

## Module Descriptions

|                                                               |                                                                                                                                                                                                                                                                                                                                     |
|---------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Module designation                                            | Fundamentals of analytical chemistry (KIM6410)                                                                                                                                                                                                                                                                                      |
| Semester(s) in which the module is taught                     | 2                                                                                                                                                                                                                                                                                                                                   |
| Person responsible for the module                             | <i>Dra. Regina Tutik Padmaningrum, MSi</i>                                                                                                                                                                                                                                                                                          |
| Language                                                      | <i>Indonesia</i>                                                                                                                                                                                                                                                                                                                    |
| Relation to curriculum                                        | <i>Compulsory / <del>elective</del> / <del>specialisation</del></i>                                                                                                                                                                                                                                                                 |
| Teaching methods                                              | <i>Lecture, discussion, project</i>                                                                                                                                                                                                                                                                                                 |
| Workload (incl. contact hours, self-study hours)              | Total workload of the activity is 91 hours for theory and 91 hours for practical work per semester for 16 weeks which consist of:<br><i>100 minutes/week for class learning</i><br><i>120 minutes/week for structured activities</i><br><i>120 minutes/week for individual study</i><br><i>170 minutes/week for laboratory work</i> |
| Credit points                                                 | <i>3 sks (4.8 ECTS)</i>                                                                                                                                                                                                                                                                                                             |
| Required and recommended prerequisites for joining the module | <i>General Chemistry</i>                                                                                                                                                                                                                                                                                                            |

| Module objectives/intended learning outcomes | <p><i>On successful completion of the course students should be able to:</i></p> <ol style="list-style-type: none"><li>1. Explain the concept of qualitative and quantitative sample identification using volumetric methods responsibly, with quality, and in a measurable manner.</li><li>2. Explains the concepts of qualitative and quantitative analysis, including gravimetry, acid-base titration, complex formation titration, oxidation-reduction titration, and precipitation titration</li><li>3. Process and interpret qualitative and quantitative analysis data, including gravimetry, acid-base titration, complex formation titration, oxidation-reduction titration, and precipitation titration</li><li>4. Design procedures for applying qualitative and quantitative analysis methods, including gravimetry, acid-base titration, complex formation titration, oxidation-reduction titration, and precipitation titration</li><li>5. perform general and specific laboratory work, as well as synthesis and measurement techniques.</li></ol> |                         |            |                        |   |   |               |      |    |         |     |    |          |      |    |                |     |   |                |     |    |                       |     |    |                         |
|----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|------------|------------------------|---|---|---------------|------|----|---------|-----|----|----------|------|----|----------------|-----|---|----------------|-----|----|-----------------------|-----|----|-------------------------|
| Content                                      | <ul style="list-style-type: none"><li>- Preparation of sampel</li><li>- qualitative analysis methods: identification of anions and cations</li><li>- quantitative analysis methods, including gravimetry, acid-base titration, complex formation titration, oxidation-reduction titration, and precipitation titration</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                         |            |                        |   |   |               |      |    |         |     |    |          |      |    |                |     |   |                |     |    |                       |     |    |                         |
| Examination forms                            | Essay, project report, labwork repot, written tests                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                         |            |                        |   |   |               |      |    |         |     |    |          |      |    |                |     |   |                |     |    |                       |     |    |                         |
| Study and examination requirements           | <p>Minimum attendance at lectures is 75%</p> <p>Final score (NA) is calculated as follows:</p> <table><tr><th>Learning Outcome</th><th>Weight (%)</th><th>Technique of Assesment</th></tr><tr><td>5</td><td>5</td><td>Participation</td></tr><tr><td>3, 4</td><td>10</td><td>Pretest</td></tr><tr><td>3,4</td><td>10</td><td>Posttest</td></tr><tr><td>3, 4</td><td>40</td><td>Labwork report</td></tr><tr><td>1,2</td><td>5</td><td>Project report</td></tr><tr><td>1,2</td><td>15</td><td>Mid-term Written Test</td></tr><tr><td>1,2</td><td>15</td><td>Final Exam Written Test</td></tr></table>                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Learning Outcome        | Weight (%) | Technique of Assesment | 5 | 5 | Participation | 3, 4 | 10 | Pretest | 3,4 | 10 | Posttest | 3, 4 | 40 | Labwork report | 1,2 | 5 | Project report | 1,2 | 15 | Mid-term Written Test | 1,2 | 15 | Final Exam Written Test |
| Learning Outcome                             | Weight (%)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Technique of Assesment  |            |                        |   |   |               |      |    |         |     |    |          |      |    |                |     |   |                |     |    |                       |     |    |                         |
| 5                                            | 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Participation           |            |                        |   |   |               |      |    |         |     |    |          |      |    |                |     |   |                |     |    |                       |     |    |                         |
| 3, 4                                         | 10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Pretest                 |            |                        |   |   |               |      |    |         |     |    |          |      |    |                |     |   |                |     |    |                       |     |    |                         |
| 3,4                                          | 10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Posttest                |            |                        |   |   |               |      |    |         |     |    |          |      |    |                |     |   |                |     |    |                       |     |    |                         |
| 3, 4                                         | 40                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Labwork report          |            |                        |   |   |               |      |    |         |     |    |          |      |    |                |     |   |                |     |    |                       |     |    |                         |
| 1,2                                          | 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Project report          |            |                        |   |   |               |      |    |         |     |    |          |      |    |                |     |   |                |     |    |                       |     |    |                         |
| 1,2                                          | 15                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Mid-term Written Test   |            |                        |   |   |               |      |    |         |     |    |          |      |    |                |     |   |                |     |    |                       |     |    |                         |
| 1,2                                          | 15                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Final Exam Written Test |            |                        |   |   |               |      |    |         |     |    |          |      |    |                |     |   |                |     |    |                       |     |    |                         |

|              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|--------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Reading list | <ol style="list-style-type: none"> <li>1. Larry G. Hargis. 1988. Analytical Chemistry Principle and Techniques. London: Practice Hall International Edition.</li> <li>2. I Made Sukarna (2007). Diktat Kimia Analisis 1. Analisis Kualitatif. Jurusan Pendidikan Kimia FMIPA UNY</li> <li>3. Sorum C.H. 1977. Introduction to Semimicro Qualitative Analysis. Fifth Edition. USA: Prentice Hall, INC</li> <li>4. Bassett, at all. (Revisers). 1978. Vogel's Text Book of Quantitative Inorganic Analysis. Including Elementary Instrumental Analysis. Fourth Ed. London and New York: Longman.</li> <li>5. Daniel C. Harris. 1987. Quantitative Chemical Analysis. New York: Freeman &amp; Co.</li> <li>6. Day, R.A, Underwood, A.L. 1989. Analisis Kimia Kuantitatif. Edisi 5. Jakarta : Erlangga</li> <li>7. Garry D. Christian. 1977. Analytical Chemistry. New York : John Willey &amp; Sons</li> <li>8. Khopkar. S.M. 1990. Konsep Dasar Kimia Analitik. Cetakan I. Jakarta : UI Press</li> </ol> |
|--------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

| Prepared by                                                                         | Verified by: | Authorized by:                                                                        |
|-------------------------------------------------------------------------------------|--------------|---------------------------------------------------------------------------------------|
|  |              |  |
| Dra. Regina Tutik Padmaningrum, MSi                                                 |              | Program Study Coordinator                                                             |