Module Descriptions

A **module** is a self-contained **learning unit** within a higher education program that includes thematically related courses and is assigned a **fixed number of credits**. It follows specific **learning objectives**, includes an **assessment component**, and contributes to achieving the qualifications of a degree program. In some countries, “modules” are also named “courses”.

Please provide a module description for each module. In addition to the compulsory and elective modules, this also includes credited internships and the final thesis.

Please summarize all module descriptions in one document (Module Handbook) and create a table of contents so that the modules can be found easily.

Module designation	*Chemistry of Solutions and Analytical Electrochemistry*
Semester(s) in which the module is taught	1 and 2
Person responsible for the module	*Prof. Dr. Isana Supiah Yosephine Louise* *Prof. Dr. Suyanta*
Language	*Indonesia*
Relation to curriculum	*Compulsory / ~~elective~~ / ~~specialisation~~*
Teaching methods	*Lecture, discussion, project*
Workload (incl. contact hours, self-study hours)	*(Estimated) Total workload:* *100 minutes/week for class learning*
Credit points	*2 sks*
Required and recommended prerequisites for joining the module	*General Chemistry*
Module objectives/intended learning outcomes	*On successful completion of the course students should be able to:* *1. Understand the scope of solutions.* *2. Explain solution composition.* *3. Explain activity and activity coefficients.* *4. Explain solution equilibrium.* *5. Understanding electrochemistry* *6. Explain electrified interfaces* *7. Understanding electrodes, and electrochemical cells* *8. Understand of applications of electroanalytical chemistry: potentiometry and voltammetry*

<table>
<tr><td>Content</td><td>- Introduction to chemistry of solutions and analytical electrochemistry
- Solutions
- Electrochemistry
- Potentiometry
- Voltammetry
- Chemistry of solutions research design
- Electrochemistry research design</td></tr>
<tr><td>Examination forms</td><td>Essay, project report and presentation, written tests</td></tr>
<tr><td>Study and examination requirements</td><td>Minimum attendance at lectures is 75% and lab work is 100%
Final score (NA) is calculated as follows:
<table>
<tr><th>Learning Outcome</th><th>Weight (%)</th><th>Technique of Assesment</th></tr>
<tr><td>1-8</td><td>5</td><td>Participation</td></tr>
<tr><td>1-8</td><td>5</td><td>Quizz</td></tr>
<tr><td>3, 5</td><td>10</td><td>Group Discussion</td></tr>
<tr><td>8</td><td>30</td><td>Lab work</td></tr>
<tr><td>4, 7</td><td>20</td><td>Project</td></tr>
<tr><td>1-7</td><td>15</td><td>Mid-term Written Test</td></tr>
<tr><td>1-8</td><td>15</td><td>Final Exam Written Test</td></tr>
</table></td></tr>
<tr><td>Reading list</td><td>
- Moore, W.J. (1976). Physical Chemistry. Fifth Edition. New Delhi: Longman Ltd.
- Hargis, L.G. (1988). Analytical Chemistry Principles and Techniques. New Jersey: Prentice-Hall, Inc.
- Hibbert, D.B. (1993). Introduction to Electrochemistry. London: The Macmillan Press Ltd.
- Skoog, D.A., West, D.M., and Holler, F.J. (1988). Fundamentals of Analytical Chemistry. Fifth Edition. New York: Saunders College Publishing.
- Bockris, J.O'M., and Reddy, A.K.N. (1977). Modern Electrochemistry, Volume 1. New York: Plenum Press.
- Bockris, J.O'M., and Reddy, A.K.N. (1977). Modern Electrochemistry, Volume 2. New York: Plenum Press.
- Bockris, J.O'M., and Khan, S.U.M. (1993). Surface Electrochemistry: A Molecular Level Approach. New York: A Plenum Press.
- Yoseph Wang. (1984). Stripping Analysis. New York: John Wiley & Sons.
- Gosser, D.K. (1993). Cyclic Voltammetry. New York: VCH Publisher.
- Wang, Yoseph. (2000). Analytical Electrochemistry. New York: John Wiley & Sons.
- Isana Supiah Yosephine Louise dan Suyanta. (2020). Kimia Larutan dan Elektrokimia Analitik, Yogyakarta: Sekolah Pascasarjana UNY..
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Prepared by	Verified by:	Authorized by:

Prof. Dr. Isana Supiah Yosephine Louise		Program Study Coordinator