






Faculty of Natural Sciences and Mathematics  
Chemistry Department  
Chemistry Education Study Program

Module Name		Analytical Chemistry I		
Module level, if applicable		1 <sup>st</sup> year		
Code, if applicable		SPK-209		
Semester (s) in which the module is taught		2 <sup>st</sup> semester		
Person responsible for the module		Prof. Riyanto, M.Si., Ph.D		
Lecturer(s)		Prof. Riyanto, M.Si., Ph.D Muhaimin, M.Sc.		
Language		Indonesia		
Relation to curriculum		Compulsory		
Types of teaching and learning	Class size	Forms of active participation	Workload 91 hours	
Lecture and discussion	50 – 60	Discussion	Lecture: 100 (min) x 16 (meeting)	27 hours
			Assignment: 120 (min) x 16 (week)	32 hours
			Independent study: 120 (min) x 16 (week)	32 hours
ECTS Credit		3.25		
Credit points		2 SCU		
Requirements according to examination regulations		Minimum attendance at lectures is 75% (according to UII regulation)		
Recommended prerequisites		Basic Chemistry		
Related course		Analytical Chemistry II		
Module objectives/intended learning		<p>On successful completion of the course students should be able to:</p> <ol style="list-style-type: none"> <li>1. Explain the role of analytical chemistry and the complete analytical process</li> <li>2. Explain the units of concentration and and can complete the calculations</li> <li>3. Explain the calculation of chemical stoichiometry; type of reaction: precipitation, acid-base, complex, redox, calculations with more than one reagent and able to complete the calculations.</li> <li>4. Explain the definition of analysis, determination, measurement techniques, methods, procedures, and</li> </ol>		

	<p>protocols.</p> <ol style="list-style-type: none"> <li>5. Explain the classification of analytical techniques; selection of an analytical method; procedure development</li> <li>6. Explain chemical reactions in solution</li> <li>7. Explain the acid-base balance</li> <li>8. Explain Complexing Equilibrium</li> <li>9. Explain solubility equilibrium Equilibrium buffer solution</li> <li>10. Explain the equilibrium of a hydrolyzed salt solution</li> <li>11. Explain the equilibrium of redox reactions</li> <li>12. Explain solvents in analytical chemistry</li> </ol>																																				
Content	<ul style="list-style-type: none"> <li>● Introduction to analytical chemistry I,</li> <li>● Perspectives and analytical problems,</li> <li>● Process analysis, Basic tools of analytical chemistry,</li> <li>● Degree of acidity of solutions,</li> <li>● Complexing and solubility equilibrium,</li> <li>● Acid-base equilibrium,</li> <li>● Complexing equilibrium,</li> <li>● Buffer solution equilibrium,</li> <li>● Hydrolyzed salt solution equilibrium,</li> <li>● Redox reaction equilibrium,</li> <li>● Qualitative analysis of cations and anions.</li> </ul>																																				
Study and examination requirements and forms of examination	Final score (NA) is calculated as follows:																																				
	<table border="1"> <thead> <tr> <th>Intended learning outcomes</th> <th>Weight (%)</th> <th>Technique of assessment</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>5</td> <td>Written test: assignment, midterm</td> </tr> <tr> <td>2</td> <td>5</td> <td>Written test: assignment, midterm</td> </tr> <tr> <td>3</td> <td>10</td> <td>Written test: assignment, midterm</td> </tr> <tr> <td>4</td> <td>10</td> <td>Written test: assignment, midterm</td> </tr> <tr> <td>5</td> <td>5</td> <td>Written test: assignment, midterm</td> </tr> <tr> <td>6</td> <td>5</td> <td>Written test: assignment, midterm</td> </tr> <tr> <td>7</td> <td>10</td> <td>Written test: assignment, midterm</td> </tr> <tr> <td>8</td> <td>10</td> <td>Written test: assignment, final examination</td> </tr> <tr> <td>9</td> <td>10</td> <td>Written test: assignment, final examination</td> </tr> <tr> <td>10</td> <td>10</td> <td>Written test: assignment, final examination</td> </tr> <tr> <td>11</td> <td>10</td> <td>Written test: assignment, final examination</td> </tr> </tbody> </table>	Intended learning outcomes	Weight (%)	Technique of assessment	1	5	Written test: assignment, midterm	2	5	Written test: assignment, midterm	3	10	Written test: assignment, midterm	4	10	Written test: assignment, midterm	5	5	Written test: assignment, midterm	6	5	Written test: assignment, midterm	7	10	Written test: assignment, midterm	8	10	Written test: assignment, final examination	9	10	Written test: assignment, final examination	10	10	Written test: assignment, final examination	11	10	Written test: assignment, final examination
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	12	10	Written test: assignment, final examination
Media employed	Power point slide presentation, video, Google classroom		
Reading lists	<ol style="list-style-type: none"> <li>1. Harvey, D., <i>Modern Analytical Chemistry</i>, McGraw-Hill Higher Education Pubs., 2000</li> <li>2. Mitra, S., <i>Sample preparation techniques in analytical chemistry</i>, Wiley, Canada, 2003</li> <li>3. Skoog, D.A., et al, <i>Fundamentals of Analytical Chemistry</i> 8th ed., Saunder College Pubs., 2004</li> <li>4. Christian, G.D., <i>Analytical Chemistry</i> 7th ed, John Wiley &amp; Sons, 2011</li> </ol>		

Prepared by:	Verified by:	Authorized by:
		
Person responsible for the module	Student representative	Coordinator Program