

**(Volumetric analysis) Course Catalogue**

**2022-2023**

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| **College** | **Koya technical institute** | |
| **Department** | **Petroleum technology – Chemical analyzing** | |
| **Module Name** | **Volumetric analysis** | |
| **Module Code** | **VOA105** | |
| **Semester** | **1** | |
| **Credit** | **8** | |
| **Module type** | **Core** | |
| **Weekly hours** | **5** |  |
| **Weekly hours (Theory)** | **( 2 )hr Class** | **( )hr Workload** |
| **Weekly hours (Practical)** | **( 3 )hr Class** | **( )hr Workload** |
| **Lecturer (Theory)** | **Yousif Taha Maaroof** | |
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| **Lecturer (Practical)** |  | |
| **Email** |  | |

**Course Book**

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| **Course overview:**  This course aims to familiarize students with the principles of analytical chemistry and basic analytical techniques including volumetric analysis. This course is not open to Chemistry or Analytical and Testing Sciences major students.  Upon successful completion students should be able to facilitate the learner to make solutions of various molar concentrations. This may include: The concept of the mole; Converting moles to grams; Converting grams to moles; Defining concentration; Dilution of Solutions; Making different molar concentrations. | | | | |
| **Course objective:**   * - Experimental practice of quantitative volumetric analysis.   -The objective of the titration is the determination of the concentration or the mass of the minimum formula from the titrated chemical material composing a pure liquid or a solution.  The main objective of volumetric analysis is to determine the amount of a substance in a given sample. When dealing with volumetric analysis the concept of concentration cannot be avoided. Molarity i.e. moles per litre or decimeter is widely used unit of concentration. | | | | |
| * **Student's obligation**   Students should read ahead and be prepared to ask/answer questions during class on the material as it is covered. Volumetric analysis is a general term for a method in quantitative chemical analysis in which the amount of a substance is determined by the measurement of the volume that the substance occupies. It is commonly used to determine the unknown concentration of a known reactant. In these cases, supplementary course material will be provided to the student either as handouts or as web links. during the academic year besides the assignment;  Pre-final: 50% = (30% exam + 20% activity + quiz)  Final Exam: 50% | | | | |
| * **Forms of teaching**   lecture halls with data show equipment for lecture presentations, white board, overhead projector, posters | | | | |
| * **Assessment scheme**   ‌6% Mid. Theory exam  10% Mid. practical exam  4% Quiz  40% Activity  25% final practical  15% final theory | | | | |
| * **Specific learning outcome:** | | | | |
| * **Course Reading List and References‌:**   **Basic references**   1. Skoog, Douglas., Holler F. James., Crouch R. Stanley, 2007. Principles of analytical chemistry.  2. A text-book of volumetric analysis: with special reference to the volumetric processes by W henry. 3. Scheme and studies of reference materials for volumetric analysis by [Toshiaki Asakai](javascript:;)  **Supplementary literature**  1. <http://www.wiredchemist.com/chemistry/instructional/laboratory-tutorials/volumetric-analysis>  2.https://www.izito.ws/analyticalchemistry/lab | | | | |
| * **Course topics (Theory)** | **Week** | | | **Learning Outcome** |
| Principles of analytical chemistry. | 1 | | |  |
| Classification of chemical analysis. | 2 | | |  |
| Fundamentals of volumetric chemical analysis. | 3 | | |  |
| Concentration and units express concentration. | 4 | | |  |
| Percentage units (W/W %, W/V % and V/V %). |  | | |
| Molarity calculations (for solids). | 5 | | |  |
| Molarity calculations (for liquids). |  | 6 |  |  |
| Normality calculations (for acids and bases). |  |  |  |
| Normality calculations (for salts). |  |
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| Dilution and dilution law of solutions. |  | | |  |
| Mole calculations. | 8 | | |  |
| Titration, theory, types and applications. | 12 | | |  |
| * **Practical Topics (If there is any)** | **Week** | | | **Learning Outcome** |
| Safety in laboratories |  | | |  |
| Introduction to analytical chemistry, methods of prevention, chemical risks. |  | | |  |
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| Preparation of solutions from liquid substances | 3 | | |  |
| Preparation of s solutions from solid substances | 4 | | |  |
| Acid – base Titration | 5 | | |  |
| Applications of Acid – base Titration | 6 | | |  |
| Precipitation titration | 7 | | |  |
| Oxidation – reduction titration | 8 | | |  |
| Complexometric titration | 9 | | |  |
| Applications of complexometric titration | 10 | | |  |
| Water treatment by cationic resin exchanger | 11 | | |  |
| Water treatment by cationic resin exchanger | 12 | | |  |
| * **Examinations (question design):** | | | | |
| * **Extra notes:** | | | | |
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| * **External Evaluator** | | | | |