



Diponegoro University
Faculty of Science and Mathematics
Undergraduate Program Of Chemistry

Module designation	Water Chemistry (Water)
Semester(s) in which the module is taught	5
Person responsible for the module	Gunawan, M.Si., Ph.D Dr. Dra. Retno Ariadi Lusiana, M.Si
Language	Indonesian
Relation to curriculum	Compulsory /elective/ specialisation
Teaching methods	Lecture
Workload (incl. contact hours, self-study hours)	Face to face : 1 x (2 x 50 min); Structured study: 1 x (2 x 60 min); Self study: 1 x (2 x 60 min)
Credit points	2
Required and recommended prerequisites for joining the module	KA2

<p>Module objectives/intended learning outcomes</p>	<p>Demonstrate an attitude of being responsible for work in their field of expertise independently.</p> <p>Able to apply logical, critical, systematic, and innovative thinking in the context of the development or implementation of science and technology.</p> <p>Able to demonstrate independent, quality, and measurable performance.</p> <p>Able to solve science and technology problems in general chemistry and in uncomplicated scopes such as identification, analysis, isolation, transformation, and micro-synthesis Able to analyze several alternative solutions in the field of spectrometric research and present analysis conclusions for decision making.</p> <p>Mastering complete operational knowledge of functions, how to operate standard chemical instruments, and analysis of data and information from these instruments.</p> <p>Students can test (C4) various types of water samples and solve (C4) water sample-based problems, and develop/modify (A4) systems.</p> <p>To obtain water that is ready to be used for both drinking and other purposes.</p>
<p>Content</p>	<ol style="list-style-type: none"> 1. Water chemistry in terms of the source it is obtained, the treatment technique as well as its analysis 2. Solids in water, Electrochemical measurements, Hardness and removal techniques and alkalinity in water 3. Measurements of DO and BOD 4. Measurements of COD 5. Measurement of chlorophyll in water 6. Measurement of Nitrogen in water in the form of ammonia, nitrite or nitrate 7. Measurement of phosphorus, chloride, sulfate in water 8. fluoride measurement and removal technique 9. iron and manganese measurement and the treatments of iron and manganese in water 10. Heavy metal measurement and techniques of heavy metal removal 11. Techniques of contaminant removal 12. Demineralization techniques in water treatment 13. Techniques for removing pathogenic bacteria and viruses in water treatment 14. THM and asbestos fiber removal techniques in water treatment
<p>Exams and assessment formats</p>	<p>Mid-Semester Exam and Final Exam</p>

Study and examination requirements	Participatory Activities -20% Project Results -30% Task -10% Quiz -10% Mid-semester -15% Final exams -15%
Reading list	<ol style="list-style-type: none"> 1. William, R.B., Culp, G.L., 1986, Handbooks of Public Water Systems, Van Nostrand Reinhold, New York 2. APHA (American Public Health Associations), 1986, Standard Methods: For Examination of Water and Waste Water, 14th ed., APHA, Washington D.C 3. Sandell, E., B. dan H Onishi, 1978, Colorimetric Determination of Traces of Metals, 4th edition, Interscience, New York 4. Radojevic, M. dan Bashkin, V. N., 1999, Practical environmental Analysis, Royal Society of Chemistry, Cambridge 5. DEKES RI, KEP-MEN 2003 tentang Baku Mutu Air