

## Module Handbook

Modul Name	<b>Spectrometry and Electrometry</b>
Module Level	Bachelor
Abbreviation, if applicable	KIA205
Sub-heading, if applicable	-
Course included in the module, if applicable	-
Semester/term	5th/ third year
Modul coordinator(s)	Dr. MujiHarsini, M.Si. (C1), Dr. MiratulKhasanah, M.Si. (C2)
Lecturer(s)	Dr. rer. nat. GandenSupriyanto, M.Sc.(C1), YanuardiRaharjo,S.Si., M.Sc. (C2)
Language	Bahasa Indonesia
Classification within the curriculum	Compulsory course
Teaching format/class hours per week during the semester	3 hours lectures (50 min/hour)
Workload	3 hours lectures, 3 hours individual study, 3 hours structured activity, 14 weeks per semester, and total 117 hours a semester ~ 3.9 ECTS *
Credit point	3
Requirement	Separation Techniques (KIA204)
Learning Outcomes	<p><b>General Competence (Knowledge):</b> Students are able to describe the basic theory and principles spectrometry analysis and electrometry</p> <p><b>Specific Competence:</b></p> <ol style="list-style-type: none"> <li>1. Students are able to distinguish between the conventional method and instrumental methods</li> <li>2. Students are able to explain the hierarchy of the analytical method</li> <li>3. Students are able to explain the various spectrometric method validation and elektrometri</li> <li>4. Students are able to apply Faraday's law in a matter of chemistry</li> <li>5. Students are able to explain the various electrodes and their use</li> <li>6. Students are able to explain the various analyzes elektrometri</li> <li>7. Students are able to explain the use of the Nernst equation in the analysis elektrometri</li> <li>8. Students are able to explain the electrodes used in the analysis potentiometrically</li> <li>9. Students are able to explain the use of reference electrode</li> <li>10. Students are able to write a reaction corresponding electrochemical cell electrode used</li> <li>11. Students are able to calculate the concentration of ions in the ion selective electrode (ISE)</li> <li>12. Students are able to explain the various analyzes koulometri</li> </ol>

	<ol style="list-style-type: none"> <li>13. Students are able to explain how to determine the equivalence point titration konduktometri</li> <li>14. Students are able to explain how to determine the equivalence point titration amperometric</li> <li>15. Students are able to calculate the mass of a substance on the analysis elektrogravimetri</li> <li>16. Students are able to explain the principles of analysis on polarography and voltammetry</li> <li>17. Students are able to explain the movement of matter in polarography and voltammetry</li> <li>18. Students are able to explain the potential of rising</li> <li>19. Students can explain the mechanism and result of interaction of electromagnetic radiation with matter</li> <li>20. Students can explain the basic qualitative analysis of analytes in a sample</li> <li>21. Students can calculate the analyte concentration based on the absorbance / transmission</li> <li>22. Students can pinpoint the area of measurement for quantitative analysis</li> <li>23. Students can calculate the levels of the two components in the mixture</li> <li>24. Students can explain fundamental analysis turbidimetry</li> <li>25. Students can calculate the concentration of analyte in the sample</li> <li>26. Students can explain the basis for the analysis of fluorescence</li> <li>27. Students can explain the formation of the plasma coupling and excellence ICP methods for quantitative analysis</li> <li>28. Students can calculate the analyte concentration berpendarfluor</li> <li>29. Students are able to explain the principles of measurement with IR</li> <li>30. Students are able to explain the types of vibrations in the IR</li> <li>31. Students are able to explain the principle of measurement by NMR</li> <li>32. Students are able to explain the chart of NMR equipment</li> <li>33. Students are able to explain the principle of measurement by AAS method</li> <li>34. Students are able to explain the AAS instrumentation</li> <li>35. Students are able to explain the application and the irregularities that occurred in the law of Lambert-Beer</li> <li>36. Students are able to explain the sequence of processes in the analysis by flame AAS</li> <li>37. Students are able to explain all kinds of interference in AAS and its handling</li> <li>38. Students are able to explain the sample preparation techniques in flame AAS</li> <li>39. Students are able to explain the method of analysis AAS-HVG</li> <li>40. Students are able to explain the interference at CVG</li> <li>41. Students are able to explain pretreatmen sample analysis Hg</li> <li>42. Students are able to explain pengatoman elektrotermal and handling systems</li> </ol>
Content	Spectrometry which includes ultra violet and visible spectrophotometry (UV-Vis), infrared (IR), nuclear magnetic resonance (NMR), Atomic Absorption Spectrometry (AAS) and Inductively Coupled Plasma (ICP); Elektrometri which include potentiometric, konduktometri,, koulometri,

	amperometric, voltammetry and polarography.
Study/exam achievements	<p>The final score : 40% UTS, 20% assignment, and 40% UAS</p> <p>Value of Completion;</p> <p>A 75.00-100  70,00- 74.99 AB  65.00 to 69.99 B  60.00 to 64.99 BC  55.00 to 59.99 C.  40.00 to 54.99 D  0.00 to 39.99 E</p>
Forms of media	White board,hand outs (PPT), LCD Projectors
Literature	<ol style="list-style-type: none"> <li>1. Skoog, D.A., 1992, <i>Principles in Instrumental Analysis</i>, 3<sup>rd</sup> ed., Saunders College Publishing, Fort Worth</li> <li>2. Willard, H.H., et al, 1988, <i>Instrumental Methods of Analysis</i>, 7<sup>th</sup> ed., Wadsworth, Belmont</li> <li>3. Hassivell, S.J., 1991, <i>Atomic Absorption Spectrometry</i>, Elsevier Science, Amsterdam.</li> <li>4. Moore, G. L., 1989, <i>Introduction to Inductively Coupled Plasma</i>, Elsevier Science, Amsterdam.</li> <li>5. Wang, J., 1985, <i>Stripping Analysis, Principle, Instrumentation and Applications</i>, VCH Publishers, Deerfield Beach.</li> </ol>
Note	<p>*Total ECTS = {(total hours workload x 50 min ) / 60 min } / 25 hours</p> <p><b>Each ECTS is equals with 25 hours</b></p>