| | Universitas Negeri Surabaya<br>Faculty of Mathematics and Natural Sciences<br>Undergraduate Chemistry Study Program | Document Code |
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# SEMESTER LEARNING PLAN

| Courses | CODE | Course Family | Credit Weight | | | SEMESTER | Compilation Date |
|---|---|---|---|---|---|---|---|
| Analytical Chemistry V: Analytical Electromet | 4720102054 | | T=2 | P=0 | ECTS=3.18 | 5 | July 18, 2024 |

| AUTHORIZATION | SP Developer | Course Cluster Coordinator | Study Program Coordinator |
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| | ..... | ..... | Dr. Amaria, M.Si. |

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| **Learning model** | **Project Based Learning** |
| **Program Learning Outcomes (PLO)** | **PLO study program that is charged to the course** |
| | **Program Objectives (PO)** |
| | **PLO-PO Matrix** |

| | P.O |
|---|---|

**PO Matrix at the end of each learning stage (Sub-PO)**

| P.O | Week | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |

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| **Short Course Description** | Qualitative and quantitative chemical analysis studies in terms of energetics, dynamics and analysis based on electrical properties include: potentiometric, conductometric, electrogravimetric, polarographic and voltammetric analysis accompanied by supporting laboratory activities so that students are able to master related concepts, are skilled in using tools, are able to work together and can communicate their knowledge and skills scientifically. |
| **References** | **Main :** |


1. Bagotsky, V.S,2006, *Fundamentals of Electrochemistry*,New Jersey: John Wiley & Sons

   Ewing G.W, 1981, *Instrumental Methods Of Chemical Analysis,*International Student Edition, Tokyo: McGraw-Hill Kogakusha Ltd

   Harvey,D. 2000. *Modern Analytical Chemistry.* Int. Ed.Singapore: Mc.Graw Hill.

   Pecsok, et al.1976. *Modern Methods of Analytical Chemistry.* 2nd New York:John Wiley and Sons

   Sawyer, Heineman,and Beebe,1984, *Chemistry Experiments forInstrumental Methods*, New York : John Wiley & Sons

   Skoog,Douglas.A. 1982, *Fundamental ofAnalytical Chemistry.* Fourth Edition. Tokyo: Holt- Sounders Japan


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| **Supporters:** | |
| **Supporting lecturer** | Prof. Dr. Pirim Setiarso, M.Si.<br>Prof. Dr. Titik Taufikurohmah, S.Si., M.Si.<br>Prof. Dr. Nita Kusumawati, S.Si., M.Sc. |

| Week- | Final abilities of each learning stage (Sub-PO) | Evaluation | Help Learning, Learning methods, Student Assignments, [ Estimated time] | Learning materials [ References | Assessment Weight (%) |
|---|---|---|---|---|---|

| | | Indicator | Criteria & Form | Offline ( *offline* ) | Online ( *online* ) | ] | |
|---|---|---|---|---|---|---|---|
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| 1 | Understand electrochemical analysis methods | Explain the methods of electrochemical analysis | **Criteria:** Numbers 0-100 | Lecture, question and answer 2 X 50 | | | 0% |
| 2 | Understand potentiometric analysis | Can know the principles of potentiometers | **Criteria:** Numbers 0-100 | Lecture, question and answer 2 X 50 | | | 0% |
| 3 | Understand potentiometric analysis | Can analyze potentiometrically | **Criteria:** Numbers 0-100 | Lecture, question and answer 2 X 50 | | | 0% |
| 4 | Understand potentiometric analysis | Can analyze potentiometrically | **Criteria:** Numbers 0-100 | Lectures, questions and answers, practice questions 2 X 50 | | | 0% |
| 5 | Understand conductometric analysis | Can know the principles of conductometry | **Criteria:** Numbers 0-100 | Lecture, question and answer 2 X 50 | | | 0% |
| 6 | Understand conductometric analysis | Can analyze conductometrically | **Criteria:** Numbers 0-100 | Lecture, questions and answers, practice questions 2 X 49 | | | 0% |
| 7 | Understand conductometric analysis | Can analyze conductometrically | **Criteria:** Numbers 0-100 | Lectures, questions and answers, practice questions 2 X 50 | | | 0% |
| 8 | | | | 2 X 50 | | | 0% |
| 9 | Understand coulometric analysis | Can know the principles of coulometry | **Criteria:** Numbers 0-100 | Lecture, question and answer 2 X 50 | | | 0% |
| 10 | Understand coulometric analysis | Can analyze coulometrically | **Criteria:** Numbers 0-100 | Lecture, question and answer 2 X 50 | | | 0% |
| 11 | Understand coulometric analysis | Can analyze coulometrically | **Criteria:** Numbers 0-100 | Lectures, questions and answers, practice questions 2 X 50 | | | 0% |
| 12 | Understand polarometric analysis | Can know the principles of polarometry | **Criteria:** Numbers 0-100 | Lecture, question and answer 2 X 50 | | | 0% |
| 13 | Understand polarometric analysis | Can analyze polarometrically | **Criteria:** Numbers 0-100 | Lectures, questions and answers, practice questions 2 X 50 | | | 0% |

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| **14** | Understand voltammetric analysis | Can know the principles of voltammetry | **Criteria:** Numbers 0-100 | Lecture, question and answer 2 X 50 | | | 0% |
| **15** | Understand voltammetric analysis | Can analyze voltammetrically | **Criteria:** Numbers 0-100 | Lecture, question and answer 2 X 49 | | | 0% |
| **16** | UAS | indicators 9-15 | **Criteria:** entry value of the uas component | 2 X 50 test | | | 0% |

**Evaluation Percentage Recap: Project Based Learning**

| No | Evaluation | Percentage |
|---|---|---|
| | | 0% |

**Notes**

1. **Learning Outcomes of Study Program Graduates (PLO - Study Program)** are the abilities possessed by each Study Program graduate which are the internalization of attitudes, mastery of knowledge and skills according to the level of their study program obtained through the learning process.
2. **The PLO imposed on courses** are several learning outcomes of study program graduates (CPL-Study Program) which are used for the formation/development of a course consisting of aspects of attitude, general skills, special skills and knowledge.
3. **Program Objectives (PO)** are abilities that are specifically described from the PLO assigned to a course, and are specific to the study material or learning materials for that course.
4. **Subject Sub-PO (Sub-PO)** is a capability that is specifically described from the PO that can be measured or observed and is the final ability that is planned at each learning stage, and is specific to the learning material of the course.
5. **Indicators for assessing** ability in the process and student learning outcomes are specific and measurable statements that identify the ability or performance of student learning outcomes accompanied by evidence.
6. **Assessment Criteria** are benchmarks used as a measure or measure of learning achievement in assessments based on predetermined indicators. Assessment criteria are guidelines for assessors so that assessments are consistent and unbiased. Criteria can be quantitative or qualitative.
7. **Forms of assessment:** test and non-test.
8. **Forms of learning:** Lecture, Response, Tutorial, Seminar or equivalent, Practicum, Studio Practice, Workshop Practice, Field Practice, Research, Community Service and/or other equivalent forms of learning.
9. **Learning Methods:** Small Group Discussion, Role-Play & Simulation, Discovery Learning, Self-Directed Learning, Cooperative Learning, Collaborative Learning, Contextual Learning, Project Based Learning, and other equivalent methods.
10. **Learning materials** are details or descriptions of study materials which can be presented in the form of several main points and sub-topics.
11. **The assessment weight** is the percentage of assessment of each sub-PO achievement whose size is proportional to the level of difficulty of achieving that sub-PO, and the total is 100%.
12. TM=Face to face, PT=Structured assignments, BM=Independent study.