer Chromatography, Paper Chromatography | | | | | | | | | | | | | | | | | | | | | | | |
| **Course Objectives** | | To learn the separation methods widely used in chemical analysis to the students and to gain some skills on the separation method applications and increase their laboratory abilities. | | | | | | | | | | | | | | | | | | | | | | | |
| **Learning Outcomes and Competences** | | Chemistry students learn what kinds of separation can be done, the meaning and importance of experimental steps and how to get accurate analytical results from the real samples. In addition, they learn how to calculate the test results, and how to prepare test report to give the results of experiment. | | | | | | | | | | | | | | | | | | | | | | | |
| **Textbook and /or References** | | Separation methods laboratory, H. Aydın, Bizim Büro Yayınevi, 2000, Ankara | | | | | | | | | | | | | | | | | | | | | | | |
| **Assessment Criteria** | |  | | | | | | | | | | | | | If any,markas (X) | | | | | | | | **Percent**  **(%)** | | |
| **Midterm Exams** | | | | | | | | | | | | | x | | | | | | | | 40 | | |
| **Quizzes** | | | | | | | | | | | | |  | | | | | | | |  | | |
| **Homeworks** | | | | | | | | | | | | |  | | | | | | | |  | | |
| **Projects** | | | | | | | | | | | | |  | | | | | | | |  | | |
| **Term Paper** | | | | | | | | | | | | |  | | | | | | | |  | | |
| **Laboratory Work** | | | | | | | | | | | | |  | | | | | | | |  | | |
| **Other** | | | | | | | | | | | | |  | | | | | | | |  | | |
| **Final Exam** | | | | | | | | | | | | | x | | | | | | | | 60 | | |
| **Instructors** | | Prof. Dr. Hasan AYDIN | | | | | | | | | | | | | | | | | | | | | | | |
| **Week** | | **Subject** | | | | | | | | | | | | | | | | | | | | | | | |
| **1**  **2**  **3**  **4**  **5**  **6**  **7**  **8**  **9**  **10**  **11**  **12**  **13**  **14** | | Introduction to Chromatography,  Adsorption Chromatography,  Partitation Chromatography,  Thin layer Chromatography,  Paper Chromatography  Column Chromatography  Ion exchange Chromatography  Jel permition Chromatography  MIDTERM EXAM  Gas Chromatography,  Gas Chromatography  High performance Liquid Chromatography (HPLC)  High performance Liquid Chromatography(HPLC)  Applications of chromatography | | | | | | | | | | | | | | | | | | | | | | | |
| **Course Title-Course Code: Electroanalytical Chemistry CHEM 414** | | | | | | | | | | | | **Name of the Programme: Chemistry** | | | | | | | | | | | | | |
| **Semester** | | **Teaching Methods** | | | | | | | | | | | | | | | | | | **Credits** | | | | | |
| **Lecture** | | **Recite** | | **Lab.** | |  | | |  | | | | **Other** | | **Total** | | | **Credit** | | | **ECTS Credit** | | |
| 7-8 | | 42 | | - | | - | | - | | | -- | | | | 28 | | 70 | | | 2 | | | 3 | | |
| **Language** | | Turkish | | | | | | | | | | | | | | | | | | | | | | | |
| **Compulsory / Elective** | | Optional | | | | | | | | | | | | | | | | | | | | | | | |
| **Prerequisites** | | - | | | | | | | | | | | | | | | | | | | | | | | |
| **Course Contents** | | Ionic migration in electrolytic solutions and conductivity, migration number, metallic indicator electrodes, membrane indicator electrodes (the glass electrode, liquid membrane electrode, crystalline electrodes) and their theories. Standard electrode potentials, cell potentials, Nernst equation, liquid juction potential, current – voltage relationships during electrolysis (ohmic drop, polarization effects), potentiometric titrations, electrogravimetry, coulometric titrations, supporting electrolytes, solvents, types of working electrolytes, voltammetric methods – their principles and comparison. | | | | | | | | | | | | | | | | | | | | | | | |
| **Course Objectives** | | Electrochemical techniques use, knowledge and conclude for analytical purposes. For this aim, firstly basic electrochemistry knowledge to obtain information. | | | | | | | | | | | | | | | | | | | | | | | |
| **Learning Outcomes and Competences** | | Basic electrochemistry knowledge to obtain information. To learn analyses tecniques uses for these kowledge. And, information for evaluate data from these tecniques. | | | | | | | | | | | | | | | | | | | | | | | |
| **Textbook and /or References** | | 1. Enstrumental analiz, D. A. Skoog, F.J. Holler ve T.A. Nieman V.Baskı. Türkçe çeviri (E. Kılıç, F.Köseoğlu ve H.Yılmaz) Bilim Yayıncılık”., Ankara  2. Electrochemical Methods (Fundamentals and Applications), A.J.Bard ve L.R. Faulkner 2. Edition, John Wiley & Sons. Inc. New York  3- Electroanalytical chemistry notes, manuels of apparatus for used  4- Analytical electrochemistry, Joseph WANG, 3. Edition, John Wiley & Sons. Inc. New York | | | | | | | | | | | | | | | | | | | | | | | |
| **Assessment Criteria** | |  | | | | | | | | | | | | | | | | | If any mark  as (X) | | | | | Percent  (%) | |
| Midterm Exams | | | | | | | | | | | | | | | | | X | | | | | 40 | |
| Quizzes | | | | | | | | | | | | | | | | |  | | | | |  | |
| Homeworks | | | | | | | | | | | | | | | | |  | | | | |  | |
| Projects | | | | | | | | | | | | | | | | |  | | | | |  | |
| Term Paper | | | | | | | | | | | | | | | | |  | | | | |  | |
| Laboratory Work | | | | | | | | | | | | | | | | |  | | | | |  | |
| Other | | | | | | | | | | | | | | | | |  | | | | |  | |
| Final Exam | | | | | | | | | | | | | | | | | X | | | | | 60 | |
| **Prepared by** | | Prof. Dr. Erdoğan HASDEMİR, Asist. Prof. Dr. Halit ARSLAN | | | | | | | | | | | | | | | | | | | | | | | |
| **Week** | | **Subject** | | | | | | | | | | | | | | | | | | | | | | | |
| **1**  **2**  **3**  **4**  **5**  **6**  **7**  **8**  **9**  **10**  **11**  **12**  **13**  **14** | | Introduction to electrochemistry  Electrolyte solutions and properties  Electrodes in the electroanalytical cells  Potentials in the electroanalytical cells  Currents in the electroanalytical cell  Electroanalytical methods  MIDTERM EXAM  Potentiometry,  Amperometry  Electrogravimetry,  Coulometry,  Voltammetric analysis methods and their principles.  Applications of Voltammetric analysis methods  Electrochemical sensors | | | | | | | | | | | | | | | | | | | | | | | |

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| **Course Title-Course Code: KİM 442 ATOMİC SPECTROSCOPIC METHODS** | | | | | | | **Name of the Programme : CHEMISTRY** | | | | | |
| **Semester** | **Teaching Methods** | | | | | | | | | **Credits** | | |
| **Lecture** | **Recite** | **Lab.** | **Home work** | **Term project** | **Other** | | | **Total** | **Credit** | | **ECTS Credit** |
| 7-8 | 42 | - | - | 30 | - | - | | | 72 | 2 | | 3 |
| **Language** | Turkish | | | | | | | | | | | |
| **Compulsory / Elective** | Optional | | | | | | | | | | | |
| **Prerequisites** | - | | | | | | | | | | | |
| **Course Contents** | This lesson contains, description of spectroscopy, properties of electromagnetic radiation, the electromagnetic spectrum and some atomic spectroscopic methods and the experiments used such as atomic absorption spectroscopy, atomic emission spectroscopy, atomic fluorescence spectroscopy, atomic mass spectroscopy, atomic X-radiaton fluorescence spectroscopy and neutron activation analysis. | | | | | | | | | | | |
| **Course Objectives** | The aim of this lesson teach the spectroscopy, atomic spectroscopic methods and experiments used in these methods. | | | | | | | | | | | |
| **Learning  Outcomes and Competences** | Be able to learn the spectroscopy, atomic spectroscopic methods and the experiments used in these methods. | | | | | | | | | | | |
| **Textbook and /or References** | 1. Principles of Instrumental Analysis, Fifth Edition, Douglas.A.Skoog, F. James Holler, Timothy A. NiemanLeary, 1992, 0-03-002078-6, Saunders College Publishing. | | | | | | | | | | | |
| **Assessment Criteria** |  | | | | | | | If any, markas (X) | | | Percent(%) | |
| Midterm Exams | | | | | | | X | | | 40 | |
| Quizzes | | | | | | | - | | | - | |
| Homeworks | | | | | | | X | | | 20 | |
| Projects | | | | | | | - | | | - | |
| Term Paper | | | | | | | - | | | - | |
| Laboratory Work | | | | | | | - | | | - | |
| Other | | | | | | | - | | | - | |
| Final Exam | | | | | | | X | | | 40 | |
| **Prepared by** | Prof. Dr. Ali Rehber TÜRKER | | | | | | | | | | | |
| **Week** | **Subject** | | | | | | | | | | | |
| **1**  **2**  **3**  **4**  **5**  **6**  **7**  **8**  **9**  **10**  **11**  **12**  **13**  **14** | What is the spectroscopy?  Properties of electromagnetic radiation  The electromagnetic spectrum  Atomic spektroscopic methods  Atomic absorption spectroscopy  Atomic absorption spectroscopy  Atomic fluorescence spectroscopy  Atomic fluorescence spectroscopy  Atomic emission spectroscopy  MIDTERM EXAM  Atomic emission spectroscopy,  Atomic mass spectroscopy  Atomic mass spectroscopy  X-radiation fluorescence spectroscopy  X-radiation fluorescence spectroscopy  Neutron activation analysis  Neutron activation analysis | | | | | | | | | | | |

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| Course Title-Course Code:  **ENVIRONMENTAL CHEMISTRY, KIM 410** | | | | | | | | | | | | | | | | | | | | | Name of the Programme:**CHEMISTRY** | | | | | | | | | |  | | |
| **Semester** | | | **Teaching Methods** | | | | | | | | | | | | | | | | **Credits** | | | | | | | | | | | |  | | |
| **Lecture** | | **Recite** | | **Lab.** | |  |  | | | **Other** | | | **Total** | | | **Credit** | | | | | | **ECTS Credit** | | | | | |  | | |
| **7-8** | | | 42 | | - | | - | | - | - | | | 28 | | | 70 | | | 2 | | | | | | 3 | | | | | |  | | |
| **Language** | | | Turkish | | | | | | | | | | | | | | | | | | | | | | | | | | | |  | | |
| **Compulsory / Elective** | | | Elective | | | | | | | | | | | | | | | | | | | | | | | | | | | |  | | |
| **Prerequisites** | | | - | | | | | | | | | | | | | | | | | | | | | | | | | | | |  | | |
| **Course Contents** | | | Introduction to environmental chemistry, Componenent of Atmosphere,  photochemical and chemical reactions, Global warming, Greenhouse Effect, Photochemical Smog, Acid Rains, Air and Air pollution, Determination of Air quality, Water and water contamination, Determination of Water Quality,  Soil chemistry, Soil  Pollution, Nuclear Chemistry, reactions of radioactive substances and radioactive waste. | | | | | | | | | | | | | | | | | | | | | | | | | | | |  | | |
| **Course Objectives** | | | A major goal is to provide the students with a sound theoretical background in those chemical principles on environment | | | | | | | | | | | | | | | | | | | | | | | | | | | |  | | |
| **Learning Outcomes and Competences** | | | Obtain a chemist point of wiev environmental equilibrium. | | | | | | | | | | | | | | | | | | | | | | | | | | | |  | | |
| **Textbook and /or References** | | | 1- General Chemistry I and  II, Petrucci, Harwood, Herring (8. Edition) Palme Publisher, Ankara, 2002.  2- Environmental Chemistry (Fifth Edition),Stanley  E. Manahan ,  Lewis Publishers,  (1991 )  3- Çevre Sorunları, Turgut Gündüz, Bilge Yayıncılık , Ankara, 1994.  4- Environmental Chemistry, John Wright, Routledge Taylor and Francis Group, New York 2003.  5- Environmental Chemistry (second edition) Peter O’Neill, Chapman & Hall , London, 1993.  6- <http://w3.gazi.edu.tr/~mkaracan/cevre.htm> | | | | | | | | | | | | | | | | | | | | | | | | | | | |  | | |
| **Assessment Criteria** | | |  | | | | | | | | | | | | | | | If any,mark  as (X) | | | | | | | | Percent  (%) | | | | |  | | |
| Midterm Exams | | | | | | | | | | | | | | |  | | | | | | | |  | | | | |  | | |
| Quizzes | | | | | | | | | | | | | | |  | | | | | | | |  | | | | |  | | |
| Homeworks | | | | | | | | | | | | | | |  | | | | | | | |  | | | | |  | | |
| Projects | | | | | | | | | | | | | | |  | | | | | | | |  | | | | |  | | |
| Term Paper | | | | | | | | | | | | | | |  | | | | | | | |  | | | | |  | | |
| Laboratory Work | | | | | | | | | | | | | | |  | | | | | | | |  | | | | |  | | |
| Other | | | | | | | | | | | | | | |  | | | | | | | |  | | | | |  | | |
| Final Exam | | | | | | | | | | | | | | |  | | | | | | | |  | | | | |  | | |
| **Prepared by** | | | Doç. Dr. Mehmet Sayım Karacan | | | | | | | | | | | | | | | | | | | | | | | | | | | |  | | |
| **Week** | | | Subject | | | | | | | | | | | | | | | | | | | | | | | | | | | |  | | |
| **1**  **2**  **3**  **4**  **5**  **6**  **7**  **8**  **9**  **10**  **11**  **12**  **13**  **14** | | | Introduction to environmental chemistry,  Component of Atmosphere, photochemical and chemical reactions,  Global warming, Greenhouse Effect,  Photochemical Smog, Acid Rains,  Air and Air pollution,  Sources and types of air pollutant  Determination of Air quality,  Water and water contamination,  MIDTERM EXAM  Sources and types of water contaminants  Determination of Water Quality,  Soil  and  Soil  Pollution,  Sources and types of soil pollutants, Determination of Soil quality  Nuclear Chemistry, reactions of radioactive substances and radioactive waste. | | | | | | | | | | | | | | | | | | | | | | | | | | | |  | | |
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| Course Title-Course Code: **FORENSIC CHEMISTRY – CHEM 407** | | | | | | | | | | | | | Name of the Programme: **CHEMISTRY** | | | | | | | | | | | | | | | |
| **Semester** | | | **Teaching Methods** | | | | | | | | | | | | | | | | | | **Credits** | | | | | | | |
| **Lecture** | | **Recite** | | **Lab.** | | **Homework** | | |  | | | **Other** | | | **Total** | | | **Credit** | | | | **ECTS Credit** | | | |
| **7-8** | | | 42 | |  | |  | |  | | |  | | | 23 | | | 75 | | | 2 | | | | 3 | | | |
| **Language** | | | Turkish | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Compulsory / Elective** | | | Elective | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Prerequisites** | | | None | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Course Contents** | | | Identification of Forensic sciences and place of chemistry in forensic sciences. Chemical analysis steps and matters to be considered. Analysis Methods of in Forensic science. Crimes committed with firearms, identification of GSR samples taken from suspects' hands and clothes. Biochemical analysis on the unidentified organism, Investigation of incidents of arson, analysis of drugs and toxic substances. Explosive substances: Determination of explosive substance, the qualitative and quantitative analysis of the findings obtained from the scene. Fabrics, fibers and analysis. Paints, inks and analysis.. Soil, glass and metallic materials, analysis and overall assessment. | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Course Objectives** | | | Educate personnel in the field of forensic chemistry, to give scientific basis to this area. | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Learning Outcomes and Competences** | | | Qualitative and quantitative chemical analysis methods using the information obtained as a result, to assist the clarification of the events of Forensic. | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Textbook and /or References** | | |  | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Assessment Criteria** | | |  | | | | | | | | | | | | | If any,mark as (X) | | | | | | | | Percent (%) | | | | |
| Midterm Exams | | | | | | | | | | | | | - | | | | | | | | - | | | | |
| Quizzes | | | | | | | | | | | | | x | | | | | | | | 20 | | | | |
| Homeworks | | | | | | | | | | | | | - | | | | | | | | - | | | | |
| Projects | | | | | | | | | | | | | - | | | | | | | | - | | | | |
| Term Paper | | | | | | | | | | | | | - | | | | | | | | - | | | | |
| Laboratory Work | | | | | | | | | | | | | x | | | | | | | | 40 | | | | |
| Other | | | | | | | | | | | | | - | | | | | | | | - | | | | |
| Final Exam | | | | | | | | | | | | | x | | | | | | | | 40 | | | | |
| **Prepared by** | | | Asist .Prof.Dr. Halit ARSLAN | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Week** | | **Subject** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **1**  **2**  **3**  **4**  **5**  **6**  **7**  **8**  **9**  **10**  **11**  **12**  **13**  **14** | | Introduction to forensic science, the place of forensic chemistry,in forensic science  The concept of evidence, investigation of general crime scene and techniques of evidence collection.  General methods of analysis used in forensic sciences.  General methods of analysis used in forensic sciences.  Explosion, explosives and explosives analysis.  Analysis of fire-arson and fire accelerator substances.  Midterm exam.  Clarify the chemical investigations of crimes committed with firearms.  Drugs, drug analysis.  Toxic substances and toxicological investigations.  Fabrics, fibers, and analysis. Paints, inks and analysis. Soil, glass and metallic materials, analysis and overall assessment.  DNA and fingerprint analysis | | | | | | | | | | | | | | | | | | | | | | | | | | |

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| Course Title-Course Code: **Analysis of Trace Elements CHEM 415** | | | | | | | | | | Name of the Programme:**CHEMISTRY** | | | | | | | | | | | | |
| **Semester** | **Teaching Methods** | | | | | | | | | | | | | | **Credits** | | | | | | | |
| **Lecture** | | **Recite** | | **Lab.** | | **Home work** | **Term project** | **Other** | | | **Total** | | | **Credit** | | | | | **ECTS Credit** | | |
| 7-8 | 42 | | - | | - | | 20 | - | 15 | | | 77 | | | 2 | | | | | 3 | | |
| **Language** | Turkish | | | | | | | | | | | | | | | | | | | | | |
| **Compulsory / Elective** | Optional | | | | | | | | | | | | | | | | | | | | | |
| **Prerequisites** | - | | | | | | | | | | | | | | | | | | | | | |
| **Course Contents** | This lesson contains, description and importance of tarce element; general conciderations for the separation and preconcentration of trace elements; seperation and preconcentration methods: general principles of trace analysis; materials to be analized, sampling, laboratory vessels and reagents used in trace analysis. | | | | | | | | | | | | | | | | | | | | | |
| **Course Objectives** | The aim of this lesson teach the importance of trace elements; general principles, preconcentration methods, sampling, laboratory vessels and reagents used in the trace analysis. | | | | | | | | | | | | | | | | | | | | | |
| **Learning  Outcomes and Competences** | Be able to know and apply the trace element description, importance, general princeples, preconcentration methods and important stiuations in a good trace analysis. | | | | | | | | | | | | | | | | | | | | | |
| **Textbook and /or References** | 1. Seperation and preconcentration methods ın inorganic trace analysis, J. Mıncewski, J. Chwastowska, R. Dybczynskı, Ellıs Horwood Limited, Market Cross House, Cooper Street, Chichester, West Sussex, PO19 IEB, England, 1982. | | | | | | | | | | | | | | | | | | | | | |
| **Assessment Criteria** |  | | | | | | | | | | | | | If any, mark  as (X) | | | | Percent  (%) | | | | |
| Midterm Exams | | | | | | | | | | | | | X | | | | | 40 | | | | |
| Quizzes | | | | | | | | | | | | | - | | | | | - | | | | |
| Homeworks | | | | | | | | | | | | | X | | | | | 20 | | | | |
| Projects | | | | | | | | | | | | | - | | | | | - | | | | |
| Term Paper | | | | | | | | | | | | | - | | | | | - | | | | |
| Laboratory Work | | | | | | | | | | | | | - | | | | | - | | | | |
| Other | | | | | | | | | | | | | - | | | | | - | | | | |
| Final Exam | | | | | | | | | | | | | X | | | | | 40 | | | | |
| **Prepared by** | Prof. Dr. Ali Rehber TÜRKER | | | | | | | | | | | | | | | | | | | | | | |
| **Week** | **Subject** | | | | | | | | | | | | | | | | | | | | | | |
| 1  2  3  4  5  6  7  8  9  10  11  12  13  14 | Introduction  The description and importance of trace elements,  General conciderations for the seperation and preconcentration of trace elements  The seperation and preconcentration methods  General principles of trace analysis  Materials to be analysed ,  Inorganic materials ,Organic materials  MIDTERM EXAM  Other materials  Sampling  Metals and alloys, Geological materials, powdered materials, Liquid materials Organic materials  Laboratory vessels used, Glass, Quartz, Platinum, Plastics,  Cleaning of laboratory vessels  Reagents used in trace analysis ;Water, Important reagents and solutions | | | | | | | | | | | | | | | | | | | | | | |
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| Course Title-Course Code:  **QUALITY AND STANDARD, KIM 409** | | | | | | | | | | Name of the Programme: **CHEMİSTRY** | | | | | | | | |
| **Semester** | **Teaching Methods** | | | | | | | | **Credits** | | | | | | | | | |
| **Lecture** | **Recite** | **Lab.** |  |  | **Other** | **Total** | | **Credit** | | | **ECTS Credit** | | | | | | |
| **7-8** | 42 | - | - | - | - | 30 | 72 | | 2 | | | 3 | | | | | | |
| **Language** | Turkish | | | | | | | | | | | | | | | | | |
| **Compulsory / Elective** | Elective | | | | | | | | | | | | | | | | | |
| **Prerequisites** | - | | | | | | | | | | | | | | | | | |
| **Course Contents** | Standard, standardization and its benefits, Standardization studies in Turkey, Certification studies (product certification, system certification), Accreditation and conformity evaluation actions, EC new approach directives and CE marking, Quality concept and quality systems, System standards (TS EN ISO 9001, TS EN ISO 14001, TS 18001, TS EN ISO 22000), Total quality management, | | | | | | | | | | | | | | | | | |
| **Course Objectives** | To teach the standard, preparation of the standards, accreditation, quality and quality systems and gain some skills about maintaining the quality. | | | | | | | | | | | | | | | | | |
| **Learning Outcomes and Competences** | Chemistry students who will be work in research institution and industry, learn quality systems, total quality management, standards and accreditation and thus, they get an ability to produce qualified products and service in order to compete with other persons. | | | | | | | | | | | | | | | | | |
| **Textbook and /or References** | 1. TSE, TS EN ISO 9000 Kalite Yönetimi El Kitabı, KTE/0198 2. TSE, TS EN ISO 9000 Kalite sistem dokümantasyonu, Eğitim Notları, 3. Kalite Sistemine Hazırlık ve TS ISO 9000, KOSGEB Yayın No:16, 1993 4. Kalite Dünyası, Sami ÖZTÜRK, Mina Ajans, ISBN: 975-96812-0-X 5. Kalitenin Seyir Defteri, Kalder Yayınları No 32, 2001. 6. Documents given in <http://www.tse.org.tr/> ve [www.turkak.org.tr](http://www.turkak.org.tr) | | | | | | | | | | | | | | | | | |
| **Assessment Criteria** |  | | | | | | | If any,mark  as (X) | | | | | Percent  (%) | | | | | |
| Midterm Exams | | | | | | | X | | | | | 40 | | | | | |
| Quizzes | | | | | | |  | | | | |  | | | | | |
| Homeworks | | | | | | |  | | | | |  | | | | | |
| Projects | | | | | | |  | | | | |  | | | | | |
| Term Paper | | | | | | |  | | | | |  | | | | | |
| Laboratory Work | | | | | | |  | | | | |  | | | | | |
| Other | | | | | | |  | | | | |  | | | | | |
| Final Exam | | | | | | | X | | | | | 60 | | | | | |
| **Instructors** | Prof. Dr. A. Rehber TÜRKER | | | | | | | | | | | | | | | | | |
| **Week** | Subject | | | | | | | | | | | | | | | | | |
| **1**  **2**  **3**  **4**  **5**  **6**  **7**  **8**  **9**  **10**  **11**  **12**  **13**  **14** | Standard, standardization and its benefits  Standardization studies in Turkey,  Certification studies (product certification, system certification),  Certification studies (product certification, system certification),  Accreditation and conformity evaluation actions,  EC new approach directives and CE marking,  Quality concept and quality systems,  Quality concept and quality systems  Midterm Exam  TS EN ISO 9001 Standard of quality management system,  TS EN ISO 14001 Standard of environmental management system,  TS 18001 Occupational health and safety management systems and TS EN ISO 22000 Food safety management system (HACCP)  Total quality management  Total quality management | | | | | | | | | | | | | | | | | |
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| **Course Title-Course Code: MOLECULAR SPECTROSCOPIC METHODS CHEM 444** | | | | | | **Name of the Programme: CHEMISTRY** | | | | | | | | | |
| **Semester** | **Teaching Methods** | | | | | | | | | | | **Credits** | | | |
| **Lecture** | **Recite** | **Lab.** | **Home work** | **Term project** | | **Other** | **Total** | | **Credit** | | **ECTS Credit** | | | |
| 7-8 | 45 | 20 | - |  |  | |  | 65 | | 2 | | 3 | | | |
| **Language** | Turkish | | | | | | | | | | | | | | |
| **Compulsory / Elective** | Elective | | | | | | | | | | | | | | |
| **Prerequisites** | No | | | | | | | | | | | | | | |
| **Course Contents** | Molecular mass spectroscopy Molecular Ultraviolet/Visible Absorption Spectroscopy, Molecular Fluorescence and Phosphorescence, Chemiluninescence Spectroscopy, Infrared Absorption Spectroscopy, Raman Spectroscopy, ESR, Nuclear Magnetic Resonance Spectroscopy and applications, Hyphenated methods: GC-MS , LC-MS ,GC-IR, HPLC and applications | | | | | | | | | | | | | | |
| **Course Objectives** | Examination of the theory and practice of spectroscopic methods and hyphenated methods. | | | | | | | | | | | | | | |
| **Learning Outcomes and Competences** | Learning about working principles of spectroscopic methods and analysis results. | | | | | | | | | | | | | | |
| **Textbook and /or References** | 1-Enstrümental Analiz İlkeleri, Skoog, West, Holler, Çevirisi, Bilim Yayıncılık, Ankara, 2002  2-Enstrümental Analiz, T. Gündüz, Ankara Ü. Yayınları, Ankara, 2003  3- Enstrumental Analiz Yöntemleri, A. Yıldız, Ö.Genç, S. Bektaş Hacettepe Üniversitesi Yayınları, Ankara,  4- http://w3.gazi.edu.tr/~mkaracan/aletlianaliz.htm  5-Organik Kimyada Spektroskopik Yöntemler, E. Erdik, (1993)., Ankara: Gazi Büro Kitapevi. | | | | | | | | | | | | | | |
| **Assessment Criteria** |  | | | | | | | | If any, mark as (X) | | | | Percent(%) | | |
| Midterm Exams | | | | | | | | X | | | | 40 | | |
| Quizzes | | | | | | | | - | | | | - | | |
| Homeworks | | | | | | | | X | | | | 20 | | |
| Projects | | | | | | | | - | | | | - | | |
| Term Paper | | | | | | | | - | | | | - | | |
| Laboratory Work | | | | | | | | - | | | | - | | |
| Other | | | | | | | | - | | | | - | | |
| Final Exam | | | | | | | | X | | | | 40 | | |
| **Prepared by** | Doç.Dr. Mehmet Sayım KARACAN | | | | | | | | | | | | | | |
| **Week** | Subject | | | | | | | | | | | | | | |
| **1**  **2**  **3**  **4**  **5**  **6**  **7**  **8**  **9**  **10**  **11**  **12**  **13**  **14** | Introduction to spectroscopy  Molecular Ultraviolet/Visible Absorption Spectroscopy and applications,  Infrared Absorption Spectroscopy and applications,  Raman Spectroscopy and applications  Molecular mass spectroscopy and applications  Molecular Fluorescence and Phosphorescence, Chemiluninescence Spectroscopy,  Nuclear Magnetic Resonance Spectroscopy and applications,  ESR, and applications  MIDTERM EXAM  Hyphenated methods: GC-MS and applications  LC-MS and applications  GC-IR and applications  HPLC and applications | | | | | | | | | | | | | | |
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| **KİM 413 Separation and Preconcentration Methods** | | | | | | | | **CHEMISTRY** | | | | | | | | | | | |
| **Semester** | **Teaching Methods** | | | | | | | | | | | | | | **Credits** | | | | |
| **Lecture** | | **Recite** | | **Lab.** | | **Home work** | | **Term project** | | **Other** | | **Total** | | **Credit** | | | **ECTS Credit** | |
| 7-8 | 42 | | - | | - | |  | |  | | 38 | | 80 | | 2 | | | 3 | |
| **Language** | Turkish | | | | | | | | | | | | | | | | | | |
| **Compulsory / Elective** | Optional | | | | | | | | | | | | | | | | | | |
| **Prerequisites** | - | | | | | | | | | | | | | | | | | | |
| **Course Contents** | The principles of separation and preconcentration methods. Inorganic and organic trace analysis and problems to be encountered. Separation and preconcentration techniques to overcome these problems. Theoretical basis and applications of liquid-Liquid extraction, adsorption, solid phase extraction, ion exchange, co-precipitation, electrolysis, volatilization, flotation and cloud point extraction. | | | | | | | | | | | | | | | | | | |
| **Course Objectives** | To teach separation and preconcentration methods that required for determination of trace species in the samples such as environmental, food and biological. | | | | | | | | | | | | | | | | | | |
| **Learning  Outcomes and Competences** | Be able to know the importance of trace species. Be able to know the problems encountered in trace element determination. Be able to compare various separation and preconcentration methods. | | | | | | | | | | | | | | | | | | |
| **Textbook and /or References** | 1. Z. B. Alfassi, C. M. Wai, Preconcentration techniques for trace elements, CRC Press, 1992. 2. J.Minczewski, J. Chwastowska, R. Dybezynski, Separation and Preconcentration Methods in Inorganic Trace Analysis, New York: Ellis Horwood, 1982. 3. C. Vandecasteele, Modern methods for trace element determination, ISBN: 0-471-94039-9, Chichester: John Wiley and Sons, 1997 4. A. Mizuike, Enrichment techniques for trace inorganic analysis, Springer Verlag, Berlin, 1983. | | | | | | | | | | | | | | | | | | |
| **Assessment Criteria** |  | | | | | | | | | | | | | If any, mark  as (X) | | Percent  (%) | | | |
| Midterm Exams | | | | | | | | | | | | | X | | | 40 | | |
| Quizzes | | | | | | | | | | | | | - | | | - | | |
| Homeworks | | | | | | | | | | | | | X | | | 20 | | |
| Other | | | | | | | | | | | | | - | | | - | | |
| Final Exam | | | | | | | | | | | | | X | | | 40 | | |
| **Prepared by** | Prof. Dr. Ali Rehber TÜRKER | | | | | | | | | | | | | | | | | | |
| **Week** | **Subject** | | | | | | | | | | | | | | | | | | |
| 1  2  3  4  5  6  7  8  9  10  11  12  13  14 | Introduction to separation and preconcentration methods  Inorganic and organic trace analysis and problems to be encountered  Liquid-Liquid extraction methods  Applications of Liquid-Liquid extraction methods  Separation and preconcentration by adsorption method  Solid phase extraction techniques  Batch and continuous adsorption techniques  MIDTERM  Separation and preconcentration by Ion Exchange  Separation and preconcentration by co-precipitation method  Separation and preconcentration by electrolysis  Separation and preconcentration by volatilization  Separation and preconcentration by flotation  Separation and preconcentration by cloud point extraction method | | | | | | | | | | | | | | | | | | |
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