



**Diponegoro University**  
**Faculty of Science and Mathematics**  
**Undergraduate Program Of Chemistry**

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| Module designation  | <b>Electrochemistry (EK)</b>   |
| Semester(s) in which the module is taught                     | 3  |
| Person responsible for the module                             | Drs. WH Rahmanto, MSi<br>Dra. Linda Suyati, Msi  |
| Language  | Indonesian   |
| Relation to curriculum  | <del>Compulsory/elective/specialisation</del>  |
| Teaching methods  | Lecture  |
| Workload (incl. contact hours, self-study hours)              | Face to Face = 1x(2x50")<br>Discovery Learning + Cooperative Learning = 1x(2x60"+2x60")  |
| Credit points   | 2  |
| Required and recommended prerequisites for joining the module | KD2  |
| Module objectives/intended learning outcomes                  | (S9) Demonstrate an attitude of being responsible for work in their field of expertise independently<br><br>(PP1) Mastering the theoretical concepts of structure, properties, changes, kinetics, and energetics of molecules and chemical systems, identification, separation, characterization, transformation, synthesis of macromolecular chemicals, and their application<br><br>(PP2) Mastering complete operational knowledge about functions, how to operate standard chemical instruments, and data and information analysis of these instruments<br><br>(KU1) Able to apply logical, critical, systematic, and innovative thinking in the development or implementation of science and technology that pays attention to and uses humanities values by their field of expertise<br><br>(KU2) Able to demonstrate independent, quality, and measurable performance<br><br>(KK1) Able to produce appropriate conclusions based on the identification, analysis, isolation, transformation, and synthesis of chemicals that have been carried out |

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| Content                            | <ol style="list-style-type: none"> <li>1. Separation Concepts/Electrolytic Cells: Electrical Properties of Substances, Electrochemical Cell Design</li> <li>2. The Concept of Separation/Cell Electrolysis: Determinants of Cell Performance, Cell Electrical Measurement</li> <li>3. Concept of Separation/Electrical conduction of solutions: Electricity in Solution, Conductance, Activity, and ionic strength</li> <li>4. Concept of Separation/conductance of solutions: Electrolytic Dissociation, Transference Number</li> <li>5. Separation Concept/ Cell potential: Electrode Potential, Standard Electrode Potential Reference Electrode</li> <li>6. Separation Concept/ Cell potential: Standard Hydrogen Electrode, Standard Calomel Electrode, Silver/Silver Chloride Electrode</li> <li>7. Separation Concept/ Cell potential: Voltaic Series: Hydrogen Scale, Redox Reaction Potential</li> <li>8. Application of electrode potential and cell e.m.f: Thermodynamics of cell reactions, Determinants of pH</li> <li>9. Application of electrode potential and cell e.m.f: Determinant of equilibrium constant, Determinant of K<sub>sp</sub></li> <li>10. Galvanized Cell: Concentration Cell, Battery Cell</li> <li>11. Galvanized Cell: Corrosion</li> <li>12. Electrolysis Cell: Electrolysis Phenomenon, Faraday's Law of Electrolysis, Pure Water Electrolysis, Acid Solution Electrolysis, Base Solution Electrolysis, Salt Solution Electrolysis, Molten Material Electrolysis, Organic Compound Electrolysis</li> </ol> |
| Exams and assessment formats       | Mid-Semester Exam and Final Exam  |
| Study and examination requirements | Participatory Activities -15%<br>Project Results -15%<br>Cognitive/Task Knowledge -10%<br>Quiz -10%<br>Mid-semester -25%<br>Final exams -25%  |
| Reading list                       | <ol style="list-style-type: none"> <li>1. Atkins dan de Paula, 2010, Physical Chemistry, W. H. Freeman and Company, New York</li> </ol>   |