UNESA

UNDERGRADUATE PROGRAM OF
CHEMISTRY EDUCATION
(UPCE)

MODULE HANDBOOK



Faculty of Mathematics and Natural Sciences
Universitas Negeri Surabaya

APPROVAL SHEET

UNDERGRADUATE PROGRAM OF CHEMISTRY EDUCATION (UPCE)
MODULE HANDBOOK

This document has been approved and endorsed on January 2024

Best Regards,
Quality Assurance Unit

Coordinator of the Chemistry Education
Study Program, FMIPA UNESA



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SUMMARY

UNDERGRADUATE PROGRAM OF CHEMISTRY EDUCATION (UPCE) MODULE HANDBOOK

The Undergraduate Program of Chemistry Education (UPCE) Module Handbook is an official academic document that provides comprehensive information for each course, including module descriptions, intended learning outcomes, workload, teaching methods, assessment strategies, and key references. This handbook provides a structured, transparent guide for students, lecturers, and stakeholders on implementing the curriculum. The following section presents the course structure for each semester, along with links to the respective module handbooks for detailed reference.

Table 1. UPCE Compulsory Course Structure and Links to Module Handbooks for Each Semester

List of Compulsory Courses				
1st Semester				
No	**Code/ Link**	**Course Name**	**CU**	**ECTS**
1	1000002018	Pancasila	2	3.18
2	8420403039	General Biology*	3	4.77
3	8420403287	Basic of Analytical Chemistry*	3	4.77
4	8420402319	Basic of Education	2	3.18
5	8420403069	General Physics*	3	4.77
6	8420403123	Basic Chemistry*	3	4.77
7	8420402323	Basic Mathematics	2	3.18
8	8420403181	Learning Theories	2	3.18
2nd Semester				
No	**Code/ link**	**Course Name**	**CU**	**ECTS**
1	100000202x	Religion Education	2	3.18
2	8420403331	Basics of Chemical Separations*	3	4.77
3	8420402293	Evaluation of Learning and Teaching	2	3.18
4	1000002033	Citizenship	2	3.18
5	8420403303	Quantum Chemistry	3	4.77
6	8420402173	Conservation of Natural Resources and Environment	2	3.18
7	8420402328	School Curriculum	2	3.18
8	8420402291	Development of Teaching Materials	2	3.18
9	8420402292	Learning Planning	2	3.18
3rd Semester				
No	**Code/ Link**	**Course Name**	**CU**	**ECTS**
1	1000002003	Indonesian	2	3.18

2	1000002046	Digital Literacy	2	3.18
3	8420402190	Spectroscopy and Chromatography Method*	3	4.77
4	8420403294	Innovative Learning	3	4.77
5	8420402215	ICT-based Learning Chemistry	2	3.18
6	8420403318	Mono-function Organic Compound	3	4.77
7	8420402329	Statistics	2	3.18
8	8420403315	Basic Theory of Inorganic Chemistry	3	4.77
9	8420403316	Thermodynamics of Chemistry*	3	4.77
4th Semester				
No	**Code/ Link**	**Course Name**	**CU**	**ECTS**
1	1000002177	English	2	3.18
2	8420404332	Biochemistry*	3	4.77
3	8420402295	Teaching Skills and Microteaching	2	3.18
4	8420402151	Coordination Chemistry	2	3.18
5	8420403317	Poly-function Organic Compound*	3	4.77
6	8420403306	Chemical Kinetics*	3	4.77
7	8420403192	Research Methodology	3	4.77
8	8420402208	Laboratory Organization	2	3.18
9	1000002047	Physical Education and Fitness	2	3.18
10	8420402171	School Chemistry	2	3.18
5th Semester				
No	**Code/ Link**	**Course Name**	**CU**	**ECTS**
1	8420402063	Philosophy of Science	2	3.18
2	1000002176	Entrepreneurship	2	3.18
3	Elective Course		20	31.8
6th Semester				
No	**Code/ Link**	**Course Name**	**CU**	**ECTS**
1	MBKM0032	Teaching Internship: Program Design	2	3.18
2	MBKM0031	Teaching Internship: Program Evaluation	2	3.18
3	Elective Course		16	25.45
7th Semester				
No	**Code/ Link**	**Course Name**	**CU**	**ECTS**
1	8420403325	Elemental Chemistry*	3	4.77
2	1000002104	Final Project Proposal	2	3.18
3	Elective Course		10	15.90
8th Semester				
No	**Code/ Link**	**Course Name**	**CU**	**ECTS**
1	1000004105	Final Project	4	6.36
2	Elective Course		6	9.54

Table 2. UPCE Elective Course Structure and Links to Module Handbooks for Each Semester

List of Elective Course Odd Semester				
No	Code/ Link	Course Name	CU	ECTS
5th Semester				
1	MBKM00xx	Community Service Program - evaluation program***	2	3.18
2	MBKM00yy	Community Service Program - program planning ***	2	3.18
3	1000020158	Critical and Creative Thinking***	2	3.18
4	1000020163	Communication skills***	2	3.18
5	1000020160	Empathy and Emotional Intelligence***	2	3.18
6	1000020161	Communication and Teamwork***	2	3.18
7	1000020162	Soft Skills***	2	3.18
8	8420404339	Public communication	2	3.18
9	8420404341	Data literacy***	2	3.18
10	8420404338	Management and leadership***	2	3.18
11	8420404340	Innovative Thinking***	2	3.18
7th Semester				
12	8420402302	Natural Product Chemistry*	2	3.18
13	8420402153	Environmental Chemistry*	2	3.18
14	8420402167	Food Chemistry*	2	3.18
15	8420402180	School Management*	2	3.18
16	8420402309	Chemistry Game Media*	2	3.18
17	8420402334	Multirepresentation of Chemistry*	2	3.18
18	8420402011	Development of Assessment Instrument*	2	3.18
19	8420402223	ICT Learning Media Development*	2	3.18
20	8420402224	Creative Learning Media Development*	2	3.18
21	8420402336	Chemistry Education for Students with Special Needs*	2	3.18
List of Elective Course Even Semester				
No	Code/ Link	Course Name	CU	ECTS
6th Semester				
1	8420402342	School Curriculum Analysis**	2	3.18
2	8420403345	Learning Plan Development**	3	4.77
3	8420402343	Learning Assessment Development**	2	3.18
4	8420403344	Analysis of Teaching Materials**	3	4.77
5	8420402222	Learning Media Development**	2	3.18
6	8420404346	Teaching Practice**	4	6.36
8th Semester				
7	8420402001	Food Analysis*	2	3.18
8	8420402128	Pharmaceutical Chemistry*	2	3.18

9	8420402147	Industrial Chemistry*	2	3.18
10	8420402152	Cosmetics*	2	3.18
11	8420402322	Surface Chemistry*	2	3.18
12	8420402333	Green Chemistry*	2	3.18
13	8420402216	Chemistry Learning for Vocational School*	2	3.18
14	8420402221	Career Development*	2	3.18
15	8420402347	AI for Chemistry Learning*	2	3.18

MODULE DESCRIPTIONS

COMPULSORY COURSE FOR EACH SEMESTER

COMPULSORY COURSE
1st SEMESTER

Module Descriptions

Module designation	**Pancasila**
Semester(s) in which the module is taught	1st Semester/First Year
Person responsible for the module	Dra. Siti Mutmainah, M.Pd. Dr Welly Suryandoko, S.Pd. M.Pd.
Language	Bahasa Indonesia (Regular Class) Bahasa Inggris (Internasional Class)
Relation to curriculum	Compulsory course
Teaching methods	Project-Based Learning, Case studies 2 workhours per week (2 x 170 minutes per week)
Workload (incl. contact hours, self-study hours)	1 CU for a bachelor's degree equals 170 minutes (50 minutes face-to-face, 60 minutes structured, 60 minutes independent learning) per week × 14 weeks, excluding mid and end-term exams. = 39.67 work hours per semester = 1.587 ECTS.
Credit points	2 Credit Units (CU) = 3,18 ECTS
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	1. Thinking critically, have a rational, ethical, aesthetic, dynamic attitude, have a national perspective, be democratic and civilised. (General Competence) 2. Understand the basic diversity of community, nation, and state life. (Attitude) 3. Study, analyse, and implement thoughts based on the values of Pancasila. (Attitude) 4. Emerge and conserve the noble personality of the Indonesian nation. (Attitude)
Content	This course will discuss the concept and essence of Pancasila as the basis and ideology of the state, as well as the nation's outlook on life. This course also examines Pancasila historically, juridically and philosophically and its actualisation in the life of the nation and state. Pancasila as a foundation in Political Ethics and Development Paradigm and its implementation in the life of society, nation and state through studies, presentation of concepts, discussions, case studies, and assignments of both individuals and groups.
Examination forms	Essay and Oral Presentation

Study and examination requirements	**Study and Examination Requirements/Assessment:** 1. Individual Assignment: Case analysis report 2. Group Case Study and Discussion 3. Documentation and Presentation of Case Study Findings **Assessment Recap (Case Study-Oriented):** 1. **Participatory Activities / Case Study Analysis**: 52,5% 2. **Project / Product Assessment**: 25% 3. **Portfolio**: 7,5% 4. **Test (Essay)**: 15% Total: 100%
Reading list	1. Tim MKU Pendidikan Pancasila Unesa. 2019. Pendidikan Pancasila. Surabaya: Unesa University Press 2. Direktorat Jenderal Pendidikan Tinggi. 2012. Materi Ajar Mata Kuliah Pendidikan Pancasila. Jakarta: Direktorat Pembelajaran dan Kemahasiswaan 3. Syarbaini, Syahrial. 2011. Pendidikan Pancasila: Implementasi Nilai-nilai Karakter Bangsa di Perguruan Tinggi. Bogor: Ghalia Indonesia 4. Latif, Yudi. 2011. Negara Paripurna: Historisitas, Rasionalitas, dan Aktualitas Pancasila. Jakarta: PT 5. Latif, Yudi. 2014. Mata Air Keteladanan. Pancasila dalam Perbuatan Pusat Studi Pancasila UGM. 2012. Pancasila Dasar Negara. Yogyakarta: PSP Press 6. Thaib, Dahlan. 1991. Pancasila Yuridis Ketatanegaraan. Yogyakarta: UPP AMP YKPN 7. Warsono. 2014. Pancasila-Isme dalam Dinamika Pendidikan. Surabaya: Unesa University Press 8. Majelis Permusyawaratan Rakyat Indonesia (MPR RI). 2002. Undang-Undang Dasar 1945 Hasil Amandemen IV. 9. Suplemen Arah Pembangunan (RPJM) 2014-2019.

Module Descriptions

Module designation	General Biology *Biologi Umum*
Module level	Bachelor degree/Undergraduate Program
Course Code	8420503056
Semester/Term	1st semester/year 1
Person responsible for the module	Prof. Dr. Yuliani, M.Si Prof. Dr. Fida Rachmadiarti, M.Kes. Mochammad Ichsan, S.Si., M.Pd., M.Eng. Fitriari Izzatunnisa Muhaimin, B.Sc., M.Sc. Farah Aisyah Nafidiastri, S.Si., M.Si. Sari Fitriyaningsih, S.Pd., M.Pd., M.Sc. Dr. Wirdatun Nafisah, S.Si., M.Si. Ahmad Fudhaili, S.Si., M.Sc., Ph.D. Dr. Nur Kuswanti, M.Sc.St. Dr. Widowati Budijastuti, M.Si. Elma Sakinatus Sajidah, S.Si., M.Si., Ph.D. Prof. Dr. Ir. Dyah Hariani, M.Si Firas Khaleyla, S.Si., M.Si. Dwi Setyo Pratiwi, S.Pd., M.Ed
Language	Bahasa Indonesia (Indonesian language)
Relation to curriculum	Compulsory course
Teaching methods	Lecture, lab works
Workload	Contact hours: 2 x50 minutes lectures, 3 x50 minutes laboratory works Private study: 2 x60 minutes structured activity, 2 x60 minutes individual activity, Total 135 hours per semester ~ 4.77 ECTS**
Credit Point	3 CU
Required and recommended prerequisites for joining the module	-

<table>
<tr><td>Module Objectives/intended learning outcomes</td><td>1. Mastering basic concepts in biology, including Biology as knowledge, cell structure and function, cell division, metabolism including transport, photosynthesis andrespiration, genetics, biodiversty, evolution, structure and function of plant and animal organ and tissue, ecology, microbial growth and development, biotechnology, andtraining to solve issues using scientific method (knowledge)
2. Able to apply basic knowledge and skill in applying basic Biology concepts in solving issues on natural resource and environment in laboratory works (knowledge)
3. Able to apply transferable skill in Biology to develop ecopreneurship (eco-innovation, eco-opportunity, eco-commitment) (Special competences)
4. Able to work and be responsible both independently or in group in performing tasks related to Basic Biology (attitude)</td></tr>
<tr><td>Content</td><td>Basic concepts of biology as a science, cell structure and function, metabolism including transport, photosynthesis and respiration, genetics, diversity of living things and nomenclature, origin of life, evolution, structure and function of plant and animal organ tissues, ecology, organism behavior and biotechnology, and practice solving problems through scientific methods.</td></tr>
<tr><td>Examination forms</td><td>Written exam</td></tr>
<tr><td>Study and examination requirements</td><td>Study Requirement

Attendance: students must attend at least 75% of the lectures to be eligible for the final examination.

Study examination

The final grade (NA) is calculated based on the following ratio:

<table>
<tr><td>Assessment Components</td><td>Percentage of contribution</td></tr>
<tr><td>Participation</td><td>20%</td></tr>
<tr><td>Assignment</td><td>30%</td></tr>
<tr><td>Mid-semester test</td><td>20%</td></tr>
<tr><td>Final semester test</td><td>30%</td></tr>
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<table>
<tr>
<td></td>
<td>Grade conversion of 0-100 scale into 0-4 scale is set as below:
<table>
<tr><th>Letter</th><th>Number</th><th>Grade Interval</th></tr>
<tr><td>A</td><td>4,00</td><td>85 ≤ A ≤ 100</td></tr>
<tr><td>A-</td><td>3,75</td><td>80 ≤ A- < 85</td></tr>
<tr><td>B+</td><td>3,50</td><td>75 ≤ B+ < 80</td></tr>
<tr><td>B</td><td>3,00</td><td>70 ≤ B < 75</td></tr>
<tr><td>B-</td><td>2,75</td><td>65 ≤ B- < 70</td></tr>
<tr><td>C+</td><td>2,50</td><td>60 ≤ C+ < 65</td></tr>
<tr><td>C</td><td>2,00</td><td>55 ≤ C < 60</td></tr>
<tr><td>D</td><td>1,00</td><td>40 ≤ D < 55</td></tr>
<tr><td>E</td><td>0,00</td><td>0 ≤ E < 40</td></tr>
</table>
</td>
</tr>
<tr>
<td>Reading List</td>
<td>

Campbell, N.A., Reece, J., Urry, L.A., Cain, M.L., Wasserman, S.A., Minorsky., P.V. 2020. Campbell Biology 10 ed. Pearson
Kimball, J.W. 1993. Biologi Jilid I, II, III . Edisi Kelima. Cetakan Kedua. Jakarta: Penerbit Erlangga.
Rachmadiarti, F.,Yuliani, Widowati B., Rinie P, Mahanani T.A,Dyah H.,Herlina F.2022 Biologi Umum . Surabaya: UNESA Press.
Luria. 1981. A View of Life . California: Benyamin Cumming.
Reece, J. B., Urry, L. A., Cain, M. L., Wasserman, S. A., Minorsky, P. V., & Jackson, R. B. 2014. Campbell biology (Vol. 9). Boston: Pearson.
Biggs,A.Hagins W.C.Holiday,W.G.2008.Biology.New York:McGraw-Hill7.Morris, J., Hartl, D., Knoll, A., Lue, R., Michael, M. 2019. Biology: How Life Works Third edition. Freeman.8.Clark, M.A., Choi, J., Douglas, M. 2018. Biology 2e. Openstax, RICE University.

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</table>

Module Descriptions

Module designation	**Basic of Analytical Chemistry**
Semester(s) in which the module is taught	1st semester/First Year
Person responsible for the module	Dr. Rusmini S.Pd., M.Si
Language	Bahasa Indonesia (Regular Class) Bahasa Inggris (Internasional Class)
Relation to curriculum	Compulsory course
Teaching methods	Case method with practicum laboratory 3 workhours per week (3 x 170 minutes per week)
Workload (incl. contact hours, self-study hours)	1 CU for a bachelor's degree equals 170 minutes (50 minutes face-to-face, 60 minutes structured, 60 minutes independent learning) per week × 14 weeks, excluding mid and end-term exams. = 39.67 work hours per semester = 1.587 ECTS.
Credit points	3 Credit Units (CU) = 4.77 ECTS
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	1. Students are able to explain the basic principles of qualitative and quantitative analysis, including the theory of cation-anion identification, gravimetry, and volumetric analysis (acid-base, precipitation, complexation, and redox). 2. Students are able to analyze cations and anions in samples using appropriate procedures. 3. Students are able to apply the principles of neutralization, complexation, precipitation, and redox titration in everyday life. 4. Students are able to systematically carry out qualitative and quantitative analysis procedures according to scientific principles.
Content	This course examines the basic theories of qualitative and quantitative analysis that support the process and evaluation of results; qualitative analysis that includes systematic identification of cations and anions; quantitative analysis that includes gravimetric and volumetric analysis (acid-base, precipitation, complexation, redox).
Examination forms	Essay and Oral Presentation
Study and examination requirements	Student assessments include: Participatory Activities 55% Practical Assessment 20% Tests 25%

Reading list	1. Sorum, Clarence Harvey, and Lagowski, J. J. 1977. *Introduction to Semimicro Qualitative Analysis*. United State of America: Prentice-Hall Inc 2. Svehla, G, 1979. *Vogel's Text Book of Macro and Semimicro Qualitative Inorganic Analysis. Fifth ed*. London: Longman Group Limited 3. Sawyer, Heineman, and Beebe.1984. *Chemistry Experiments for Instrumental Methods*. New York: John Wiley & Sons 4. Day, Jr, R.A., dan Underwood, A.L., 2002. *Quantitative Analysis*. Sixth Ed. (Alih bahasa: Sopyan, I.). Jakarta: Penerbit Erlangga. 5. Poedjiastoeti, S., Monica, M., Sukarmin, dan Rusmini. 2016. Kimia Analisis Kualitatif. Surabaya: Unipress

MODULE DESCRIPTION

Module designation	**Basic of Education**
Semester(s) in which the module is taught	1st /First Year
Person responsible for the module	Prof. Dr. Achmad Lutfi, M.Pd.
Language	Bahasa Indonesia (Regular Class) Bahasa Inggris (Internasional Class)
Relation to curriculum	Compulsory Courses
Teaching methods	Case Study 2 workhours per week (2 x 170 minutes per week)
Workload:	1 CU for a bachelor's degree equals 170 minutes (50 minutes face-to-face, 60 minutes structured, 60 minutes independent learning) per week × 14 weeks, excluding mid and end-term exams. = 39.67 work hours per semester = 1.587 ECTS.
Credit points:	2 Credit Units (CU) = 3.18 ECTS
Required and recommended prerequisites for joining the module	-
Module objectives/ Intended Learning Outcomes	1. Applying the basic concepts of education, the nature of human beings and their development, the foundations of education, education as a system, the national education system, teachers as a profession, educational problems, educational innovation in Indonesia, and character education both in schools and outside of schools. 2. Demonstrate an open attitude in learning, collaborate with colleagues, and continuously develop one's abilities in understanding basic educational concepts.
Content:	This course discusses the basic concepts of education, human nature and development, the foundations of education, education as a system, the national education system, teachers as a profession, educational issues, educational innovation in Indonesia, and character education both in and outside of school. This course is an introductory course on education for new students in the education study program.
Examination forms	Study and Examination Requirements/Forms of Examination: 1. Group assignments/case study 2. Discussion and presentation

Study and examination requirements	Assessment Recap (Case Study): Participatory Activities: 50% Project/Product Assessment: 15% Portfolio Assessment: 5% Practical/Performance Assessment: 10% Test: 20%
Reading list	1. Editorial Team of Pustaka Yustisia. 2009. Compilation of Education Legislation: Series of the Most Complete and Latest Legislation Compilation. Yogyakarta: Pustaka Yustisia. 2. Roesminingsih, M. V., and Susarno, L. H. 2015. Theory and Practice of Education. Surabaya: Institute for Educational Research and Development, Faculty of Education, Universitas Negeri Surabaya, in collaboration with Bintang Publisher.

Module Descriptions

Module designation	General Physics *Fisika Umum*
Module level	Bachelor degree/Undergraduate Programme of Biology
Course Code	8420503100
Semester/Term	1st Semester
Person responsible for the module	Dra. Titin Sunarti, M.Si. Woro Setyarsih, S.Pd., M.Si. Suliyanah, S.Pd M.Si
Language	Bahasa Indonesia (Indonesian Language)
Relation to curriculum	Compulsory/ ~~Elective~~
Teaching method	Lecture
Workload	3 x 50 minutes lectures, 3 x 60 minutes structured activity, 3 x 60 minutes individual activity, 14 weeks per semester, 118.99 total hours per semester ~ 4.77 ECTS**
Credit Point	3 credit unit (4.77 ECTS)
Required and recommended prerequisites for joining the module	
Module Objectives/intended learning outcomes	1. Utilizing science and technology to make representations of physical symptoms (mechanics and heat energy) in the form of graphs, data tables, mathematics, and information retrieval *(Knowledge)* 2. Analyze facts, concepts, principles, laws, theories and procedures in the field of mechanics and thermal energy for solving relevant problems. *(Knowledge)* 3. Able to make strategic decisions based on data and information in mechanics and heat energy. *(Special Competence)* 4. Responsible for self-learning, assignments, and agreements with colleagues. *(Attitude)*
Content	This course discusses the concepts and principles / laws of measurement, kinematics, dynamics, temperature, heat, and heat transfer. Lecture

<table>
<tr><td></td><td>activities are carried out in a student center with discussions, observations, and presentations</td></tr>
<tr><td>Examination forms</td><td>Written test</td></tr>
<tr><td>Study and examination requirements and forms of examination</td><td>
Study Requirement

Attendance: students must attend at least 75% of the lectures to be eligible for the final examination.

Study examination

The final grade (NA) is calculated based on the following ratio:

<table>
<tr><td>Assessment Components</td><td>Percentage of contribution</td></tr>
<tr><td>Participation</td><td>20%</td></tr>
<tr><td>Assignment</td><td>30%</td></tr>
<tr><td>Mid-semester test</td><td>20%</td></tr>
<tr><td>Final semester test</td><td>30%</td></tr>
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Grade conversion of 0-100 scale into 0-4 scale is set as below:
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<tr><td>B+</td><td>3,50</td><td>75 ≤ B+ < 80</td></tr>
<tr><td>B</td><td>3,00</td><td>70 ≤ B < 75</td></tr>
<tr><td>B-</td><td>2,75</td><td>65 ≤ B- < 70</td></tr>
<tr><td>C+</td><td>2,50</td><td>60 ≤ C+ < 65</td></tr>
<tr><td>C</td><td>2,00</td><td>55 ≤ C < 60</td></tr>
<tr><td>D</td><td>1,00</td><td>40 ≤ D < 55</td></tr>
<tr><td>E</td><td>0,00</td><td>0 ≤ E < 40</td></tr>
</table>
</td></tr>
<tr><td>Reading List</td><td>

1. Giancoli, Douglas. 2016. Physics: Principles with Applications II Global Edition. California: AddisonWesley.
2. Halliday & Resnick. 2013. Fundamental of Physics, 10th
3. Albert Lewis. 2016. Sears and Zemansky's University Physics: With Modern Physics. Pearson

</td></tr>
</table>

Module Descriptions

Module designation	**Basic Chemistry**
Semester(s) in which the module is taught	1st semester/First Year
Person responsible for the module	Prof. Dr. Utiya Azizah, M.Pd.
Language	Indonesian (Regular Class) English (International Class)
Relation to curriculum	Compulsory course
Teaching methods	Case method with practicum laboratory 3 workhours per week (3 x 170 minutes per week)
Workload (incl. contact hours, self-study hours)	1 CU for a bachelor's degree equals 170 minutes (50 minutes face-to-face, 60 minutes structured, 60 minutes independent learning) per week × 14 weeks, excluding mid and end-term exams. = 39.67 work hours per semester = 1.587 ECTS.
Credit points	3 Credit Units (CU) = 4.77 ECTS
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	1. Utilize learning resources and ICT to support mastery of Basic Chemistry concepts and theories. 2. Make decisions about the relationship between basic chemical concepts and laboratory activities and the existence of chemistry in everyday life 3. Know the basics of chemistry, including Stoichiometry, Atomic Structure & Periodic System of Elements, Chemical Bonding, Solutions, Colloidal Systems, Energetics, Reaction Rates, Chemical Equilibrium, Redox & Electrochemistry, Organic Chemistry, and Green Chemistry 4. Have an honest and responsible attitude in carrying out lectures and practicums.
Content	Study of basic concepts: Stoichiometry, Atomic Structure & Periodic System of Elements, Chemical Bonding, Solutions, Colloidal Systems, Energetics, Reaction Rates, Chemical Equilibrium, Redox & Electrochemistry, Organic Chemistry, and Green Chemistry, as well as appropriate laboratory activities through discussions, assignments, and practicums
Examination forms	Essay and Oral Presentation
Study and examination requirements	Student assessments include: Participatory Activities 60% Product assessment 2,5% Practical assessment 7,5% Tests 30%

Reading list	1. Tim Kimia Dasar. 2017. Kimia Dasar . Surabaya: Unesa University Press. 2. Tim Kimia Umum. 2017. Kimia Umum. Surabaya: Unesa University Press. 3. Chang, Raymond. 2008. General Chemistry: The Essential Concepts, Fifth Edition. USA: McGraw Hill. 4. Tim Kimia Dasar. 2014. Kimia Umum . Surabaya: Unesa University Press. 5. Brady and Humiston. 2018. Chemistry: The Molecular Nature of Matter. New York: John Willey and Sons. 6. Achmad, Hiskia, dan Tupamahu. 1990. Penuntun Belajar Struktur Atom, Struktur Molekul, Sistem Periodik. Bandung: ITB. 7. Achmad, Hiskia, dan Tupamahu. 1991. Stoikiometri dan Energetika Kimia, Bandung, PT Citra Aditya Bakti. 8. Ahmad, Hiskia. 1990. Kimia Larutan. Bandung: Jurusan Kimia FMIPA ITB

Module Descriptions

Module designation	Basic Mathematics *Matematika Dasar*
Course Code	8420502278
Semester/Term	1st Semester
Person responsible for the module	Prof. Dr. R. Sulaiman, M.Si.
Language	Bahasa Indonesia (Indonesian language)
Relation to curriculum	Compulsory course
Teaching methods	Lecture
Workload	3 x 50 minutes lectures, 3 x 60 minutes structured activity, 3 x 60 minutes individual activity, 14 weeks per semester. 119 total hours per semester ~ 4.77 ECTS **
Credit Point	2 CU(3.18 ECTS)
Required and recommended prerequisites for joining the module	-
Module Objectives/intended learning outcomes	1. Understand real functions, limit functions, their derivatives and applications, integrals and their applications, matrices and solutions for systems of linear equations. *(Knowledge)* 2. Demonstrate good scientific manners and critical thinking *(Attitude and Social)*
Content	Assessment of functions, limit functions, continuity of functions, derivatives of functions and their applications, integrals and their applications, as well as matrices for solving systems of linear equations.Lecture activities are carried out in a student center with discussions
Study and examination requirements and forms of examination	Students are eligible for the final semester test if they have at least 75% attendance in class. The final grade (NA) is calculated based on the following ratio:

Assessment Components	Percentage of contribution
Participation	20%
Assignment	30%

	Mid-semester test: 20% Final semester test: 30% Grade Conversion of 0-100 scale into 0-4 scale is set as below:

Letter	Number	Grade interval
A	4.00	85 ≤ A ≤ 100
A-	3.75	80 ≤ A- <85
B+	3.50	75 ≤ B+ < 80
B	3.00	70 ≤ B < 75
B-	2.75	65 ≤ B- < 70
C+	2.50	60 ≤ C+ < 65
C	2.00	55 ≤ C < 60
D	1.00	40 ≤ D < 55
E	0.00	0 ≤ E < 40

Reading List	1. Purcel, EJ and D. Verberg. 1996. Kalkulus dan Geometri Analitik I. Indonesian translation. Susila B. Kartasasmita dan Rawuh. Erlangga, Jakarta. 2. Finney, R.L., Weir, M.D., Giordano F.R., 2001. Thomas' Calculus 10th Edition. USA : Addison-Wesley Publishing Company

MODULE DESCRIPTION

Module designation	**Learning Theory**
Semester(s) in which the module is taught	1st/First Year
Person responsible for the module	Prof. Dr. Utiya Azizah, M.Pd.
Language	Bahasa Indonesia (Regular Class) English (International Class)
Relation to curriculum	Compulsory Course
Teaching methods	Case Method
Workload (incl. contact hours, self-study hours)	1 CU for a bachelor's degree equals 170 minutes (50 minutes face-to-face, 60 minutes structured, 60 minutes independent learning) per week × 14 weeks, excluding mid and end-term exams. = 39.67 work hours per semester = 1.587 ECTS.
Credit points	2 CU (3,18 ECTS)
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	Knowledge: 1. Utilizing ICT-based learning resources and learning media to support the implementation of learning by applying certain learning theories. 2. Make decisions based on analysis of learning case examples in class and provide ideas for selecting various alternative solutions. 3. Mastering learning theories and being able to apply them in learning. 4. Have a responsible attitude by applying learning according to relevant learning theories
Module Content:	A study of learning theories that begins with a brief introduction to developmental (cognitive) psychology, followed by principles and explanations of how students learn according to behavioral learning theory, social learning theory, cognitive learning theory, constructivist learning theory, neuroscientific learning theory, and theory of student motivation to learn; and its implications for learning through analysis of MIPA learning case examples in class. Lectures are carried out using theory and assignments.
Examination Forms:	Individuals assignment, group assignment, discussion, and presentation

<table>
<tr>
<td>Study and examination requirements</td>
<td>Students are considered competent and pass if they get at least a maximum test score of 68 (UTS and UAS), and structured activities (assignments / T) and participatory activities (P)
The final grade (NA) is calculated according to the formula:
NA = (2xP)+(3xT)+(2xUSS)+(3xUS)
10
Convert the 0-100 scale value to a 0-4 scale and the letters are arranged as follows.

<table>
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<tr><td>A-</td><td>3,75</td><td>80 ≤ A- < 85</td></tr>
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<tr><td>B</td><td>3,00</td><td>70 ≤ B < 75</td></tr>
<tr><td>B-</td><td>2,75</td><td>65 ≤ B- < 70</td></tr>
<tr><td>C+</td><td>2,50</td><td>60 ≤ C+ < 65</td></tr>
<tr><td>C</td><td>2,00</td><td>55 ≤ C < 60</td></tr>
<tr><td>D</td><td>1,00</td><td>40 ≤ D < 55</td></tr>
<tr><td>E</td><td>0,00</td><td>0 ≤ E < 40</td></tr>
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<tr>
<td>Reading Lists:</td>
<td>
Hergenhahn, B. R. & Olson, Matthew H. 2012. Theories of Learning (Teori Belajar). Edisi Ketujuh. Jakarta: Kencana Prenada Media Group
Santrock, J. W. 2008. Educational Psychology. Third Edition. Boston: McGraw-Hill.
Slavin, R. E. 2011. Psikologi Pendidikan Teori dan Praktik. Edisi Kesembilan Jilid 1. Jakarta: PT Indeks.
Slavin, R. E. 2011. Psikologi Pendidikan Teori dan Praktik. Edisi Kesembilan Jilid 2. Jakarta: PT Indeks.
Mitarlis, Utiya Azizah, Bertha Yonata. 2024. Teori Belajar dan Implementasinya dalam Pembelajaran Kimia. Surabaya: Unesa University Press
Woolfolk, A. 2010. Educational Psychology, Global Edition. Eleventh Edition. New Jersey: Pearson Education.
</td>
</tr>
</table>

COMPULSORY COURSE
2nd SEMESTER

Module Descriptions

Module designation	**Religion Education** **Pendidikan Agama**
Semester(s) in which the module is taught	2nd Semester/First Year
Person responsible for the module	Aqim Amral Hukmi, S.Pd., M.Pd. Nurul Hikmah, Lc., M.HI.
Language	Bahasa Indonesia (Regular Class) Bahasa Inggris (Internasional Class)
Relation to curriculum	Compulsory course
Teaching methods	Project-Based Learning, Case studies 2 workhours per week (2 x 170 minutes per week)
Workload (incl. contact hours, self-study hours)	1 CU for a bachelor's degree equals 170 minutes (50 minutes face-to-face, 60 minutes structured, 60 minutes independent learning) per week × 14 weeks, excluding mid and end-term exams. = 39.67 work hours per semester = 1.587 ECTS.
Credit points	2 Credit Units (CU) = 3,18 ECTS
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	1. Able to demonstrate religious values and national culture, as well as academic ethics, in carrying out professional duties. (Attitude and Social) 2. Explore data/information in the context of learning Islamic Religious Education,n including insight/knowledge about Islam, religious attitudes, skills in carrying out Islamic teachings, commitment to Islam, and self-confidence as a Muslim, and proficiency in implementing religious teaching. (Knowledge) 3. Recognise theoretical concepts about Islamic knowledge according to references. (Knowledge) 4. Have a mindset, attitude and behaviour that reflect a good Muslim personality who has the ability to do religious teaching. (Special Competence) 5. Have responsible, caring, honest, and cooperative attitudes, respect others' opinions and love the country in implementing and preserving the values of Pancasila in reality and everyday life. (Attitude)

Content	This course provides provisions for the formation of students' personality as a whole by making Islamic teachings a basis for thinking and behaving in scientific and professional development. A complete personality can only be realised if each student has faith and piety in Allah SWT. Faith and piety will only be realized if it is supported by the development of its elements, namely: insight/knowledge about Islam (Islamic knowledge), religious attitudes (religion dispositions), skills in carrying out Islamic teachings (Islamic skills), commitment to Islam, self- confidence as a Muslim (moslem confidence), and proficiency in implementing religious teachings (Islamic competence). In the psycho-social constellation, either as individuals, family members, community members, or as Indonesian citizens. This course upholds divine values, humanity, unity, deliberation and justice within the framework of Pancasila and NKRI. This course also integrates Anti-Corruption Education material and religious moderation.
Examination forms	Essay and Oral Presentation
Study and examination requirements	**Study and Examination Requirements/Assessment:** 1. Individual Assignment: Case analysis report 2. Group Case Study and Discussion 3. Documentation and Presentation of Case Study Findings **Assessment Recap (Case Study-Oriented):** 1. **Participatory Activities / Case Study Analysis**: 52,5% 2. **Project / Product Assessment**: 25% 3. **Portfolio**: 7,5% 4. **Test (Essay)**: 15% Total: 100%
Reading list	1. Alquran dan terjemahannya. 2014. Jakarta: Kementerian Agama Republik Indonesia. 2. Ausop, Asep Zaenal. 2014. Islamic Character Building. Bandung: Salamadani. 3. Sauqi, Achmad. 2010. Meraih Kedamaian Hidup: Kisah Spiritualitas Orang Modern. Yogyakarta: Sukses Offset. 4. Praja, Juhaya S. 2002. Filsafat dan Metodologi Ilmu dalam Islam dan Penerapannya di Indonesia. Jakarta: Teraju. 5. Maman. 2012. Pola Berpikir Sains Membangkitkan Kembali Tradisi Keilmuan Islam. Bogor: QMM Publishing. 6. Rahmat, Munawar. 2010. Pendidikan Insan Kamil Berbasis Sufisme Syaththariah. Bandung: ADPISI Press. 7. Mustaqim, Abdul. 2012. Epistemologi Tafsir Kontemporer. Yogyakarta: LKIS. 8. Madjid, Nurcholis. 2008. Islam Kemoderenan dan Keindonesiaan. Bandung: PT Mizan Pustaka. 9. Anonym. 2008. Islam Agama Peradapan. Jakarta: Paramadina. 10. Tim Penulis Kemendikbud. 2014. Pendidikan Agama Islam pada Perguruan Tinggi Umum. Jakarta: Kementerian Pendidikan dan Kebudayaan Republik Indonesia. 11. Tim Dosen PAI-Unesa. 2010. Pendidikan Agama Islam pada Perguruan Tinggi Umum. Surabaya: Unesa University Press. 12. Toshihiko, Izutsu. 2003. Konsep-konsep Etika Religius dalam Al-Quran. (Penerjemah AE Priyono dkk). Yogyakarta: Tiara Wacana Yogya.

Module Descriptions

Module designation	**Basics of Chemical Separations**
Semester(s) in which the module is taught	2nd semester/First Year
Person responsible for the module	Dr. Rusmini S.Pd., M.Si
Language	Bahasa Indonesia (Regular Class) Bahasa Inggris (Internasional Class)
Relation to curriculum	Compulsory course
Teaching methods	Case method with practicum laboratory 3 workhours per week (3 x 170 minutes per week)
Workload (incl. contact hours, self-study hours)	1 CU for a bachelor's degree equals 170 minutes (50 minutes face-to-face, 60 minutes structured, 60 minutes independent learning) per week × 14 weeks, excluding mid and end-term exams. = 39.67 work hours per semester = 1.587 ECTS.
Credit points	3 Credit Units (CU) = 4.77 ECTS
Required and recommended prerequisites for joining the module	Basic Chemistry
Module objectives/intended learning outcomes	1. Students are able to analyze the basic concepts and application of distillation chemical separation methods. 2. Students are able to analyze the basic concepts and application of extraction chemical separation methods. 3. Students are able to analyze the basic concepts and application of chromatography chemical separation methods. 4. Students are able to analyze the basic concepts and application of electrogravimetric chemical separation methods. 5. Students are able to analyze the basic concepts and application of membrane chemical separation methods. 6. Students are able to evaluate separation methods using distillation, extraction, chromatography, electrogravimetry, and membranes. 7. Students are able to apply chemical separation methods, including distillation, extraction, chromatography, electrogravimetry, and membranes.
Content	This course examines chemical separation techniques from the perspective of chemical structure, energetics and chemical analysis, including distillation, extraction, chromatography, membrane and electrogravimetry techniques, followed by supporting laboratory activities.
Examination forms	Essay and Oral Presentation

Study and examination requirements	Student assessments include: Participatory Activities 50% Practical Assessment 25% Tests 25%
Reading list	1. Pecksok, et al. 1976. *Modern Methods of Analytical Chemistry*. 2nd New York: John Wiley and Sons 2. Harvey, D.2000. *Modern Analytical Chemistry*. Int.Ed. Singapore: Mc Graw Hill 3. Soebagio, Budiasih, E, Ibnu, S, Widarti, H.R, Munzil. 2001. *Kimia Analitik II (Common Book)*, Malang: IMSTEP – JICA FMIPA Universitas Negeri Malang 4. Nita Kusumawati, Agus Budi Santoso, Maria Monica Sianita, & Supari Muslim. 2017. Extraction, Characterization, and Application of Natural Dyes from the Fresh Mangosteen (Garcinia mangostana L.) Peel, International Advanced Science Engineering Information Technology, Vol 7, No 3, 878-884 5. Pirim Setiarso, Rochman Wachid (2017) Pembuatan Elektroda Pasta Karbon Termodifikasi Bentonit Untuk Analisis Logam Tembaga (II)) Secara Cyclic Voltammetry Stripping, Indonesian Chemistry and Application Journal Vol 1 no 1 6. Nita Kusumawati, Pirim Setiarso, Agus Budi Santoso, Setya Chendra Wibawa and Supari Muslim, 2019, The Development Of PVDF/PEI Blended Membrane: Effect Of Stirring Time On Membrane Characteristics And Performance, Rasayan Journal Chemistry, Vol 12. No 2, 975-986 7. Taufik Hidayatulloh, Pirim Setiarso (2019) Pembuatan Elektroda Kerja Graphene Oxide-Paraffin Untuk Analisis Logam Cd Menggunakan Cyclic Voltammetry Making of Graphene Oxide-Paraffin Working Electrode for Analysis of Cd Using Cyclic Voltammetry, Unesa Journal of Chemistry vol 8 no 2 8. Nita Kusumawati, Agus Budi Santoso, Setya Chendra Wibawa, Pirim Setiarso, Supari Muslim (2020) Development of a New Polymer Membrane: Polyvinylidene fluoride/Polyetherimide Blend Membrane International Advanced Science Engineering Information Technology, Vol 10, No 6, 2547-2559

Module Descriptions

Module designation	**Evaluation of Learning and Teaching**
Semester(s) in which the module is taught	4th/Second Year
Person responsible for the module	Prof. Dr. Harun Nasrudin, M.S.
Language	Bahasa Indonesia (Regular Class) Bahasa Inggris (Internasional Class)
Relation to curriculum	Compulsory course
Teaching methods	Project-Based Learning, 2 workhours per week (2 x 170 minutes per week)
Workload (incl. contact hours, self-study hours)	1 CU for a bachelor's degree equals 170 minutes (50 minutes face-to-face, 60 minutes structured, 60 minutes independent learning) per week × 14 weeks, excluding mid and end-term exams. = 39.67 work hours per semester = 1.587 ECTS.
Credit points	2 Credit Units (CU) = 3,18 ECTS
Required and recommended prerequisites for joining the module	Basic Chemistry, Basic of Education
Module objectives/intended learning outcomes	1. Utilize several learning resources and ICT to develop assessments. 2. Demonstrate critical thinking skills in selecting assessments that are appropriate for the learning indicators to be achieved. 3. Skilled in managing various forms of assessment relevant to the knowledge, skills, and attitudes of students, including students with special needs. 4. Demonstrate the ability to use time in designing assessments. 5. Master the concepts and principles of evaluation, measurement, and assessment and be able to apply them in assessing the learning process and outcomes. 6. Creates instruments to assess the learning process and outcomes in the affective, cognitive, and psychomotor domains that are adequate for the learning indicators and is able to develop assessment guidelines. 7. Has a responsible attitude by developing tests in accordance with the aspects being measured.
Content	Study of the meaning, purpose, function, and principles of evaluation, taxonomy of cognitive, affective, and psychomotor learning outcomes, evaluation strategies (paper & pencil and alternative evaluation), forms of evaluation instruments, rubrics, analysis and interpretation of evaluation results, classroom-based evaluation, evaluation for science process skills and scientific attitudes (including character).
Examination forms	Essay and Oral Presentation

Study and examination requirements	Assessment Recap (Project-Based Learning): - Participatory Activities: 20% - Project/Product Assessment: 60% - Practice/Performance: 20% - Total: 100%
Reading list	1. Tim. 2015. Buku Pegangan Mahasiswa: Evaluasi. Yogyakarta: Absolute Media. 2. Arends, Richard I. (2004). Guide to Field Experiences ad Portofolio Development: to accompany ;learning to teach. New York: McGraw-Hill Book Company. 3. Arikunto, Suharsimi / I. Jabar, Cepi Safruddin Abdul. 2008. Evaluasi program pendidikan: pedoman teoritis bagi mahasiswa dan praktisi pendidikan . Jakarta: BumiAksara. 4. Brookhart, Susan M. 2010. How to assess higher-order thinking skills in your classroom. Alexandria: ASCD. 5. George, David. 2005. Examination and evaluation in education . New Delhi: Commonwealth. 6. Glencoe Series. Tanpa Tahun. Performance Assessment in The Science Classroom. New York: McGraw- Hill Company. 7. I. Naik, S.P. 2004. Role of evaluation in education . New Delhi: Anmol Publications PVT. 8. Johnson, David W. and Johnson, Robert T. 2002. Meaningful Assessment Manageable and Cooperative process. Boston:Allyn and Bacon. 9. Nasrudin, H., Azizah, U., Agustini, R., & Muchlis. 2024. Evaluasi Belajar dan Pembelajaran. Surabaya: Unesa University Press.

Module Descriptions

Module designation	**Citizenship** **Pendidikan Kewarganegaraan**
Semester(s) in which the module is taught	**2nd Semester/First Year**
Person responsible for the module	Dr. Asnimawati, M.Pd. Prof. Dr. Rr Nanik Setyowati, M.Si.
Language	Bahasa Indonesia (Regular Class) Bahasa Inggris (Internasional Class)
Relation to curriculum	Compulsory course
Teaching methods	Project-Based Learning, Case studies 2 workhours per week (2 x 170 minutes per week)
Workload (incl. contact hours, self-study hours)	1 CU for a bachelor's degree equals 170 minutes (50 minutes face-to-face, 60 minutes structured, 60 minutes independent learning) per week × 14 weeks, excluding mid and end-term exams. = 39.67 work hours per semester = 1.587 ECTS.
Credit points	2 Credit Units (CU) = 3,18 ECTS
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	1. Demonstrate responsible, ethical, and law-abiding behavior based on national ideology and constitutional values. (Attitude) 2. Explain the concepts of state, constitution, democracy, human rights, and rule of law within the Indonesian context. (Knowledge) 3. Analyze contemporary civic issues critically using constitutional, democratic, and human rights perspectives. (General Competence) 4. Participate actively and collaboratively in solving social and civic problems in multicultural society. (Special Competence) 5. Demonstrate civic skills (critical thinking, deliberation, decision-making, and participation) in academic and social contexts. (Special Competence)
Content	1. The concept and urgency of Citizenship Education 2. Pancasila as the foundation of the state 3. The 1945 Constitution and constitutional system 4. Democracy and democratic culture 5. Human rights and citizens' obligations 6. Rule of law and good governance 7. National identity and multiculturalism 8. Civic participation and civil society 9. Geopolitics and national resilience 10. Contemporary issues: digital citizenship, radicalism, corruption, and social conflict

Examination forms	Essay and Oral Presentation
Study and examination requirements	**Study and Examination Requirements/Assessment:** 1. Individual Assignment: Case analysis report 2. Group Case Study and Discussion 3. Documentation and Presentation of Case Study Findings **Assessment Recap (Case Study-Oriented):** 1. **Participatory Activities / Case Study Analysis**: 52,5% 2. **Project / Product Assessment**: 25% 3. **Portfolio**: 7,5% 4. **Test (Essay)**: 15% Total: 100%
Reading list	1. Budimansyah, D. (2010). *Penguatan pendidikan kewarganegaraan untuk membangun karakter bangsa*. Bandung: Widya Aksara Press. 2. Kaelan. (2016). *Pendidikan kewarganegaraan untuk perguruan tinggi*. Yogyakarta: Paradigma. 3. Somantri, M. N. (2001). *Menggagas pembaharuan pendidikan IPS*. Bandung: Remaja Rosdakarya. 4. Ubaedillah, A., & Rozak, A. (2017). *Pendidikan kewarganegaraan (Civic education): Demokrasi, hak asasi manusia, dan masyarakat madani*. Jakarta: Kencana. 5. Winarno. (2019). *Paradigma baru pendidikan kewarganegaraan*. Jakarta: Bumi Aksara. 6. Republik Indonesia. (1945). *Undang-Undang Dasar Negara Republik Indonesia Tahun 1945*. 7. Republik Indonesia. (2012). *Undang-Undang Nomor 12 Tahun 2012 tentang Pendidikan Tinggi*. 8. Banks, J. A. (2008). Diversity, group identity, and citizenship education in a global age. *Educational Researcher, 37*(3), 129–139. 9. Torney-Purta, J., Lehmann, R., Oswald, H., & Schulz, W. (2001). *Citizenship and education in twenty-eight countries: Civic knowledge and engagement at age fourteen*. Amsterdam: IEA. 10. Relevant journal articles (Scopus / SINTA indexed) on: Civic engagement and democratic education, Character education and national identity, and Digital citizenship and civic literacy

Module Descriptions

Module designation	**Quantum Chemistry**
Semester(s) in which the module is taught	2nd/first year
Person responsible for the module	Prof. Dr. I Gusti Made Agung Sanjaya
Language	Bahasa Indonesia (Regular Class) Bahasa Inggris (Internasional Class)
Relation to curriculum	Compulsory course
Teaching methods	Project-Based Learning 3 workhours per week (3 x 170 minutes per weak)
Workload (incl. contact hours, self-study hours)	1 CU for a bachelor's degree equals 170 minutes (50 minutes face-to-face, 60 minutes structured, 60 minutes independent learning) per week × 14 weeks, excluding mid and end-term exams. = 39.67 work hours per semester = 1.587 ECTS.
Credit points	3 Credits Units (CU) = (4.77 ECTS)
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	1. Students are able to think critically and creatively to produce appropriate solutions and visualizations for problems involving quantum chemistry. 2. Students are able to draw accurate quantum-chemistry conclusions about structure and bonding—covering both physical and chemical aspects—when analyzing various materials. 3. Students master the basic concepts and principles of quantum chemistry to describe atomic structure, chemical bonding, molecular structure, molecular symmetry, spectroscopy, and molecular interactions. 4. Students can be entrusted with responsibility to complete quantum-chemistry assignments independently and communicate their results responsibly.
Content	A study of the basic concepts and principles of quantum chemistry and their applications to atomic structure, chemical bonding, molecular structure, molecular symmetry, spectroscopy, and molecular interactions of matter, delivered through theory, laboratory practice, and simple engineering/design activities.
Examination forms	Essay and Oral Presentation

Study and examination requirements	**Study and Examination Requirements/Assessment:** 1. Individual assignments 2. Documentation and presentation of assignments **Assessment Recap (Case Study-Oriented):** 1. Participatory Activities/Case Study Analysis: 52.5% 2. Project Result Assessment / Product Assessment: 17.5% 3. Test:30% Total: 100%
Reading list	1. Atkins, S.P.W. and Paula, J. d. 2018. Physical Chemistry, 11th edition. New York: Oxford University Press. 2. David W. Ball, Physical Chemistry, 2nd Edition. Stamford: Cengage Learning. 3. Levine, Ira N. 2014. Quantum chemistry, 7th edition. New York: Pearson Education, Inc. 4. Mortimer, R.G. 2008, Physical Chemistry, 3th edition, London: Elsevier Inc

MODULE DESCRIPTION

Module designation	*Conservation of Natural Resources and the Environment (KSDAL)*
Semester(s) in which the module is taught	1st/First Year
Person responsible for the module	Prof. Dr. Mitarlis, S.Pd., M.Si.
Language	Bahasa Indonesia (Regular Class) Bahasa Inggris (Internasional Class)
Relation to curriculum	Compulsory Course
Teaching Methods	Team Based Project
Workload:	2 x 50 minutes lectures, 2 x 60 minutes structured activity, 2 x 60 minutes individual activity, 14 weeks per semester, 79 total hours per semester ~ 3.18 ECTS
Credit points:	2 CU = 2 x 1.59 = 3.18 ECTS
Prerequisite course(s):	-
Module objectives/intended learning outcomes	Knowledge: 1. Explain the scope of conservation, including: background, definition and objectives of natural resource conservation. 2. Analyze the management and problems of natural resources and the environment, including: problems and management of natural resources and the environment. 3. Analyze local wisdom which includes: Understanding, approaches, challenges and local wisdom in the lives of people in the 4. Designing urban/local scale natural resource management, or national scale
Content:	- The meaning of conservation of natural resources and the environment. - Describe the purpose, and benefits of conservation. As well as the efforts to conserve natural resources and the environment. - Natural resources and the environment, issues of natural living resources at the local, national and global levels, - Conservation and management of natural living and non-living resources at the local, national and global levels, - Environmental paradigms and ethics, management of urban natural resources through observation, discussion and presentation. - Local wisdom includes: Definition, approach, challenges, and local wisdom in future community life.

<table>
<tr><td></td><td>- Management of natural resource and environmental issues, including: issues and management of natural resources and the environment</td></tr>
<tr><td>Examination forms</td><td>Individuals assignment, group assignment, discussion, presentation, and practicum or team based project</td></tr>
<tr><td>Study and examination requirements</td><td>Students are considered competent and pass if they get at least a maximum test score of 68 (UTS and UAS), and structured activities (assignments /T) and participatory activities (P)
The final grade (NA) is calculated according to the formula:
NA = (2xP)+(3xT)+(2xUSS)+(3xUS)
10
Convert the 0-100 scale value to a 0-4 scale and the letters are arranged as follows.
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</table></td></tr>
<tr><td>Reading list</td><td>Cluras, D. D. and Reganold, J.P. 2010. Natural Resources Conservation Future . Washington: Washington State University.
Indrawan, Mochamad., Primack, Richard B., Supriatna, Jatna. 2007. Biologi Konservasi . Jakarta : Yayasan Obor Indonesia
Rachmadiarti, F., Faizah, U., Kuntjoro, S. 2017. Buku Ajar Mahasiswa Konservasi Sumber Daya Alam dan Lingkungan. Surabaya: Unesa University Press.
Faizah, U., Rachmadiarti,F., Prastiwi, Muji Sri., Kuntjoro, S. 2017. Buku Ajar Konservasi Sumber Daya Alam dan Lingkungan berbasis Problem Based Learning untuk melatih Sadar Konservasi. Surabaya: Airlangga University Press.
Warsilah, H. (Ed.). (2025). Approaching natural resources for sustainable development in Indonesia: Confronting the socio-ecological crisis. BRIN Press.</td></tr>
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MODULE DESCRIPTION

<table>
<tr><td>Module designation</td><td>Curriculum School</td></tr>
<tr><td>Semester(s) in which the module is taught</td><td>2th/First Year</td></tr>
<tr><td>Person responsible for the module</td><td>Prof. Dr. Achmad Lutfi, M.Pd.</td></tr>
<tr><td>Language</td><td>Bahasa Indonesia (Regular Class)
English (Internasional Class)</td></tr>
<tr><td>Relation to curriculum</td><td>Compulsory Course</td></tr>
<tr><td>Teaching methods</td><td>Case Study</td></tr>
<tr><td>Workload (incl. contact hours, self-study hours):</td><td>2 x 50 minutes lectures, 2 x 60 minutes structured activity, 2 x 60 minutes individual activity, 14 weeks per semester, 79 total hours per semester ~ 3.18 ECTS</td></tr>
<tr><td>Credit points:</td><td>2 CU = 2 x 1.59 = 3.18 ECTS</td></tr>
<tr><td>Requirements according to the examination regulations</td><td>Students attend at least 75% of lectures.</td></tr>
<tr><td>Recommended prerequisites</td><td>-</td></tr>
<tr><td>Module objectives/ Intended Learning Outcomes</td><td>Students are able to:
1. Identify the school curriculum applied in the education unit
2. Analyze the implementation of the school curriculum/expertise competencies using aspecific approach
3. Prepare semester programs and annual program sat certain classes and levels</td></tr>
<tr><td>Content:</td><td>1. School Curriculum</td></tr>
<tr><td>Study and examination requirements and forms of examination</td><td>Students are considered to be competent and pass if at least get 68.

Assessment Recap (Case Method):
<table><tr><th>Assessment Type</th><th>Weight (%)</th></tr><tr><td>Participatory Activities</td><td>60%</td></tr><tr><td>Test</td><td>40%</td></tr><tr><td>TOTAL</td><td>100%</td></tr></table>
Grading Index:
A = 85–100
A- = 80–84
B+ = 75–79
B = 70–74
B- = 65–69
C+ = 60–64</td></tr>
</table>

	C = 55–59 D = 40–54 E = 0–39
Reading list	1. Goos, M., Stillman, G., Vale, C. 2007. Teaching Secondary School Mathematics Reasearch and Practice forthe 21st Century . Australia: Allen & Unwin. 2. Hamdani, Hamid. 2012. Pengembangan Kurikulum Pendidikan. Bandung: Pustaka Setia 3. Ibrahim, dkk. 2013. Kurikulum Dan Pembelajaran. Jakarta: Rajarafindo Persada 4. Sukmadinata, Nana Syaodih. 2013. Pengembangan Kurikulum. Bandung: Remaja Rosdakarya

Module Descriptions

Module Name :	Development of Teaching Materials (Pengembangan Bahan Ajar)
Module level :	Sarjana (S-1) / *Bachelor*
Course Code :	
Subtitle, if applicable	-
Courses, if applicable	-
Semester/Term	2nd/ first year
Person responsible for the module	Prof. Dr. Achmad Lutfi, M.Pd.
Lecturer(s):	Dr. Sukarmin, M.Pd. Dr. Dian Novita, S.T.,M.Pd Dr. Bertha Yonata, M.Pd.
Language:	Indonesian Language and English
Relation to curriculum	Compulsory course
Type of teaching, contact hours	Per week consists of : 2 hours face-to-face (1 hour face to face = 50 minutes / hour)
Workload :	2 hours face-to-face, 2 hours structured assignments, 2 hours of independent study, over 15 weeks, a total of 90 hours/ semester
Credit Point	2 CU = 2 x 1.59 = 3.18 ECTS
Requirements according to the examination regulations	-
Recommended Prerequisites	-
Module Objectives/intended learning outcomes	1. Utilizing learning resources and ICT to support the implementation and application of the development of certain learning media. (utilization of ICT) 2. Mastering the meaning, types/classifications, functions, basics of developing learning media and being able to apply them in learning according to learning strategies. 3. Designing and producing learning media by utilizing the surrounding environment (contextual) and/or ICT-based 4. Have a responsible attitude in developing learning media according to the field of study
Content	Study of the meaning, type / classification, function, basics of media development, as well as being able to select, design, and produce learning media by utilizing the surrounding environment (contextual) and ICT
Study and examination requirements and forms of examination	Students are considered competent and pass if they get at least a minimum score 55. The final grade (NA) is calculated according to the formula: Participatory Activities: 10.00%, Project Result Assessment/Product Assessment: 80.00%, test: 10%,

<table>
<tr><td></td><td>Convert the 0-100 scale value to a 0-4 scale and the letters are arranged as follows.

<table>
<tr><th>Letter</th><th>Number</th><th>Interval</th></tr>
<tr><td>A</td><td>4.00</td><td>85 ≤ A < 100</td></tr>
<tr><td>A-</td><td>3.75</td><td>80 ≤ A- < 85</td></tr>
<tr><td>B+</td><td>3.50</td><td>75 ≤ B+ < 80</td></tr>
<tr><td>B</td><td>3.00</td><td>70 ≤ B < 75</td></tr>
<tr><td>B-</td><td>2.75</td><td>65 ≤ B- < 70</td></tr>
<tr><td>C+</td><td>2.50</td><td>60 ≤ C+ < 65</td></tr>
<tr><td>C</td><td>2.00</td><td>55 ≤ C < 60</td></tr>
<tr><td>D</td><td>1.00</td><td>40 ≤ D < 55</td></tr>
<tr><td>E</td><td>0.00</td><td>0 ≤ E < 40</td></tr>
</table></td></tr>
<tr><td>Media employed</td><td>Worksheet, Computer, LCD, White board, laboratory instruments</td></tr>
<tr><td>Reading List</td><td>1. Pagarra, H.,Syawaluddin, A., Krismanto, W., Sayidiman. 2022 Media Penbelajaran. Makassar: Badan Penerbit UNM
2. Kosasih, E. (2021). Pengembangan Bahan Ajar. Jakarta: Bumi Aksara.
3. Smaldino,S.E., Lowther,D.L., Russell, J.D. 2014. Instructional Technology & Media For Learning. Jakarta: Prenada Media
4. Sadiman. 2009. Media Pendidikan. Jakarta
5. Depdiknas. 2005. Pedoman Pengembangan Buku Pelajaran . Jakarta: Pusat Perbukuan
6. Heinich, R., Molenda. 1999. Instructional Media and Technologies for Learning . USA: Prentice Hall
7. Fenrich, P. 1997. Practical Guidelines For Creating Instructional Multimedia Application . USA:Harcourt Brace College Publisher</td></tr>
<tr><td>Date of last amandment</td><td>31 Januari 2025</td></tr>
</table>

Module Descriptions

Module designation	**Learning Planning**
Semester(s) in which the module is taught	2nd /First Year
Person responsible for the module	Bertha Yonata, S.Pd., M.Pd.
Language	Bahasa Indonesia (Regular Class) Bahasa Inggris (Internasional Class)
Relation to curriculum	Compulsory course
Teaching methods	Project-Based Learning, 2 workhours per week (2 x 170 minutes per week)
Workload (incl. contact hours, self-study hours)	1 CU for a bachelor's degree equals 170 minutes (50 minutes face-to-face, 60 minutes structured, 60 minutes independent learning) per week × 14 weeks, excluding mid and end-term exams. = 39.67 work hours per semester = 1.587 ECTS.
Credit points	2 Credit Units (CU) = 3.18 ECTS
Required and recommended prerequisites for joining the module	Basic of Education
Module objectives/intended learning outcomes	1. Students have a comprehensive understanding of the components in developing instructional materials 2. Students demonstrate the ability to design and develop student-centered chemistry instruction that fosters meaningful learning experiences 3. Students demonstrate responsibility and act wisely in developing chemistry learning materials to achieve learning competencies
Content	This course discusses the fundamental concepts of learning design, which involve analyzing key subject matter, developing semester and annual programs (Promes and Prota), designing syllabi and lesson plans (RPP) in relation to learning implementation. The course also covers the stages of lesson planning, innovative models of learning design and instruction, and the development of instructional design products and their supporting components. This course is delivered bilingually (in Indonesian and English) for the Outstanding Chemistry Education Class.
Examination forms	Essay and Oral Presentation

Study and examination requirements	Study and Examination Requirements/Forms of Examination: 1. Group assignments / project (Calculate effective week for class learning and develop instructional module) 2. Discussion and Presentation Assessment Recap (Project-Based Learning): - Participatory Activities: 15% - Project/Product Assessment: 55% - Test: 30% - Total: 100%
Reading list	1. Johnstone, A., H. 1993. The Development of Chemistry Teaching: A Changing Response to Changing Demand. Journal of Chemical Education, 70(9) 2. Ananda, Rusydi. 2019. Perencannaan Pembelajaran. Medan: LPII Press. 3. Cooper, J.M, et.all. 2011. Classroom Teaching Skills, Ninth Edition. USA: Wadsworth, Cengage Learning. 4. Arends, Richard. 2012. Learning to Teach . Tenth Edition. New York: McGraw-. Hill Education 5. Muchlis, M., Ibnu, S., Subandi, S., & Marfuah, S. (2020). Students' result of learning at chemistry department through assessment of, for, and as learning implementation. International Journal of Instruction, 13(2), 165–178. International Journal of Instruction, Eskisehir Osmangazi University, Faculty of Education, Eskisehir, Turkey. https://doi.org/10.29333/iji.2020.13212a

COMPULSORY COURSE
3rd SEMESTER

Module Descriptions

Module designation	**Indonesian** **Bahasa Indonesia**
Semester(s) in which the module is taught	**3rd Semester**/Second Year
Person responsible for the module	Dr. Abdul Kholiq, S.Pd. M.Pd. Dr. Yoga Rifqi Azizan, M.Pd.
Language	Bahasa Indonesia (Regular Class) Bahasa Inggris (Internasional Class)
Relation to curriculum	Compulsory course
Teaching methods	Project-Based Learning, Case studies 2 workhours per week (2 x 170 minutes per week)
Workload (incl. contact hours, self-study hours)	1 CU for a bachelor's degree equals 170 minutes (50 minutes face-to-face, 60 minutes structured, 60 minutes independent learning) per week × 14 weeks, excluding mid and end-term exams. = 39.67 work hours per semester = 1.587 ECTS.
Credit points	2 Credit Units (CU) = 3,18 ECTS
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	1. Able to communicate scientific ideas, both orally and written using appropriate communication media as targeted, as a provision for lifelong learning for academic self-development (General competences) 2. Utilize learning resources and ICT-assisted learning media to browse data, collect information, and problem solving to support the implementation of Indonesian language learning (General competences) 3. Master the concept of writing techniques, presentation techniques, various languages, editing techniques using discussion models, expository, lesson study (General competences) 4. Communicate ideas related to Indonesian Language learning scientifically, both orally and in writing using good and correct Indonesian language (General competences). 5. Make decisions based on analysis of pieces of information and data related to the Indonesian language for planning, implementing, and evaluating learning activity so that it can be adapted to various learning conditions (General competences) 6. Have responsible attitude towards task of making language skills products (speaking, reading, and writing) (Attitude and Social)

Content	1. History, position, and function of Indonesian language 2. Critical reading 3. Characteristics of scientifics Indonesian language 4. Spelling, choice of words, sentences, and paragraphs 5. Scientific papers 6. Proposal writing 7. Research reports 8. Articles and papers 9. Editing 10. Citations and references 11. Presentation technique
Examination forms	Essay and Oral Presentation
Study and examination requirements	**Study and Examination Requirements/Assessment:** 1. Individual Assignment: Case analysis report 2. Group Case Study and Discussion 3. Documentation and Presentation of Case Study Findings **Assessment Recap (Case Study-Oriented):** 1. **Participatory Activities / Case Study Analysis**: 52,5% 2. **Project / Product Assessment**: 25% 3. **Portfolio**: 7,5% 4. **Test (Essay)**: 15% Total: 100%
Reading list	1. Arifin, E. Z. (2017). *Menulis karya ilmiah*. Jakarta: Grasindo. 2. Badan Pengembangan dan Pembinaan Bahasa. (2016). *Pedoman umum ejaan bahasa Indonesia*. Jakarta: Kementerian Pendidikan dan Kebudayaan. 3. Badan Pengembangan dan Pembinaan Bahasa. (2016). *Kamus besar bahasa Indonesia* (Edisi ke-5). Jakarta: Balai Pustaka. 4. Dalman. (2018). *Bahasa Indonesia untuk penulisan karya ilmiah*. Jakarta: Rajawali Pers. 5. Tim Penyusun MKWU Bahasa Indonesia. (2020). *Bahasa Indonesia untuk perguruan tinggi*. Jakarta: Direktorat Jenderal Pendidikan Tinggi. 6. Pedoman penulisan karya ilmiah Universitas Negeri Surabaya. (Edisi terbaru). Surabaya: Universitas Negeri Surabaya. 7. Hyland, K. (2004). Disciplinary discourses: Social interactions in academic writing. *Applied Linguistics, 25*(3), 350–371. 8. Swales, J. M. (1990). Genre analysis: English in academic and research settings. *Cambridge Applied Linguistics Series*. Cambridge: Cambridge University Press. 9. Cargill, M., & O'Connor, P. (2013). Writing scientific research articles: Strategy and steps (2nd ed.). Oxford: Wiley-Blackwell. 10. Sugiharti, R., & Suyitno, I. (2019). Academic writing competence of university students in Indonesia. *Journal of Language and Education, 5*(2), 45–56. 11. Relevant journal articles (Scopus / SINTA indexed)

Module Descriptions

Module designation	**Digital Literacy**
Semester(s) in which the module is taught	1st/First Year
Person responsible for the module	Team of General Education (MKWU) Lecturers
Language	Bahasa Indonesia (Regular Class) Bahasa Inggris (Internasional Class)
Relation to curriculum	Compulsory course
Teaching methods	Project-Based Learning, Case studies 2 workhours per week (2 x 170 minutes per week)
Workload (incl. contact hours, self-study hours)	1 CU for a bachelor's degree equals 170 minutes (50 minutes face-to-face, 60 minutes structured, 60 minutes independent learning) per week × 14 weeks, excluding mid and end-term exams. = 39.67 work hours per semester = 1.587 ECTS.
Credit points	2 Credit Units (CU) = 3.18 ECTS
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	Upon completing this module, students are expected to be able to: 1. Apply the concepts of digital literacy by using digital devices and information technology safely, ethically, and effectively in academic and professional contexts. 2. Utilize various digital technologies—including cloud storage, file conversion, presentation tools, and online collaboration platforms—to enhance personal and team productivity. 3. Apply proper academic writing techniques using reference management software such as *Mendeley* according to standard templates. 4. Analyze technological developments, current digital issues, and regulations related to information and electronic transactions to formulate appropriate prevention strategies. 5. Apply the basic concepts of *Internet of Things (IoT)* and *Artificial Intelligence (AI)* in simple case studies to solve everyday problems. 6. Design, implement, and present an innovative final project based on digital technology and reflect on the learning process for continuous improvement.

Content	This module introduces students to the fundamentals of digital literacy and responsible technology use in the 21st century. The topics include: 1. The concept and scope of digital literacy 2. History and development of digital technology 3. Cyber ethics and online behavior 4. Misinformation and digital fraud prevention 5. Academic writing and reference management (Mendeley) 6. Cloud storage and collaborative tools (Google Workspace, LMS) 7. Digital payments, e-commerce, and digital law (ITE and Data Privacy Act) 8. Basic applications of IoT and AI 9. Final digital innovation project Learning activities include lectures, discussions, simulations, case studies, project-based assignments, and presentations.
Examination forms	Essay and Oral Presentation
Study and examination requirements	Student performance is assessed through: 1. Class participation and discussion: 56.5% 2. Project and product-based assessment: 20.5% 3. Practical performance: 3% 4. Written tests (midterm and final exams): 20% Forms of examination: portfolio-based assessment, case study report, simulation and demonstration, written exams, and project presentation.
Reading list	1. David Alford. (2021). *BGE S1-S3 Computing Science and Digital Literacy: Third and Fourth Levels.* Edinburgh: Leckie & Leckie. 2. Joel Bloch. (2021). *Creating Digital Literacy Spaces for Multilingual Writers.* Multilingual Matters. 3. Lauren Hays & Jenna Kammer. (2021). *Integrating Digital Literacy in the Disciplines.* Bloomfield: Taylor & Francis Group. 4. Bart Van de Wiele. (2022). *Adobe Photoshop, Illustrator, and InDesign Collaboration and Workflow.* Adobe Press. 5. Earl Aguilera. (2022). *Digital Literacies and Interactive Media: A Framework for Multimodal Analysis.* New York: Routledge. 6. Kathy A., et al. (2022). *Literacy for Digital: Futures Mind, Body, Text.* New York: Routledge. 7. Nicole M. Fox. (2022). *Digital Visual Literacy.* Santa Barbara, CA: ABC-CLIO. 8. Subuh Isnur, et al. (2024). *Digital Literacy.* Jakarta: Erlangga.

Module Descriptions

Module designation	**Spectroscopy and Chromatography method**
Semester(s) in which the module is taught	3rd/Second Year
Person responsible for the module	Dr. Indah Ardiningsih
Language	Bahasa Indonesia (Regular Class) Bahasa Inggris (Internasional Class)
Relation to curriculum	Compulsory course
Teaching methods	Case method 3 workhours per week or 170 minutes
Workload (incl. contact hours, self-study hours)	1 CU for a bachelor's degree equals 170 minutes (50 minutes face-to-face, 60 minutes structured, 60 minutes independent learning) per week × 14 weeks, excluding mid and end-term exams. = 39.67 work hours per semester = 1.587 ECTS.
Credit points	3 Credit Units (CU) = 4,761 ECTS
Required and recommended prerequisites for joining the module	Basic Chemistry
Module objectives/intended learning outcomes	1. Explain the basics and principles of spectroscopy and chromatography, including UV-Visible spectroscopy, atomic absorption spectroscopy, infrared spectroscopy, and spectrofluorometry; 2. Carry out separation techniques using chromatography and spectroscopy methods appropriate to the characteristics of the samples being analyzed; and 3. Apply spectroscopy and chromatography methods to analyze samples and interpret the results of the analysis effectively. These objectives aim to develop students' theoretical understanding, practical skills, and analytical capabilities in instrumental chemical

Content	1. Introduction to spectrometric, spectrophotometric, and chromatographic analysis methods 2. UV-Vis spectrometry analysis method 3. Atomic Absorption Spectrophotometry (AAS) analysis method 4. Chromatography principles and apparatus components 5. Types of chromatography and their characteristics 6. Chromatographic separation techniques and analysis 7. Application of chromatography in qualitative and quantitative analysis 8. Chromatographic parameter concepts and operational skills development 9. Principles of Nuclear Magnetic Resonance (NMR) 10. NMR spectroscopy analysis parameters and interpretation 11. Infrared (IR) spectroscopy principles and instrument components 12. IR spectra interpretation and practical applications 13. Mass Spectrometry (MS) fundamentals and combined analysis methods
Examination forms	Essay and Oral Presentation
Study and examination requirements	Individuals assignment, group assignment, discussion, presentation, and practicum. Assessment Recap (Project-Based Learning): - Participatory Activities: 57.5% - Project/Product Assessment: 10% - Practice/Performance: 12.5% - Test : 20% - Total: 100%
Reading list	1. David Harvey, 2023, Modern Analytical Chemistry, McGraw-Hill Higher Education 2. Ardiningsih, et al .2021. Iron speciation in Fram Strait and over the northeast Greenland shelf: An inter-comparison study of voltammetric methods. Frontiers in Marine Science, https://doi.org/10.3389/fmars.2020.609379

Module Descriptions

Module designation	**Innovative Learning**
Semester(s) in which the module is taught	4th /Second Year
Person responsible for the module	Prof. Dr. Utiya Azizah, M.Pd.
Language	Bahasa Indonesia (Regular Class) Bahasa Inggris (Internasional Class)
Relation to curriculum	Compulsory course
Teaching methods	Project-Based Learning 3 workhours per week (3 x 170 minutes per weak)
Workload (incl. contact hours, self-study hours)	1 CU for a bachelor's degree equals 170 minutes (50 minutes face-to-face, 60 minutes structured, 60 minutes independent learning) per week × 14 weeks, excluding mid and end-term exams. = 39.67 work hours per semester = 1.587 ECTS.
Credit points	3 Credits Units (CU) = (4.77 ECTS)
Required and recommended prerequisites for joining the module	Basic understanding of learning theories and microteaching concepts.
Module objectives/intended learning outcomes	Upon successful completion of this module, students are expected to: 1. Explain the concepts and principles of various innovative learning models (cooperative learning, problem-based learning, inquiry–discovery, contextual, and project-based learning) and their implications in chemistry education. 2. Demonstrate professional, creative, collaborative, and open-minded attitudes toward innovation in designing and implementing chemistry learning. 3. Design chemistry learning tools (lesson plans, media, and assessments) aligned with the characteristics of innovative learning models and the needs of 21st-century learners. 4. Implement innovative learning models through peer teaching using ICT-based media and conduct critical reflection and evaluation of teaching practices.
Content	This module discusses the concepts, characteristics, and implementation of innovative learning models, including: 1. Cooperative Learning 2. Problem-Based Learning (PBL) 3. Inquiry–Discovery Learning 4. Project-Based Learning (PjBL) Students analyze theoretical foundations, evaluate existing learning tools, design learning materials and media, and implement them through peer teaching sessions. Activities are designed to foster collaboration, creativity, and reflective practices aligned with 21st-century learning needs.

Examination forms	Essay and Oral Presentation
Study and examination requirements	Assessment is based on continuous evaluation through: 1. Class participation and discussion (12%) 2. Project/Product-based assessment (66.5%) 3. Portfolio evaluation (1.5%) 4. Performance/practical peer teaching (20%) Forms: project reports, peer teaching demonstration, reflective journals, and portfolio documentation.
Reading list	1. National Research Council. (2001). *Inquiry and the National Science Education Standards: A Guide for Teaching and Learning.* Washington, D.C.: National Academy Press. 2. Arends, R. I. (2004). *Guide to Field Experiences and Portfolio Development: to accompany Learning to Teach.* McGraw-Hill. 3. Ibrahim, M., Rachmadiarti, F., & Ismono. (2005). *Pembelajaran Kooperatif.* Surabaya: Pusat Sains dan Matematika Sekolah. 4. Arends, R. I. (2007). *Learning to Teach* (6th Ed.). New York: McGraw-Hill. 5. Ibrahim, M. (2012). *Pembelajaran Berdasarkan Masalah* (Edisi II). Surabaya: University Press. 6. Dwiningsih, K., Sukarmin, & Azizah, U. (2017). *Inovasi Pembelajaran 2*. Surabaya: University Press. 7. Dwiningsih, K., et al. (2022). *Panduan Penyusunan Perangkat Perkuliahan Microteaching Kimia*. Surabaya: University Press.

Module Descriptions

Module designation	**ICT-based Learning Chemistry**
Semester(s) in which the module is taught	3rd /Second Year
Person responsible for the module	Dr. Sukarmin, M.Pd.
Language	Bahasa Indonesia (Regular Class) Bahasa Inggris (Internasional Class)
Relation to curriculum	Compulsory course
Teaching methods	Project-Based Learning, 2 workhours per week (2 x 170 minutes per week)
Workload (incl. contact hours, self-study hours)	1 CU for a bachelor's degree equals 170 minutes (50 minutes face-to-face, 60 minutes structured, 60 minutes independent learning) per week × 14 weeks, excluding mid and end-term exams. = 39.67 work hours per semester = 1.587 ECTS.
Credit points	2 Credit Units (CU) = 3,18 ECTS
Required and recommended prerequisites for joining the module	Basic understanding of learning media and computer literacy.
Module objectives/intended learning outcomes	Upon completing this module, students are expected to be able to: 1. Understand the fundamental concepts of Information and Communication Technology (ICT) and its relevance to effective and interactive chemistry learning. 2. Demonstrate responsibility and collaboration in developing ICT-based instructional media for chemistry education. 3. Design and develop ICT-based learning media such as instructional videos, animations, virtual laboratory simulations, and interactive presentations. 4. Integrate recent innovations and trends in educational technology, such as e-learning platforms, augmented reality (AR), and game-based learning, into chemistry teaching. 5. Evaluate the effectiveness of ICT-based learning media through reflection and student feedback analysis.

Content	This course focuses on the theoretical foundations and practical skills needed to develop ICT-based instructional media for chemistry learning. Main topics include: 1. Fundamental concepts of ICT in education 2. Design principles of instructional media 3. Storyboard and interface design 4. Multimedia development (audio, image, animation, and video editing) 5. Interactive learning tools (Flipbook, Adobe Flash, Articulate Storyline, Lectora) 6. Video production and editing (Microsoft PowerPoint, Camcorder, Pinnacle Studio) 7. Integration of ICT into chemistry lessons 8. Evaluation and reflection on media effectiveness 9. Development of web-based or AR-enhanced learning media Learning is conducted using Project-Based Learning (PjBL) through discussion, collaboration, simulation, and hands-on digital media creation.
Examination forms	Essay and Oral Presentation
Study and examination requirements	Student performance will be evaluated through: 1. Class participation and activity: 10.33% 2. Project and product-based assessment: 68% 3. Portfolio assessment: 16% 4. Practical performance: 4.33% 5. Written tests: 1.33% Forms of examination: project reports, product evaluation, reflective journals, portfolio documentation, presentation, and written exams.
Reading list	1. Fenrich, P. (1997). *Practical Guidelines for Creating Instructional Multimedia Applications.* USA: Harcourt Brace College Publishers. 2. Heinich, R., Molenda, M., Russell, J. D., & Smaldino, S. E. (1999). *Instructional Media and Technologies for Learning.* USA: Prentice Hall. 3. Ellen Finkelstein & Gurdy Leete. (2002). *50 Fast Flash MX Techniques.* Indianapolis: Wiley Publishing. 4. CambridgeSoft Corporation. (2006). *User's Guide Chem & Bio Office Desktop 2008 for Windows.* 5. Sadiman, A. S. (2009). *Media Pendidikan.* Jakarta: Rajawali Press. 6. Sony Creative Software Inc. (2009). *Sound Forge Pro 10 User Guide.* 7. Dwiningsih, K., Fajaroh, F., Parlan, P., Munzil, M., & Habiddin, H. (2022). *3D Molecular Interactive Multimedia for Building Chemistry Students' Spatial Ability. International Journal of Emerging Technologies in Learning (iJET)*, 17(14), 253–262.

Module Descriptions

Module designation	**Mono-function Organic Compound**
Semester(s) in which the module is taught	3rd Semester/Second Year
Person responsible for the module	Prof. Dr. Suyatno, M.Si.
Language	Bahasa Indonesia (Regular Class) Bahasa Inggris (Internasional Class)
Relation to curriculum	Compulsory course
Teaching methods	Project-Based Learning, 3 workhours per week (3 x 170 minutes per week)
Workload (incl. contact hours, self-study hours)	1 CU for a bachelor's degree equals 170 minutes (50 minutes face-to-face, 60 minutes structured, 60 minutes independent learning) per week × 14 weeks, excluding mid and end-term exams. = 39.67 work hours per semester = 1.587 ECTS.
Credit points	3 Credit Units (CU) = 4.77 ECTS
Required and recommended prerequisites for joining the module	Basic Chemistry
Module objectives/intended learning outcomes	1. Applying scientific process skills, critical and creative thinking, and problem-solving to produce accurate conclusions based on case study identification, while applying teaching, research, and management skills in chemistry education. 2. Demonstrating responsible attitudes by applying understanding of monofunctional organic compounds' properties in real-life applications. 3. Analyzing concepts (knowledge) regarding the structural theory of organic compounds, including monofunctional compounds: alkanes, alkenes, alkynes; alkyl halides; alcohols, phenols, ethers; aldehydes, ketones; carboxylic acids; and amines. 4. Integrating learning resources and ICT tools to support understanding of monofunctional organic compounds through case studies and collaboration.
Content	This course covers the structure, properties, and reactions of monofunctional organic compounds, including alkanes, alkenes, alkynes, alkyl halides, alcohols, phenols, ethers, aldehydes, ketones, carboxylic acids, and amines. Students actively engage in **case studies** to analyze functional group properties, reaction mechanisms, and conduct compound identification based on real-life scenarios or literature. Group discussions, Q&A, and reflection are employed to interpret case study results and literature data. Learning is supported by ICT-based tools for research, documentation, and presentation. Emphasis is placed on collaboration, reflection, and documentation of case study outcomes, enabling students to integrate theoretical knowledge with practical applications in chemistry education and daily life.

Examination forms	Essay and Oral Presentation
Study and examination requirements	**Study and Examination Requirements/Assessment:** 1. Individual assignments (case analysis reports) 2. Group case studies and discussions 3. Laboratory identification tasks 4. Documentation and presentation of case study findings **Assessment Recap (Case Study-Oriented):** 1. Participatory Activities/Case Study Analysis: 52,5% 2. Project Result Assessment / Product Assessment: 25% 3. Portfolio: 7,5% 4. Test: 15%% Total: 100%
Reading list	1. McMurry, John. (2023). Organic Chemistry: A Tenth Edition. Houston, Texas: OpenStax. https://open.umn.edu/opentextbooks/textbooks/1498?utm_source=chatgpt.com 2. Solomons, T. W. G., Fryhle, C. B., & Snyder, S. A. (2021). Organic Chemistry (12th ed.). Wiley. Retrieved from https://newbooksnbooks.pk/products/organic-chemistry-12th-edition-by-t-w-graham-solomons 3. Klein, D. R. (2021). Essential Organic Chemistry (4th ed.). Wiley. 4. Bruice, P. Y. (2021). Organic Chemistry (9th ed.). Pearson. 5. Wardana, A. P., Abdjan, M. I., Aminah, N. S., Fahmi, M. Z., Siswanto, I., Kristanti, A. N., ... & Takaya, Y. (2022). 3, 4, 3′-Tri-O-methylellagic acid as an anticancer agent: in vitro and in silico studies. RSC advances, 12(46), 29884-29891. 6. Tukiran, T., Wardhana, A. P., Hidajati, N., & Shimizu, K. (2018). Two phenolic compounds from chloroform fraction of Syzygium polycephalum MIQ. stem bark (Myrtaceae). Molekul, 13(1), 23-29.

MODULE DESCRIPTION

Module designation	**Statistics**
Semester(s) in which the module is taught	2th/Second Year
Person responsible for the module	Prof. Dr. Achmad Lutfi, M.Pd.
Language	Bahasa Indonesia (Regular Class) English (Internasional Class)
Relation to curriculum	Compulsory Course
Teaching methods	Case Method
Workload:	2 x 50 minutes lectures, 2 x 60 minutes structured activity, 2 x 60 minutes individual activity, 14 weeks per semester, 79 total hours per semester ~ 3.18 ECTS
Credit points:	2 CU = 2 x 1.59 = 3.18 ECTS
Requirements according to the examination regulations	Students attend at least 75% of lectures.
Recommended prerequisites	-
Module objectives/ Intended Learning Outcomes	Students are able to: 1. Understanding the nature of statistics for chemistry education students 2. Research data, use descriptive statistics and inferential statistics (parametric and non parametric) 3. Various parametric statistical test techniques available in the SPSS application 4. Various non-parametric statistical test techniques available in the SPSS application 5. Cases of errors in the selection in previous students' theses or articles published in scientific journals.
Content:	1. Statistics is tool of science 2. Basic understanding and concepts of statistics and statistics. 3. Understanding data scale type. 4. Data organizing exercises. 5. Understanding descriptive and inferential data analysis. 6. Parametric statistics using software SPSS. 7. Non parametric statistics using software SPSS. 8. Comparison test. 9. Correlation test. 10. Case study from thesis or article. 11. Suggestions for improvements to errors in the use of statistical tests.
Study and examination requirements and forms of examination	Students are considered to be competent and pass if at least get 68.

<table>
<tr>
<td></td>
<td>Assessment Recap (Case Method):
<table>
<tr><th>Assessment Type</th><th>Weight (%)</th></tr>
<tr><td>Participatory Activities</td><td>60%</td></tr>
<tr><td>Test</td><td>40%</td></tr>
<tr><td>TOTAL</td><td>100%</td></tr>
</table>

Grading Index:
A = 85–100
A- = 80–84
B+ = 75–79
B = 70–74
B- = 65–69
C+ = 60–64
C = 55–59
D = 40–54
E = 0–39</td>
</tr>
<tr>
<td>Reading list</td>
<td>1. Howell, D. C,. 2010. Statistical Methods For Psychology,US: Wadsworth Learning
2. Sudjana. 1996. Metoda Statistika, Bandung : Tarsito
3. Sugiyono, 2009. Statistika untuk Penelitian,Bandung: Alfabeta
4. Sugiyono. 2010.Statistik Nonparametris untuk Penelitian, Bandung. Alfabeta
5. RPS Statistika Dasar
6. Kuzon, W.M., Urbancheck, M.G., & McCabe, S. 1996. The Seven Deadly Sins of Statistical Analysis. Annals of Plastic Surgery. Volume 37/Number 3/Sept 1996,
7. Suriasumantri, J.S. 2013. Filsafat Ilmu; Sebuah Pengantar Populer, Jakarta: Pustaka Sinar Harapan, 2013.</td>
</tr>
</table>

Module Descriptions

Module designation	**Basic Theory of Inorganic Chemistry**
Semester(s) in which the module is taught	3rd Semester/Second Year
Person responsible for the module	Dr. Dina Kartika Maharani, S.Si., M.Sc.
Language	Bahasa Indonesia (Regular Class) Bahasa Inggris (Internasional Class)
Relation to curriculum	Compulsory course
Teaching methods	Case Method 3 workhours per week (3 x 170 minutes per week)
Workload (incl. contact hours, self-study hours)	1 CU for a bachelor's degree equals 170 minutes (50 minutes face-to-face, 60 minutes structured, 60 minutes independent learning) per week × 14 weeks, excluding mid and end-term exams. = 39.67 work hours per semester = 1.587 ECTS.
Credit points	3 Credit Units (CU) = 4.77 ECTS
Required and recommended prerequisites for joining the module	Basic Chemistry
Module objectives/intended learning outcomes	1. Analyzing the periodicity of elemental properties and its relationship with atomic structure and electron configuration. 2. Elaborating on the concepts of covalent and ionic bonds, as well as intermolecular forces, in determining the properties of compounds. 3. Evaluating acid-base theories and redox reactions based on thermodynamic principles in the context of chemical problem-solving. 4. Implementing the concepts of chemical bonding, acid-base reactions, redox reactions, and solid-state systems through scientific discussion activities and group collaboration, as well as presenting the study results responsibly.
Content	A study (or review) of the periodicity of elemental properties, covalent bonds, ionic bonds, chemical forces, acid-base theories, fundamentals of chemical reactions, thermodynamics and redox reactions, solid-state systems.
Examination forms	Essay and Oral Presentation

Study and examination requirements	**Study and Examination Requirements/Assessment:** 1. Individual assignments (case analysis reports) 2. Group case studies and discussions 3. Documentation and presentation of case study findings **Assessment Recap (Case Study-Oriented):** 1. Participatory Activities/Case Study Analysis: 60% 2. Portfolio: 17,5% 3. Test:22.5% Total: 100%
Reading list	1. INORGANIC CHEMISTRY HAND BOOK: A Legend Book for M.Sc. I Semeter Chemistry. (2025). (n.p.): Shashwat Publication. 2. Pfennig, B. W. (2022). Principles of Inorganic Chemistry. United Kingdom: Wiley. 3. Mackay, R., Henderson, W. (2017). Introduction to Modern Inorganic Chemistry, 6th Edition. United Kingdom: CRC Press. 4. Hosmane, N. S. (2017). Advanced Inorganic Chemistry: Applications in Everyday Life. United Kingdom: Elsevier Science. 5. Huheey, J. E. ; Keiter, E. A. ; Keiter, R. L. , 1990, Inorganic Chemistry, Principles of Structure and Reactivity, Fourth Edition, HarperCollins College Publishers. 6. Madan, R. D. , 1997. Modern Inorganic Chemistry, S. Chand and Company LTD, NewDelhi. 7. Sugiarto, Bambang. 2012. Sistem Periodik Unsur. Surabaya: Penerbit Unesa 8. Sari Edi Cahyaningrum, 2018, Dasar Reaksi Kimia Anorganik, Unesa University Press

Module Descriptions

Module designation	**Thermodynamics of Chemistry**
Semester(s) in which the module is taught	3rd/second year
Person responsible for the module	Dr. Dian Novita ST., M.Pd
Language	Bahasa Indonesia (Regular Class) Bahasa Inggris (Internasional Class)
Relation to curriculum	Compulsory course
Teaching methods	Project-Based Learning 3 workhours per week (3 x 170 minutes per weak)
Workload (incl. contact hours, self-study hours)	1 CU for a bachelor's degree equals 170 minutes (50 minutes face-to-face, 60 minutes structured, 60 minutes independent learning) per week × 14 weeks, excluding mid and end-term exams. = 39.67 work hours per semester = 1.587 ECTS.
Credit points	3 Credits Units (CU) = (4.77 ECTS)
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	1. Understand the fundamental principles of thermodynamics and their applications: properties and behavior of gases; gas kinetics; energy, heat, and work; internal energy and enthalpy; direction of processes and the concept of entropy; free energy and its relation to system stability, chemical equilibrium, thermodynamics of electrochemical cells, solution thermodynamics, and phase equilibrium. 2. Solve science-and-technology problems in chemistry within common/simple contexts by applying knowledge of gas properties and behavior; gas kinetics; energy, heat, and work; internal energy and enthalpy; process direction and entropy; free energy and its relation to system stability, chemical equilibrium, thermodynamics of electrochemical cells, solution thermodynamics, and phase equilibrium. 3. Demonstrate the ability to use learning resources and ICT-based media to understand concepts in energetics/thermodynamics. 4. Make decisions linking basic chemical concepts with laboratory activities, research findings, and the presence of chemistry in everyday life. 5. Show a responsible attitude toward work in one's area of expertise and carry it out independently.

Content	A study of the properties and behaviour of gases; gas kinetics; energy, heat, and work; internal energy and enthalpy; process direction and the concept of entropy; free energy and its relationship to system stability; chemical equilibrium; thermodynamics of electrochemical cells; solution thermodynamics; phase equilibrium; and appropriate laboratory activities.
Examination forms	Essay and Oral Presentation
Study and examination requirements	**Study and Examination Requirements/Assessment:** 1. Individual assignments 2. Documentation and presentation of assignments 3. Group discussions 4. Laboratory works **Assessment Recap (Case Study-Oriented):** 5. Participatory Activities/Case Study Analysis: 60% 6. Practical Assessment: 10% 7. Test: 30%% Total: 100%
Reading list	1. Atkins, S.P.W. and Paula, J. d. 2018. Physical Chemistry, 11th edition. New York: Oxford University Press. 2. David W. Ball, Physical Chemistry, 2nd Edition. Stamford: Cengage Learning. 3. Levine, Ira N. 2014. Quantum chemistry, 7th edition. New York: Pearson Education, Inc. 4. Mortimer, R.G. 2008, Physical Chemistry, 3th edition, London: Elsevier Inc

COMPULSORY COURSE
4th SEMESTER

Module Descriptions

Module designation	**English**
Semester(s) in which the module is taught	4th/Second Year
Person responsible for the module	Dr. Henny Dwi Iswati, S.S., M.Pd.
Language	English
Relation to curriculum	Compulsory course
Teaching methods	Case Study 2 workhours per week (2 x 170 minutes per week)
Workload (incl. contact hours, self-study hours)	1 CU for a bachelor's degree equals 170 minutes (50 minutes face-to-face, 60 minutes structured, 60 minutes independent learning) per week × 14 weeks, excluding mid and end-term exams. = 39.67 work hours per semester = 1.587 ECTS.
Credit points	2 Credit Units (CU) = 3,18 ECTS
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	• Demonstrates religious, national, and cultural values, as well as academic ethics, in carrying out their duties • Demonstrates a resilient, collaborative, adaptive, innovative, inclusive, lifelong learning, and entrepreneurial character • Develops logical, critical, systematic, and creative thinking in carrying out specific work in the field of expertise and in accordance with the work competency standards in the relevant field. • Develops self-sustainably and collaborates.
Content	This course equips undergraduate students with fundamental English competencies to support their academic learning and professional development in higher education. The course is organised into two integrated learning phases. The first phase focuses on TOEFL-like test preparation through strategy-based instruction and guided practice in Listening Comprehension, Structure and Written Expression, and Reading Comprehension. The second phase develops students' foundational academic reading skills through texts related to the Sustainable Development Goals (SDGs). Students learn to apply previewing and predicting strategies, identify main ideas, supporting information, basic text organisation, and author's purpose, provide simple responses based on textual information, write concise academic summaries, and communicate their understanding through collaborative digital video presentations. The course is delivered fully online through guided practice, collaborative learning, quizzes, project-based activities, peer feedback, and reflection. It also promotes logical and critical thinking, academic integrity, digital literacy, collaboration, adaptability, responsibility, and lifelong learning.
Examination forms	Essay and Oral Presentation

Study and examination requirements	Study and Examination Requirements/Forms of Examination: 1. Individual assignments (literature review, analysis) 2. Group assignments / project work (identifying misconceptions, proposing solutions) 3. Discussions and Q&A participation 4. Presentations and project documentation Assessment Recap (Project-Based Learning): 1. Participatory Activities: 27% 2. Project/Product Assessment: 53% 3. Practice/Performance: 20% Total: 100%
Reading list	1. Iswati, H.D., Anam, S., & Asningtias, S. (2024). English for Higher Education. Surabaya: Penerbit Airlangga 2. Educational Testing Service. (n.d.). TOEFL ITP® test content. https://www.ets.org/toefl/itp/test-content.html 3. Educational Testing Service. (n.d.). Prepare for the TOEFL ITP® tests. https://www.ets.org/toefl/itp/prepare.html 4. Phillips, D. (2001). Longman complete course for the TOEFL test: Preparation for the computer and paper tests. Pearson Education. 5. Columbia College. (n.d.). Finding the main idea. https://www.ccis.edu/academic-resources/main-idea 6. Cuesta College. (n.d.). Reading comprehension: Main idea and supporting details. https://www.cuesta.edu/student-support/ssc/study-guides/reading-comp/307-read-main-idea.html 7. British Council. (n.d.). Reading. https://learnenglish.britishcouncil.org/free-resources/reading 8. Purdue Online Writing Lab. (n.d.). Quoting, paraphrasing, and summarizing. https://owl.purdue.edu/owl/research_and_citation/using_research/quoting_paraphrasing_and_summarizing/index.html 9. Purdue Online Writing Lab. (n.d.). Paragraphs and paragraphing. https://owl.purdue.edu/owl/general_writing/academic_writing/paragraphs_and_paragraphing/index.html 10. Baldwin, A. (2023). College success concise. OpenStax, Rice University. 11. United Nations. (n.d.). The 17 Sustainable Development Goals. https://sdgs.un.org/goals 12. Canva Design School. (n.d.). Presenting in Canva.

Module Descriptions

Module designation	**Biochemistry**
Semester(s) in which the module is taught	4th Semester/ Second Year
Person responsible for the module	Prof. Dr. Rudiana Agustini, M.Pd.
Language	Bahasa Indonesia (Regular Class) Bahasa Inggris (Internasional Class)
Relation to curriculum	Compulsory course
Teaching methods	Project-Based Learning, 3 workhours per week (3 x 170 minutes per week)
Workload (incl. contact hours, self-study hours)	1 CU for a bachelor's degree equals 170 minutes (50 minutes face-to-face, 60 minutes structured, 60 minutes independent learning) per week × 14 weeks, excluding mid and end-term exams. = 39.67 work hours per semester = 1.587 ECTS.
Credit points	3 Credit Units (CU) = 4.77 ECTS
Required and recommended prerequisites for joining the module	Mono-function Organic Compound
Module objectives/intended learning outcomes	1. Able to develop logical, critical, systematic and creative thinking in carrying out specific work in his/her field of expertise and in accordance with the work competency standards in the relevant field. 2. Able to interpret and solve problems in the field of biochemistry related to theoretical concepts of structure, dynamics, and energy 3. Able to manage a laboratory and use its equipment by applying K3 principles and skilled in carrying out quantitative analysis, especially determining glucose and protein levels and isolating amino acids.

Content	1. Characteristics of living matter, cellular structure, molecular organization, and energy use in biological systems. 2. Structure, properties, classification, reactions, and functions of amino acids and peptide formation. 3. Protein homology and structural organization from primary to tertiary levels, including conformational characteristics. 4. Structure, properties, functions, classification, kinetics, and mechanisms of enzyme action. 5. Classification of carbohydrates, structural features, mutarotation, and biological functions. 6. Structural and functional roles of mono-, di-, and polysaccharides in biological systems. 7. Structure and function of lipids, membrane components, and membrane organization. 8. Scientific writing related to biochemistry content. 9. Components and structures of nucleotides, DNA, and RNA, and their roles in genetic information flow. 10. Integration of nucleic acid structure and function with gene expression mechanisms. 11. CO_2 and N_2 cycles, heterotroph–autotroph relationships, catabolism–anabolism, and biological energy carriers. 12. Overview of carbohydrate, amino acid, and lipid metabolism. 13. Principles of biochemistry laboratory work, chromatography, glucose analysis, and UV–Vis data interpretation. 14. Factors influencing enzyme activity and analytical principles of protein quantification. 15. Chromatographic identification and analysis of amino acids.
Examination forms	Essay and Oral Presentation
Study and examination requirements	**Study and Examination Requirements/Assessment:** Individual assignments (case analysis reports) Group case studies and discussions Laboratory identification tasks Documentation and presentation of case study findings Laboratory works **Assessment Recap (Case Study-Oriented):** Participatory Activities/Case Study Analysis: 60% PracticalAssessment: 25% Test: 15%% Total: 100%
Reading list	1. emy M. Berg, John L. Tymoczko, Gregory J. Gatto Jr. Lubert Stryer, 2018, Biochemistry, New York, W. H. Freeman 2. Nelson, L.D., Cox, M.M. 2021. Lehninger Principle of Biochemistry 8th Edition, Mac Millan Learning University of Wiconsin 3. Color Atlas of Biochemistry, 2005, Koolman, J and Roehm K.H., 2nd edition, Stutgard New York

Module Descriptions

Module designation	**Teaching Skills and Microteaching**
Semester(s) in which the module is taught	4th/Second Year
Person responsible for the module	Prof. Dr. Utiya Azizah, M.Pd.
Language	Bahasa Indonesia (Regular Class) Bahasa Inggris (Internasional Class)
Relation to curriculum	Compulsory course
Teaching methods	Project-Based Learning, 2 workhours per week (2 x 170 minutes per week)
Workload (incl. contact hours, self-study hours)	1 CU for a bachelor's degree equals 170 minutes (50 minutes face-to-face, 60 minutes structured, 60 minutes independent learning) per week × 14 weeks, excluding mid and end-term exams. = 39.67 work hours per semester = 1.587 ECTS.
Credit points	2 Credit Units (CU) = 3,18 ECTS
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	1. Students are able to apply pedagogical knowledge of chemistry related to curriculum, active-innovative learning methods, evaluation, and media use in teaching activities. 2. Students are skilled in communicating ideas and demonstrating basic teaching skills. 3. Students are skilled in designing and developing effective learning tools using learning resources, research results, and ICT. 4. Students are skilled in conducting microteaching simulations. 5. Students are able to develop themselves continuously based on evaluation results of macro teaching simulations.
Content	1. Basic concepts of microteaching, 2. Integration of Pedagogical Content Knowledge, 3. Basic teaching skills: questioning skills, reinforcement, variation, explaining, opening and closing lessons, guiding small group discussions, classroom management, teaching small groups and individuals, and microteaching simulation.
Examination forms	Essay and Oral Presentation

<table>
<tr>
<td>Study and examination requirements</td>
<td>Students are considered to be competent and pass if at least get 68.

Assessment Recap (Project-Based Learning):

<table>
<tr><th>Assessment Type</th><th>Weight (%)</th></tr>
<tr><td>Participation Activities</td><td>10%</td></tr>
<tr><td>Project/Assignment (Program of Semester, Program of Year, Module Development)</td><td>55%</td></tr>
<tr><td>Practice/Performance (Microteaching Simulation)</td><td>35%</td></tr>
<tr><td>TOTAL</td><td>100%</td></tr>
</table>

Grading Index:
A = 85–100
A- = 80–84
B+ = 75–79
B = 70–74
B- = 65–69
C+ = 60–64
C = 55–59
D = 40–54
E = 0–39</td>
</tr>
<tr>
<td>Reading list</td>
<td>

1. Khasanah, Uswatun. (2025). Pengantar Microteaching (Edisi Revisi). Sukoharjo: Tahta Media Group.
2. Wajdi, F., Sopratu, P., Fajar, A., La Mido, Randan, M. W., Safitri, N. L., Sembiring, D., Dawami, Rasyid, S., Halimah, L., Mulyani, M., & Martini, E. (2025). Microteaching sebagai pengantar. Bandung: Widina Media Utama.
3. Hartley J., 2017, The Uses of Digital Literacy, New York: Routledge Published.
4. Clark, R. C., & Mayer, R. E. (2008). E-learning and the science of instruction: Proven guidelines for consumers and designers of multimedia learning (2nd ed.). Pfeiffer/John Wiley & Sons.

</td>
</tr>
</table>

Module Descriptions

Module designation	**Coordination Chemistry**
Semester(s) in which the module is taught	4th semester/ 2nd year
Person responsible for the module	Dr. Amaria, M.Si.
Language	Bahasa Indonesia (Regular Class) Bahasa Inggris (Internasional Class)
Relation to curriculum	Compulsory course
Teaching methods	Case Method 2 workhours per week (3 x 170 minutes per week)
Workload (incl. contact hours, self-study hours)	1 CU for a bachelor's degree equals 170 minutes (50 minutes face-to-face, 60 minutes structured, 60 minutes independent learning) per week × 14 weeks, excluding mid and end-term exams. = 39.67 work hours per semester = 1.587 ECTS.
Credit points	2 Credit Units (CU) = 3.18 ECTS
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	1. Able to elaborate on the concepts of covalent bonds, ligands, stereochemistry, stability, magnetic properties, and electronic spectra of coordination compounds. 2. Able to predict the structure and properties of coordination compounds. 3. Able to communicate, both verbally and in writing, the concepts of chemical bonding, stereochemistry, stability, magnetic properties, and electronic spectra of coordination compounds. 4. Able to demonstrate a caring and responsible attitude in applying coordination compounds in the environment.
Content	Study of the concepts: chemical bonding, stereochemistry, reaction mechanisms, properties, spectra, preparation, and stability of coordination chemistry.
Examination forms	Essay and Oral Presentation
Study and examination requirements	**Study and Examination Requirements/Assessment:** 1. Individual assignments (case analysis reports) 2. Group case studies and discussions 3. Documentation and presentation of case study findings **Assessment Recap (Case Study-Oriented):** 1. Participatory Activities/Case Study Analysis: 60% 2. Portfolio: 17,5% 3. Test: 22.5% Total: 100%

Reading list	1. Quagliano, J. V. And Vallarino, L. M., 1969. Coordination Chemistry, Massachusetts: D. C. Heath and Company 2. Huheey, E. James, Ellen, A.K, and Richard I.K. 1978. Inorganic Chemistry, Principle of Structure and Reactivity. USA: Harper Collins College Publishers 3. Madan, R.D., 1997. Modern Inorganic Chemistry, S. Chand and Company LTD, New Delhi. 4. Kagatikar, S., Sunil, D., 2021. Schiff Bases and Their Complexes in Organic Light Emitting Diode Application. Journal of Electronic Materials. 50, 6708 6723. 5. Liang, L., Wu X., et al. 2022. Synthesis and characterization of polypyridine ruthenium(II) complexes and anticancer efficacy studies in vivo and in vitro. Journal of Inorganic Biochemistry. 236, 111963

Module Descriptions

Module designation	**Poly-function Organic Compound**
Semester(s) in which the module is taught	4th Semester/ Second Year
Person responsible for the module	Dr. First Ambar Wati
Language	Bahasa Indonesia (Regular Class) Bahasa Inggris (Internasional Class)
Relation to curriculum	Compulsory course
Teaching methods	Project-Based Learning, 3 workhours per week (3 x 170 minutes per week)
Workload (incl. contact hours, self-study hours)	1 CU for a bachelor's degree equals 170 minutes (50 minutes face-to-face, 60 minutes structured, 60 minutes independent learning) per week × 14 weeks, excluding mid and end-term exams. = 39.67 work hours per semester = 1.587 ECTS.
Credit points	3 Credit Units (CU) = 4.77 ECTS
Required and recommended prerequisites for joining the module	Mono-function Organic Compound
Module objectives/intended learning outcomes	1. Developing logical, critical, systematic, creative and innovative thinking in the context of developing or implementing science and technology in the field of education 2. Able to apply science process skills, critical thinking, creativity and problem solving to produce appropriate conclusions based on the results of the identification that has been carried out, and able to apply educational, research and management skills in the implementation of chemistry education. 3. Mastering the concept (knowledge) about the theory of the structure of organic compounds, monofunctional compounds: dicarboxylic acids, dienes, polyfunctional organic compounds, polycyclic and heterocyclic aromatic hydrocarbons, carbohydrates, proteins, lipids, and biological organic compounds. 4. Having a responsible attitude in applying the concept of polyfunctional organic compounds, polycyclic and heterocyclic aromatic hydrocarbons, carbohydrates, proteins, lipids, and biological organic compounds. 5. Able to carry out analysis of simple organic compounds including identification of carbohydrates, lipids, proteins, and biological organic compounds
Content	Studies on polyfunctional organic compounds, polycyclic and heterocyclic aromatic hydrocarbons, carbohydrates, proteins, lipids, and biological organic compounds.

Examination forms	Essay and Oral Presentation
Study and examination requirements	**Study and Examination Requirements/Assessment:** Individual assignments (case analysis reports) Group case studies and discussions Laboratory identification tasks Documentation and presentation of case study findings Laboratory works **Assessment Recap (Case Study-Oriented):** Participatory Activities/Case Study Analysis: 60% PracticalAssessment: 25% Test: 15%% Total: 100%
Reading list	1. Saputri, R. D., Wati, F. A., Purnamasari, A. P., Ilmi, H., Tjahjandarie, T. S., Mardhiyyah, S., & Tanjung, M. (2024). Three novel dihydrochalcones from Flemingia lineata (L.) WT Aiton and their antiplasmodial activity. Natural Product Research, 1-8. 2. Wardana, A. P., Abdjan, M. I., Aminah, N. S., Fahmi, M. Z., Siswanto, I., Kristanti, A. N., ... & Takaya, Y. (2022). 3, 4, 3′-Tri-O-methylellagic acid as an anticancer agent: in vitro and in silico studies. RSC advances, 12(46), 29884-29891. 3. Kristanti, A. N., Aminah, N. S., Siswanto, I., Manuhara, Y. S. W., Abdjan, M. I., Wardana, A. P., ... & Takaya, Y. (2022). Anticancer potential of β-sitosterol and oleanolic acid as through inhibition of human estrogenic 17beta-hydroxysteroid dehydrogenase type-1 based on an in silico approach. RSC advances, 12(31), 20319-20329. 4. Solomon, T.W.G. & Fryhle, C.B. (2016). Organic Chemistry. New York: John Wiley & Sons, Inc. 5. McMurry, J. (2016). Organic chemistry. Cengage Learning

Module Descriptions

Module designation	**Chemical Kinetics** **(Kinetika Kimia)**
Semester(s) in which the module is taught	4th/ second year
Person responsible for the module	Prof. Dr. Suyono, M.Pd. Dr. Bertha Yonata, M.Pd. Nur Hayati, M.Si.
Language	Indonesian Language and English
Relation to curriculum	Compulsory course
Teaching methods	Project method 3 work hours per week (3 x 170 minutes per week)
Workload (incl. contact hours, self-study hours)	1 CU for a bachelor's degree equals 170 minutes (50 minutes face-to-face, 60 minutes structured, 60 minutes independent learning) per week × 14 weeks, excluding mid and end-term exams. = 39.67 work hours per semester = 1.587 ECTS.
Credit Point	3 CU = 3 x 1.59 = 4.77 ECTS
Requirements according to the examination regulations	Quantum Chemistry
Recommended Prerequisites	
Module Objectives/intended learning outcomes	1. Students have the ability to communicate the results of experiments, so they are able to develop a conceptual framework for formulating actions or alternative actions in solving chemical problems in life. 2. Students skillfully use tools in determining reaction rates and reaction mechanisms based on empirical facts (inductive dimensions) and submit theoretical arguments to explore empirical facts that occur (deductive dimensions) in the field of reaction kinetics. 3. Students have knowledge of the laws of reaction rates and reaction mechanisms based on empirical facts (inductive dimensions) and submit theoretical arguments to explore empirical facts that occur (deductive dimensions) in the field of reaction kinetics. 4. Students have the ability to cooperate and are responsible for assessing the rate of reaction as a function of concentration, temperature, and catalyst as well as the legal interpretation of the reaction rate to the discussion and design of reaction mechanisms (including photochemical).
Content	Empirical and theoretical studies of reaction rates as a function of concentration, temperature and catalysts and the interpretation of the reaction rate laws to the discussion and design of reaction mechanisms (including photochemical).
Examination forms	Project/product results and presentation

<table>
<tr><td>Study and examination requirements</td><td>Students are considered competent and pass if they get at least a minimum score of 68 from these assessments:
1. Participatory Activities (discussion, presentation, assignment): 55.00%
2. Test: 10.00%
3. Laboratory Practical Assessment: 35.00%
Convert the 0-100 scale value to a 0-4 scale and the letters are arranged as follows.
<table>
<tr><th>Letter</th><th>Number</th><th>Interval score</th></tr>
<tr><td>A</td><td>4.00</td><td>85 ≤ A < 100</td></tr>
<tr><td>A-</td><td>3.75</td><td>80 ≤ A- < 85</td></tr>
<tr><td>B+</td><td>3.50</td><td>75 ≤ B+ < 80</td></tr>
<tr><td>B</td><td>3.00</td><td>70 ≤ B < 75</td></tr>
<tr><td>B-</td><td>2.75</td><td>65 ≤ B- < 70</td></tr>
<tr><td>C+</td><td>2.50</td><td>60 ≤ C+ < 65</td></tr>
<tr><td>C</td><td>2.00</td><td>55 ≤ C < 60</td></tr>
<tr><td>D</td><td>1.00</td><td>40 ≤ D < 55</td></tr>
<tr><td>E</td><td>0.00</td><td>0 ≤ E < 40</td></tr>
</table></td></tr>
<tr><td>Media employed</td><td>Worksheet, Computer, LCD, White board, laboratory instruments</td></tr>
<tr><td>Reading List</td><td>1. Ancheyta, J. (2017). Chemical Reaction Kinetics: Concepts, Methods and Case Studies. New Jersey: John Wiley & Sons Ltd.
2. House, J. E. (2007). Principles of chemical kinetics, 2nd ed. San Diego: Elsevier Inc.
3. Laidler, K. J. (1987). Chemical Kinetics, third edition. New Delhi: Pearson Education Inc.
4. Wilkinson, F. (1980). Chemical Kinetics and Reaction Mechanisms. Victoria: Van Nostrand Reinhold Company.</td></tr>
<tr><td>Date of last amandment</td><td>31 Januari 2025</td></tr>
</table>

Module Descriptions

Module designation	**Research Methodology**
Semester(s) in which the module is taught	4th/Second Year
Person responsible for the module	Dr. Dian Novita, S.T., M.Pd.,
Language	Bahasa Indonesia (Regular Class) Bahasa Inggris (Internasional Class)
Relation to curriculum	Compulsory course
Teaching methods	Project-Based Learning, 2 workhours per week (2 x 170 minutes per week)
Workload (incl. contact hours, self-study hours)	1 CU for a bachelor's degree equals 170 minutes (50 minutes face-to-face, 60 minutes structured, 60 minutes independent learning) per week × 14 weeks, excluding mid and end-term exams. = 39.67 work hours per semester = 1.587 ECTS.
Credit points	2 Credit Units (CU) = 3,18 ECTS
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	1. Explain the basic concepts and characteristics of research. 2. Identify research designs and their variables. 3. Describe types of research and their characteristics. 4. Describe types of research and their characteristics. 5. Describe types of research and their characteristics. 6. Select a research approach and design appropriate to the problem being solved. 7. Select a research approach and design appropriate to the problem being solved. 8. Selecting a research approach and design appropriate to the problem being solved. 9. Developing a conceptual research framework and systematic research proposal. 10. Developing an introductory chapter (background, problem statement, objectives, benefits, assumptions, limitations, and operational definitions). 11. Developing a theoretical framework (literature review chapter) that supports the problem. 12. Developing a research design, research procedures, and creating a matrix of relationships between research data and data analysis. 13. Developing a list of references used to conduct the research. Drafting a proposal and providing mentoring/guidance

Content	A study of the nature, objectives, and types of research methods relevant to research in chemistry education and providing students with skills in decision-making and applying research methods to find alternative solutions to educational problems, including research paradigms, conceptual frameworks, hypotheses, and variables, populations and samples, research instruments, research designs, data collection techniques, and data analysis, packaged in a science education research proposal as a course output.
Examination forms	Essay and Oral Presentation
Study and examination requirements	Assessment Recap (Project-Based Learning): - Participatory Activities: 20% - Project/Product Assessment: 60% - Test Assessment: 20% - Total: 100%
Reading list	1. Widoyoko, S. E. P. 2025. *Research Instrument Preparation Techniques*. Yogjakarta: Pustaka Pelajar. 2. Tim Unesa. 2024. *Bedoman Penulisan Tugas Akhir*. Surabaya: Universitas Negeri Surabaya. 3. Lutfi, A. 2021. *Research and Development (R & D): Implikasi dalam pendidikan kimia.* Surabaya: Jurusan Kimia Unesa. 4. Plom, T., & Nieveen, N. 2013. *Educational Design Research*. Netherlands Institute for Curriculum Developmet (SLO). 5. Faisal,Sanapiah. 1982. Metodologi Penelitian Pendidikan. Surabaya: Penerbit Usaha Nasional. 6. Moleong, Lexy J. 2004.MetodologiPenelitian Kualitatif. Bandung: Remaja Rosdakarya 7. Muhadjir, Noeng. 2000. Metodologi Penelitian Kualitatif. Edisi IV. Yogyakarta : Rake Sarasin

MODULE DESCRIPTION

Module Title	Laboratory Organization
Semester(s) in which the module is taught	1st/First Year
Person responsible for the module	Prof. Dr. Harun Nasrudin, M.S.
Language	Bahasa Indonesia (Regular Class) Bahasa Inggris (Internasional Class)
Relation to curriculum	Compulsory course
Teaching Methods	Project Team Method
Classification within the curriculum	Compulsory Course
Workload (incl. contact hours, self-study hours)	1 CU for a bachelor's degree equals 170 minutes (50 minutes face-to-face, 60 minutes structured, 60 minutes independent learning) per week × 14 weeks, excluding mid and end-term exams. = 39.67 work hours per semester = 1.587 ECTS.
Credit points:	2 Credit Units (CU) = 3,18 ECTS
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	Knowledge: 1. General Competency Achievement: Able to apply logical, critical, systematic and innovative thinking in the context of developing or implementing science and technology that pays attention to and applies humanitarian values. 2. Special Competency Achievements: Able to produce accurate conclusions based on the results of the identification that has been carried out and able to apply educational, research and management skills in the implementation of chemistry education. 3. Achievement of Knowledge Field Competencies: Mastering theoretical concepts (knowledge) about the function and role of chemical education laboratories, the basics of planning the construction of chemical laboratories, as well as the management of procurement of chemical laboratory equipment and materials as well as the principles of K3 (Occupational Safety and Security) and laboratory management. 4. Attitude competency achievement: Having a responsible attitude by applying understanding of laboratory

<table>
<tr><td></td><td>organization material in carrying out daily lectures and practicals as well as future tasks.</td></tr>
<tr><td>Content:</td><td>A study of the function and role of the Chemistry Education Laboratory, planning, construction, and management of the Laboratory, procurement and management of equipment and materials, management of hazardous and toxic materials (B3), Occupational Safety and Security (K3) in the Laboratory, fire prevention, solution preparation, and assessment of laboratory activities. The study is conducted through discussions, demonstrations, laboratory practice, and presentations.</td></tr>
<tr><td>Examination forms</td><td>Individuals assignment, group assignment, discussion, presentation, and project</td></tr>
<tr><td>Study and examination requirements</td><td>Students are considered competent and pass if they get at least a maximum test score of 68 (UTS and UAS), and structured activities (assignments / T) and participatory activities (P)
The final grade (NA) is calculated according to the formula:
NA = (2xP)+(3xT)+(2xUSS)+(3xUS)
10
Convert the 0-100 scale value to a 0-4 scale and the letters are arranged as follows.

<table>
<tr><th>Letter</th><th>Number</th><th>Interval</th></tr>
<tr><td>A</td><td>4,00</td><td>85 ≤ A < 100</td></tr>
<tr><td>A-</td><td>3,75</td><td>80 ≤ A- < 85</td></tr>
<tr><td>B+</td><td>3,50</td><td>75 ≤ B+ < 80</td></tr>
<tr><td>B</td><td>3,00</td><td>70 ≤ B < 75</td></tr>
<tr><td>B-</td><td>2,75</td><td>65 ≤ B- < 70</td></tr>
<tr><td>C+</td><td>2,50</td><td>60 ≤ C+ < 65</td></tr>
<tr><td>C</td><td>2,00</td><td>55 ≤ C < 60</td></tr>
<tr><td>D</td><td>1,00</td><td>40 ≤ D < 55</td></tr>
<tr><td>E</td><td>0,00</td><td>0 ≤ E < 40</td></tr>
</table></td></tr>
<tr><td>Reading list</td><td>Mitarlis, Azizah U, Amaria, 2016. Organisasi dan Manajemen Laboratorium Pendidikan Kimia . Surabaya: Unesa University Press.
Cahyono, A.B. 2004. Keselamatan Kerja Bahan Kimia di Industri. Yogyakarta: Gajahmada University Press.
Kumpulan Makalah Seminar. 2003. Safety and Waste Analysis in the Laboratory . PT. Merck Tbk. Chemical Division Surabaya.</td></tr>
</table>

Module Descriptions

Module designation	**Physical Education and Fitness** **Pendidikan Jasmani dan Olahraga**
Semester(s) in which the module is taught	4th Semester/Second Year
Person responsible for the module	Dr. Abdul Kholiq, S.Pd. M.Pd. Dr. Yoga Rifqi Azizan, M.Pd.
Language	Bahasa Indonesia (Regular Class) Bahasa Inggris (Internasional Class)
Relation to curriculum	Compulsory course
Teaching methods	Project-Based Learning, Case studies 2 workhours per week (2 x 170 minutes per week)
Workload (incl. contact hours, self-study hours)	1 CU for a bachelor's degree equals 170 minutes (50 minutes face-to-face, 60 minutes structured, 60 minutes independent learning) per week × 14 weeks, excluding mid and end-term exams. = 39.67 work hours per semester = 1.587 ECTS.
Credit points	2 Credit Units (CU) = 3,18 ECTS
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	1. Able to demonstrate religious values and national culture, as well as academic ethics in carrying out professional duties. (Attitude) 2. Work collaboratively in understanding the nature, function, and goals of physical education. (Special Competence) 3. Have social sensitivity in various sports and game activities (Special Competence) 4. Bring a change to a techno-ecopreneurship community through the increasing of the level of physical fitness using various measurement methods, indicators and measuring the ideal body shape based on various methods, sports management and competition systems. (Special Competence)
Content	The nature, function, and goals of physical education, various sports and game activities, physical education programs, the level of physical fitness using various measurement methods, indicators and measuring the ideal body shape based on various methods, sports management and competition systems.
Examination forms	Essay and Oral Presentation.

Study and examination requirements	**Study and Examination Requirements/Assessment:** 1. Individual Assignment: Case analysis report 2. Group Case Study and Discussion 3. Documentation and Presentation of Case Study Findings **Assessment Recap (Case Study-Oriented):** 1. Participatory Activities / Case Study Analysis: 52,5% 2. Project / Product Assessment: 25% 3. Portfolio: 7,5% 4. Test (Essay): 15% Total: 100%
Reading list	1. Physical Education for Lifelong Fitness – American Alliance for Health, Physical Education, Recreation and Dance (AAHPERD). 2. Fitness & Wellness – Werner W.K. Hoeger & Sharon A. Hoeger. 3. Concepts of Physical Fitness – Charles B. Corbin et al. 4. Foundations of Sport and Exercise Psychology – Robert S. Weinberg & Daniel Gould. 5. World Health Organization (2020). *WHO Guidelines on Physical Activity and Sedentary Behaviour.* 6. Kementerian Pemuda dan Olahraga Republik Indonesia. Pedoman Pembinaan dan Manajemen Olahraga. 7. Relevant journal articles (Scopus / SINTA indexed) on physical fitness assessment, sports management, and physical education innovation.

Module Descriptions

Module designation	**School Chemistry**
Semester(s) in which the module is taught	4th/Second Year
Person responsible for the module	Dr. Dian Novita, S.T., M.Pd.,
Language	Bahasa Indonesia (Regular Class) Bahasa Inggris (Internasional Class)
Relation to curriculum	Compulsory course
Teaching methods	Project-Based Learning, 2 workhours per week (2 x 170 minutes per week)
Workload (incl. contact hours, self-study hours)	1 CU for a bachelor's degree equals 170 minutes (50 minutes face-to-face, 60 minutes structured, 60 minutes independent learning) per week × 14 weeks, excluding mid and end-term exams. = 39.67 work hours per semester = 1.587 ECTS.
Credit points	2 Credit Units (CU) = 3,18 ECTS
Required and recommended prerequisites for joining the module	Basic Chemistry, Basic of Education
Module objectives/intended learning outcomes	Upon successful completion of this module, students are expected to: 1. Analyzing the fundamental principles of chemistry at junior high, senior high, and vocational high school levels in accordance with the applicable curriculum, covering both content depth and breadth. 2. Designing solutions to common and simple science and technology (IPTEKS) problems in chemistry through the application of knowledge about chemistry materials at junior high, senior high, and vocational high school levels in accordance with the curriculum, covering content depth and breadth as well as relevant technology. 3. Integrating learning resources and ICT-based learning media to understand chemistry concepts. 4. Evaluating and making decisions regarding the relationship between fundamental chemistry concepts and laboratory activities, research findings, and the presence of chemistry in daily life, accompanied by responsible professional attitudes in their field of expertise independently.

Content	Study of chemistry materials at junior high, senior high, and vocational high school levels in accordance with the applicable curriculum, with emphasis on both content depth and breadth. Students actively engage in project-based learning activities, including analyzing common misconceptions or conceptual errors in chemistry, reviewing scientific literature and educational journals, and proposing solutions to improve students' understanding of chemistry concepts. Learning is facilitated through discussions, Q&A sessions, group assignments, and ICT-based tools, with emphasis on collaboration, reflection, and documentation of project outcomes.
Examination forms	Essay and Oral Presentation
Study and examination requirements	Study and Examination Requirements/Forms of Examination: 1. Individual assignments (literature review, analysis) 2. Group assignments / project work (identifying misconceptions, proposing solutions) 3. Discussions and Q&A participation 4. Presentations and project documentation Assessment Recap (Project-Based Learning): 1. Participatory Activities: 27% 2. Project/Product Assessment: 53% 3. Practice/Performance: 20% Total: 100%
Reading list	1. Rusmini. (2021). The Diagnosis of Misconception on The Concept of Acid-Base Theory in Prospective Teacher Students Used a Three-Tier Test.In *Journal of Physics: Conference Series* (Vol. 1899, No. 1, p. 012061). IOP Publishing. DOI: 10.1088/1742-6596/1899/1/012061 2. Novita, D., Suyono, & Suyatno. (2024). Dynamic equilibrium: Identification of initial conceptions and misconceptions on prospective teachers. In *AIP Conference Proceedings* (Vol. 3116, No. 1, p. 060044). AIP Publishing LLC. DOI: 10.1063/5.0210463 3. Brady, J. E., Jespersen, N. D., & Hyslop, A. (2014). *Chemistry.* USA: John Wiley & Sons Limited. 4. Duit, R., Treagust, D. F. (2003). *Conceptual Change: A Powerful Framework for Improving Science Teaching and Learning.* International Journal of Science Education, 25(6), 671–688.\ 5. Brady, J. E. (1990). *General Chemistry: Principles and Structure.* USA: John Wiley & Sons Limited. 6. Dingrando, L., Gregg, K. V., Hainen, N., & Wistrom, C. (1990). *Chemistry: Matter & Change, Student Edition (Glencoe Chemistry), 2nd Edition.* USA: John Wiley & Sons Limited.

COMPULSORY COURSE
5th SEMESTER

MODULE DESCRIPTION

Module designation	**Philosophy of Science**
Semester(s) in which the module is taught	5th/Third Year
Person responsible for the module	Prof. Dr. Suyono, M.Pd.
Language	Bahasa Indonesia (Regular Class) English (Internasional Class)
Relation to curriculum	Compulsory Course
Teaching methods	Case Method
Workload:	2 x 50 minutes lectures, 2 x 60 minutes structured activity, 2 x 60 minutes individual activity, 14 weeks per semester, 79 total hours per semester ~ 3.18 ECTS
Credit points:	2 CU = 2 x 1.59 = 3.18 ECTS
Requirements according to the examination regulations	Students attend at least 75% of lectures.
Recommended prerequisites	-
Module objectives/ Intended Learning Outcomes	Students are able to: 1. apply logical, critical, systematic, and innovative thinking in the context of natural science development or implementation (especially chemistry), 2. reason correctly and comprehensively (in-depth and broadly) in gaining scientific understanding, 3. possess knowledge in comprehensively defining natural science, classifying scientific products, developing concepts, understanding scientific methods, distinguishing schools of thought within science, developing syllogisms, and demonstrating the role of scientific tools in scientific development. 4. recognizing the weaknesses of knowledge and recognizing the greatness of God, thus becoming wise in developing and applying knowledge.
Content:	1. Thought in science. 2. Philosophical questions of science (ontology, epistemology, and axiology). 3. The role of tools of science 4. Scientific components (scientific products, scientific methods, and scientific attitudes) in the natural sciences (especially chemistry), as well as their implementation in religious life.
Study and examination requirements and forms of examination	Students are considered to be competent and pass if at least get 68.

<table>
<tr>
<td></td>
<td>Assessment Recap (Case Method):
<table>
<tr><th>Assessment Type</th><th>Weight (%)</th></tr>
<tr><td>Participatory Activities</td><td>57,5%</td></tr>
<tr><td>Project Outcome Assessment/Product Assessment</td><td>5%</td></tr>
<tr><td>Portfolio Assessment</td><td>17,5%</td></tr>
<tr><td>Practical Assessment</td><td>2,5%</td></tr>
<tr><td>Practical/Performance</td><td>2,5%</td></tr>
<tr><td>Test</td><td>15%</td></tr>
<tr><td>TOTAL</td><td>100%</td></tr>
</table>

Grading Index:
A = 85–100
A- = 80–84
B+ = 75–79
B = 70–74
B- = 65–69
C+ = 60–64
C = 55–59
D = 40–54
E = 0–39</td>
</tr>
<tr>
<td>Reading list</td>
<td>

1. McLelland, Christine V. 2006. The Nature of Science and The Scientific Method. USA: The Geological Society of America.
2. Dane, F.C. 2010. Evaluating Research: Methodology for People Who Need to Read Research (Chapter 2: The Scientific Approach). California: SAGE Publication, Inc.
3. Herron, J.D. et al. 1977. Problems Associated with Concept Analysis. Science Education 61(2). P. 185-199.
4. Materi Dasar Pendidikan Program Akta Mengajar V. 1985. Buku IA Filsafat Ilmu. Jakarta: Departemen Pendidikan dan Kebudayaan, Universitas Terbuka.
5. Bunge, Mario. 2007. Philosophy of Science from Explanation to Justification. London: Transaction Publishers.
6. Suriasumantri, Jujun S., 2013, Filsafat ilmu: sebuah pengantar populer, Sinar Harapan
7. Camarinha-Matos, Luis M. Tanpa Tahun. Scientific Research, Methodologies and Techniques. Nova School of Science and Technology.
8. Materi Dasar Pendidikan Program Akta Mengajar V. 1985. Buku IA Filsafat Ilmu. Jakarta: Departemen Pendidikan dan Kebudayaan, Universitas Terbuka.
9. Soelaiman, Darwis A. 2019. Filsafat Ilmu Pengetahuan Pespektif Barat dan Islam

</td>
</tr>
</table>

Module Descriptions

Module designation	**Entrepreneurship**
Semester(s) in which the module is taught	5th/Third Year
Person responsible for the module	Dr. Rusly Hidayah, M.Pd.
Language	Bahasa Indonesia (Regular Class) Bahasa Inggris (Internasional Class)
Relation to curriculum	Elective course
Teaching methods	Project-Based Learning, 2 workhours per week (2 x 170 minutes per week)
Workload (incl. contact hours, self-study hours)	1 CU for a bachelor's degree equals 170 minutes (50 minutes face-to-face, 60 minutes structured, 60 minutes independent learning) per week × 14 weeks, excluding mid and end-term exams. = 39.67 work hours per semester = 1.587 ECTS.
Credit points	2 Credit Units (CU) = 3,18 ECTS
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	Upon successful completion of this module, students are expected to: 1. Demonstrate a resilient, collaborative, adaptive, innovative, inclusive, lifelong learning, and entrepreneurial character 2. Develop yourself sustainably and collaborate. 3. Able to make decisions based on data/information in order to complete tasks that are their responsibility and evaluate performance, both individually and in groups, and possess an environmentally conscious edu-ecopreneurship spirit.
Content	A study of the meaning of entrepreneurship, selection of business types, production, marketing, partnerships and financial management.
Examination forms	Essay and Oral Presentation
Study and examination requirements	Study and Examination Requirements/Forms of Examination: 1. Individual assignments (literature review, analysis) 2. Group assignments / project work (identifying misconceptions, proposing solutions) 3. Discussions and Q&A participation 4. Presentations and project documentation Assessment Recap (Project-Based Learning): 1. Participatory Activities: 27% 2. Project/Product Assessment: 53% 3. Practice/Performance: 20% Total: 100%

Reading list	1. Tim Kewirausahaan. 2016. Kewirausahaan. Unipress: Unesa. 2. Tim. 2013. Modul Pembelajaran Kewirausahaan. Drjen Pembelajaran dan Kemahasiswaan. Ditjen Pendidikan Tinggi. Kementrian Pendidikan dan Kebudayaan 3. Suryana. 2003. Kewirausahaan. Jakarta : Salemba Empat 4. Pelatihan Pembuatan Hand Sanitizer Berbasis Bahan Alam Ramah Lingkungan di Wilayah Loceret Kabupaten Nganjuk, 2022

COMPULSORY COURSE
6th SEMESTER

MODULE DESCRIPTION

Module designation	**Teaching Internship: Program Design**
Semester(s) in which the module is taught	6th/Third Year
Person responsible for the module	Prof. Dr. Utiya Azizah, M.Pd.
Language	Indonesian (Regular Class) English (International Class)
Relation to curriculum	Compulsory Course
Teaching methods	Project-based Learning
Workload:	2 x 50 minutes lectures, 2 x 60 minutes structured activity, 2 x 60 minutes individual activity, 14 weeks per semester, 79 total hours per semester ~ 3.18 ECTS
Credit points:	2 CU = 2 x 1.59 = 3.18 ECTS
Requirements according to the examination regulations	Students attend at least 75% of lectures.
Recommended prerequisites	-
Module objectives/ Intended Learning Outcomes	After completing this module, students are able to: 1. Explain the concepts, objectives, and forms of Teaching Internship and Academic Mobility programs. 2. Analyse partner needs and contextual requirements for internship-based learning activities. 3. Design a structured, feasible, and impact-oriented teaching internship program. 4. Develop a comprehensive program proposal including background, objectives, methods, timeline, and evaluation plan. 5. Present and justify the designed program in a professional and academic manner.
Content:	The module covers the following main topics: 1. Overview of Teaching Internship and Academic Mobility Programs 2. Principles of Program Planning and Management 3. Needs Analysis and Partner Mapping 4. Proposal Development for Teaching Internship Programs 5. Project Design and Impact Measurement 6. Program Evaluation and Reporting 7. Presentation and Reflection on Program Design The learning emphasis is placed on **project-based learning**, with students developing a **realistic and measurable internship program proposal** aligned with partner and institutional expectations.

<table>
<tr>
<td>Study and examination requirements and forms of examination</td>
<td>Students are considered to be competent and pass if at least get 68.

Assessment Recap (Project-Based Learning):
<table>
<tr><th>Assessment Type</th><th>Weight (%)</th></tr>
<tr><td>Participation and discussion</td><td>10%</td></tr>
<tr><td>Presentation</td><td>10%</td></tr>
<tr><td>Project/Assignment (Program design)</td><td>55%</td></tr>
<tr><td>Final program proposal</td><td>25%</td></tr>
<tr><td>TOTAL</td><td>100%</td></tr>
</table>

Grading Index:
A = 85–100
A- = 80–84
B+ = 75–79
B = 70–74
B- = 65–69
C+ = 60–64
C = 55–59
D = 40–54
E = 0–39</td>
</tr>
<tr>
<td>Reading list</td>
<td>1. Biggs, J., & Tang, C. (2022). Teaching for Quality Learning at University. Open University Press.
2. Kolmos, A., de Graaff, E., & Du, X. (2021). Diversity of Problem-Based Learning. Brill.
3. Ministry of Education, Culture, Research, and Technology. (2023). Guidelines for Academic Mobility and Internship Programs.</td>
</tr>
</table>

MODULE DESCRIPTION

Module designation	**Teaching Internship: Program Evaluation**
Semester(s) in which the module is taught	6th/Third Year
Person responsible for the module	Prof. Dr. Utiya Azizah, M.Pd.
Language	Indonesian (Regular Class) English (International Class)
Relation to curriculum	Compulsory Course
Teaching methods	Project-based Learning
Workload:	2 x 50 minutes lectures, 2 x 60 minutes structured activity, 2 x 60 minutes individual activity, 14 weeks per semester, 79 total hours per semester ~ 3.18 ECTS
Credit points:	2 CU = 2 x 1.59 = 3.18 ECTS
Requirements according to the examination regulations	Students attend at least 75% of lectures.
Recommended prerequisites	-
Module objectives/ Intended Learning Outcomes	After completing this module, students are able to: 1. Analyse the implementation process of the teaching internship program based on predefined objectives and indicators. 2. Evaluate the academic, professional, and social impacts of the internship project on partner institutions, communities, and personal development. 3. Develop a systematic, data-based, and reflective final internship report aligned with institutional guidelines. 4. Design sustainability-oriented follow-up plans for internship projects. 5. Present and communicate internship outcomes professionally using effective academic and visual communication strategies.
Content:	The module covers the following main topics: 1. Principles and objectives of teaching internship evaluation 2. Reflective practice and evidence-based evaluation 3. Structure and systematics of internship reports 4. Academic writing techniques for professional reporting 5. Evaluation of internship impact and partner feedback 6. Sustainability and follow-up planning 7. Professional presentation of internship outcomes

<table>
<tr><td></td><td>The module emphasizes reflection, impact evaluation, and professional reporting, ensuring alignment with outcome-based education principles.</td></tr>
<tr><td>Study and examination requirements and forms of examination</td><td>Students are considered to be competent and pass if at least get 68.

Assessment Recap (Project-Based Learning):
<table><tr><th>Assessment Type</th><th>Weight (%)</th></tr><tr><td>Final internship report</td><td>30%</td></tr><tr><td>Partner evaluation</td><td>20%</td></tr><tr><td>Internship project output</td><td>25%</td></tr><tr><td>Sustainability & follow-up plan</td><td>10%</td></tr><tr><td>Final presentation</td><td>10%</td></tr><tr><td>Activity logbook</td><td>5%</td></tr><tr><td>TOTAL</td><td>100%</td></tr></table>Grading Index:
A = 85–100
A- = 80–84
B+ = 75–79
B = 70–74
B- = 65–69
C+ = 60–64
C = 55–59
D = 40–54
E = 0–39</td></tr>
<tr><td>Reading list</td><td>Fitzpatrick, J. L., Sanders, J. R., & Worthen, B. R. (2022). Program Evaluation: Alternative Approaches and Practical Guidelines. Pearson.
Rossi, P. H., Lipsey, M. W., & Freeman, H. E. (2021). Evaluation: A Systematic Approach. Sage Publications.
Ministry of Education, Culture, Research, and Technology. (2023). Guidelines for Academic Mobility and Internship Programs.</td></tr>
</table>

COMPULSORY COURSE
7th SEMESTER

Module Descriptions

Module designation	**Elemental Chemistry**
Semester(s) in which the module is taught	7th semester/ 3th year
Person responsible for the module	Prof. Dr. Achmad Lutfi, M.Pd.
Language	Bahasa Indonesia (Regular Class) Bahasa Inggris (Internasional Class)
Relation to curriculum	Compulsory course
Teaching methods	Case Method 3 workhours per week (3 x 170 minutes per week)
Workload (incl. contact hours, self-study hours)	1 CU for a bachelor's degree equals 170 minutes (50 minutes face-to-face, 60 minutes structured, 60 minutes independent learning) per week × 14 weeks, excluding mid and end-term exams. = 39.67 work hours per semester = 1.587 ECTS.
Credit points	3 Credit Units (CU) = 4.761 ECTS
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	1. Students are able to analyze the abundance, properties, benefits, and periodic trends of main and transition group elements logically, critically, systematically, and creatively through discussions, case studies, and class presentations, using coherent arguments and supported by relevant scientific sources. 2. Students are able to analyze theoretical concepts regarding atomic structure, reaction dynamics, bond energies, and the basic principles of analysis, synthesis, and characterization of main and transition group elements based on literature and observations from practical work with a minimum accuracy of 75%, according to the assessment criteria. 3. Students are able to apply OHS principles, operate laboratory equipment, and conduct practical work on the identification and utilization of elements and their compounds appropriately during practical work, consistently adhering to safety procedures and without fatal errors. 4. Students are able to design and implement mini-research, prepare scientific reports, and communicate the results of studies and practical work orally and in writing, utilizing information technology through project assignments and final presentations, with a minimum quality rating of "Good" according to the assessment rubric. 5. Analyze the application of elemental chemistry concepts in industrial processes through field visits and prepare systematic observation reports.

Content	A study of the abundance, properties, methods of obtaining, benefits, and identification of elements and their compounds from the main and transition groups (first, second, and third series, block D). Learning is conducted through discussions, presentations, practical work, and project assignments, enabling students to think critically and creatively, understand theoretical concepts, apply OHS principles and the use of laboratory instruments, and convey ideas orally and in writing using information technology.
Examination forms	Essay and Oral Presentation
Study and examination requirements	**Study and Examination Requirements/Assessment:** 1. Individual assignments (case analysis reports) 2. Group case studies and discussions 3. Documentation and presentation of case study findings **Assessment Recap (Case Study-Oriented):** 1. Participatory Activities/Case Study Analysis: 52.5% 2. Project: 3% 3. Portfolio: 7,5% 4. Practical: 21% 5. Test: 16% Total: 100%
Reading list	1. Lee, J.D. 1991. Concise Inorganic Chemistry. Four Edition. London: Chapman & Hall. 2. Madan, R.D. 1997. Modern Inorganic Chemistry. New Delhi: S. Chand and Company LDT. 3. Sugiarto, B. dkk. 1997. Kimia Anorganik. Surabaya: Unipress IKIP Surabaya. 4. Perry, Dale L. 2011. Handbook of Inorganic Compounds, Second Edition (Hardcover) – May 18, 2011. ISBN-13: 000-1439814619 ISBN-10: 14398146

Module Descriptions

Module designation	**Final Project Proposal**
Semester(s) in which the module is taught	7th/Fourth Year
Person responsible for the module	Prof. Dr. Utiya Azizah, M.Pd.
Language	Bahasa Indonesia (Regular Class) English (Internasional Class)
Relation to curriculum	Compulsory course
Teaching methods	Project-Based Learning, 2 workhours per week (2 x 170 minutes per week)
Workload (incl. contact hours, self-study hours)	1 CU for a bachelor's degree equals 170 minutes (50 minutes face-to-face, 60 minutes structured, 60 minutes independent learning) per week × 14 weeks, excluding mid and end-term exams. = 39.67 work hours per semester = 1.587 ECTS.
Credit points	2 Credit Units (CU) = 3.18 ECTS
Required and recommended prerequisites for joining the module	Research Methodology
Module objectives/intended learning outcomes	Upon successful completion of this course, students are expected to: 1. Identify relevant and contextual problems in chemistry education as a basis for preparing research proposals. 2. Formulate research problems that are focused, specific, and researchable within the context of chemistry education. 3. Formulate research objectives and benefits logically and measurably in accordance with the issues raised. 4. Conduct literature reviews of scientific journals, books, and other credible sources to support the background and theoretical basis of the research. 5. Formulate a theoretical framework relevant to the research topic and focus systematically and critically. 6. Design research methods (type, approach, and design) that are appropriate to the research objectives and problems. 7. Develop research instruments that are valid and reliable according to the approach used. 8. Determine data collection techniques that are appropriate to the research approach and design. 9. Explain the data analysis techniques used accurately and logically. 10. Organize the systematics of a research proposal in accordance with applicable scientific writing conventions. 11. Use precise, standard, and communicative academic language in proposal writing. 12. Use scientific support applications in compiling bibliographies.

	13. Present research proposals with a logical structure, strong argumentation, and effective communication. 14. Receive, respond to, and revise proposals based on input from supervisors and examiners. 15. Demonstrate an attitude of responsibility, honesty, and ethics in preparing and presenting research proposals. 16. Prepare a feasible proposal to be examined in a proposal defense as the initial step in completing the final project.
Content	This course is designed to broaden students' insights into contextual issues in chemistry education, enhancing their ability to organize and present research problems while fostering active participation and organizational skills in conducting academic seminars. The scope of the course encompasses the study of actual problems in chemistry education, synthesized into a comprehensive paper that includes problem identification and formulation, the development of a conceptual framework, critical discussion, and concluding recommendations. Specifically, the course aims to facilitate the development and refinement of final project proposals, the enhancement of presentation and analytical skills, and a deeper understanding of research methodology. Ultimately, this course prepares students to effectively construct, present, and refine research proposals that are academically sound and ready for implementation.
Examination forms	Essay and Presentation
Study and examination requirements	Study and Examination Requirements/Forms of Examination: 1. Individual assignments (literature review, analysis) 2. Discussions 3. Presentations and project documentation Assessment Recap (Project-Based Learning): 1. Participatory Activities: 60% 2. Project/Product Assessment: 40% Total: 100%
Reading list	1. Azahari, A. 1995. Materi Pokok Teknik Penulisan Ilmiah. Jakarta: UniversitasTerbuka. 2. Lindsay, D. 1998. Penuntun Penulisan Ilmiah. Alih Bahasa oleh S.S.Achmadi. Universitas Indonesia Press, Jakarta 3. Yuzal, dkk 2001. Panduan Praktis Seminar. Jakarta: PT RajaGrafindo Persada 4. Tim penyusun buku pedoman penulisan skripsi program sarja strata sati (S-1). 2014.Pedoman Penulisan Skripsi. Surabaya: Unesa University Press. 5. Jones, T., & Roberts, M. (2021). Developing Effective Final Project Proposals: A Guide for Graduate Students. Journal of Academic Writing and Research, 15(3), 212-225 6. Smith, A., & Wilson, P. (2022). Crafting Research Proposals: Best Practices for Final Project Seminars. Educational Research Review, 48(2), 98-110 7. Anderson, K., & Martin, L. (2021). Strategies for Effective Proposal Presentations in Final Project Seminars. Journal of Higher Education Pedagogy, 29(4), 142-155.

	8. Clark, J., & Thompson, M. (2022). Final Project Proposal Seminars: Structuring and Presenting Research Ideas. International Journal of Academic Excellence, 33(5), 187-202. 9. Miller, H., & Green, B. (2021). Peer Review in Final Project Proposal Seminars: Enhancing Feedback and Collaboration. Journal of Educational Collaboration, 27(3), 115-130. 10. Carter, R., & Hayes, S. (2021). Improving Research Proposal Skills: A Practical Guide for Students in Final Project 11. Seminars. Journal of Graduate Education, 30(2), 72-85. 12. Nelson, K., & Fisher, L. (2022). Developing Critical Thinking in Final Project Proposal Seminars. Journal of Critical Pedagogy, 31(2), 50-63. 13. Ferguson, G., & Peterson, R. (2021). Designing Effective Final Project Proposals for Graduate Students: A Seminar Based Approach. Journal of Research Methodology, 40(5),185-198. 14. Wright, S., & Lee, H. (2021). Final Project Proposal Seminars: Bridging Theory and Practice. Journal of Academic Seminar Studies, 22(7), 98-110. 15. Roberts, M., & Gray, T. (2022). Enhancing Final Project Proposal Seminars Through Interactive Feedback. Journal of Higher Learning, 28(8), 130-142. 16. Purnomo, A., Rahmasari, D., & Riyanto, Y. (2024). Implementasi Penelitian Multiple Intelligences (MIR) untuk 17. Meningkatkan Mutu Pembelajaran. Jurnal Penelitian Pendidikan, 5 (3), 2660-2670. 18. Relevance Article(s) from journal that indexed in Scopus, Google Scholar and SINTA

COMPULSORY COURSE
8th SEMESTER

Module Descriptions

Module designation	**Final Project**
Semester(s) in which the module is taught	8th/Fourth Year
Person responsible for the module	Prof. Dr. Utiya Azizah, M.Pd.
Language	Bahasa Indonesia (Regular Class) English (Internasional Class)
Relation to curriculum	Compulsory course
Teaching methods	Project-Based Learning, 4 workhours per week (4 x 170 minutes per week)
Workload (incl. contact hours, self-study hours)	1 CU for a bachelor's degree equals 170 minutes (50 minutes face-to-face, 60 minutes structured, 60 minutes independent learning) per week × 14 weeks, excluding mid and end-term exams. = 39.67 work hours per semester = 1.587 ECTS.
Credit points	4 Credit Units (CU) = 6.36 ECTS
Required and recommended prerequisites for joining the module	Final Project Proposal
Module objectives/intended learning outcomes	Upon successful completion of this course, students are expected to: 1. Formulate and analyze research problems specifically within the field of chemistry education; 2. Utilize diverse information technologies effectively in the preparation of their final project; 3. Organize and manage the development of their final project independently, demonstrating both theoretical and practical application through the project.
Content	The final project course aims to enable students to understand and apply fundamental research concepts. In this assignment, students are directed to prepare a research proposal by examining a background problem, identifying issues, and defining limitations, formulations, and research objectives. This is followed by a literature review, a conceptual framework, and the formulation of preliminary hypotheses. Subsequently, data collection and technical analysis are conducted in alignment with the established problem formulation. Students perform data analysis, explain the findings, draw conclusions, and compile a research report using proper academic writing techniques and ensuring it is free from plagiarism. Once the plagiarism check is cleared, students are scheduled for a final project defense before a board of examiners. By completing a final project course, students demonstrate their ability to conduct structured scientific research and prove they are ready to face professional challenges in their field.

Examination forms	Essay and Presentation
Study and examination requirements	Study and Examination Requirements/Forms of Examination: 1. Individual assignments (literature review, analysis) 2. Discussions 3. Presentations and project documentation Assessment Recap (Project-Based Learning): 1. Project/Product Assessment: 100% Total: 100%
Reading list	1. Universitas Negeri Surabaya. (2014). *Pedoman penulisan skripsi*. 2. Song, H.-Y., Walker, J. A., & Tasuo, J. (2022). *Writing successful scientific papers: A user's guide*. Panmu Education Co. Ltd. 3. Love, G. L. (2021). *Writing and publishing scientific papers: A primer for the non-English speaker*. Open Book Publishers. 4. Belcher, W. L. (2019). *Writing your journal article in twelve weeks: A guide to academic publishing success* (2nd ed.). University of Chicago Press. 5. Thomas, C. G. (2021). *Research methodology and scientific writing*. Springer. 6. Reis, S., & Reis, A. (2013). *How to write your first scientific paper*. https://doi.org/10.1109/IEDEC.2013.6526784 7. Khatri, B. (2022). Writing an effective abstract for a scientific paper. *Nepalese Journal of Development and Rural Studies*, *19*, 1–7. https://doi.org/10.3126/njdrs.v19i01.51910 8. Ayu, F., Anggriani, D., & Nizamuddin. (2023). Improving students' ability in writing scientific papers through process approach. *The International Conference on Education, Social Sciences and Technology (ICESST)*, *2*, 77–86. https://doi.org/10.55606/icesst.v2i1.272 9. Wahyuddin, W., Syafaruddin, & Maharida. (2022). Training on using Mendeley for citations in writing scientific papers for students. *Jurnal Pengabdian Masyarakat Bestari*, *1*, 1063–1072. https://doi.org/10.55927/jpmb.v1i9.2064 10. Klahr, S. (2007). Guidelines for writing a scientific paper: An address to beginners. *Nephrology*, *2*, s230–s234. https://doi.org/10.1111/j.1440-1797.1996.tb00178.x 11. Léane, J., Boudin, F., Dufour, R., & Hernandez, N. (2023). *Text revision in scientific writing assistance: An overview*. 12. Relevance Article(s) from journal that indexed in Scopus, Google Scholar and SINTA

MODULE DESCRIPTIONS

ELECTIVE COURSE FOR EACH SEMESTER

ELECTIVE COURSE
5th SEMESTER

MODULE DESCRIPTION

Module designation	Community Service : Program Evaluation
Semester(s) in which the module is taught	6th/Third Year
Person responsible for the module	Prof. Dr. Utiya Azizah, M.Pd.
Language	Bahasa Indonesia (Regular Class) Bahasa Inggris (Internasional Class)
Relation to curriculum	Compulsory Course
Teaching methods	Project-based
Workload (incl. contact hours, self-study hours)	2 x 50 minutes lectures, 2 x 60 minutes structured activity, 2 x 60 minutes individual activity, 14 weeks per semester, 79 total hours per semester ~ 3.18 ECTS
Credit points	2 CU = 2 x 1.59 = 3.18 ECTS
Required and recommended prerequisites for joining the module	Students attend at least 75% of lectures.
Recommended prerequisites	-
Module objectives/ Intended Learning Outcomes	After completing this module, students are able to: 1. Analyse the implementation process of the community service program based on predefined objectives and indicators. 2. Evaluate the academic, professional, and social impacts of the community service project on partner institutions, communities, and personal development. 3. Develop a systematic, data-based, and reflective final community service report aligned with institutional guidelines. 4. Design sustainability-oriented follow-up plans for community service projects. 5. Present and communicate Community service outcomes professionally using effective academic and visual communication strategies.
Content:	The module covers the following main topics: 1. Principles and objectives of community service evaluation 2. Reflective practice and evidence-based evaluation 3. Structure and systematics of community service reports 4. Academic writing techniques for professional reporting

<table>
<tr><td></td><td>5. Evaluation of community service impact and partner feedback
6. Sustainability and follow-up planning
7. Professional presentation of community service outcomes
The module emphasizes reflection, impact evaluation, and professional reporting, ensuring alignment with outcome-based education principles.</td></tr>
<tr><td>Study and examination requirements and forms of examination</td><td>Students are considered to be competent and pass if at least get 68.

Assessment Recap (Project-Based Learning):
<table>
<tr><th>Assessment Type</th><th>Weight (%)</th></tr>
<tr><td>Final internship report</td><td>30%</td></tr>
<tr><td>Partner evaluation</td><td>20%</td></tr>
<tr><td>Internship project output</td><td>25%</td></tr>
<tr><td>Sustainability & follow-up plan</td><td>10%</td></tr>
<tr><td>Final presentation</td><td>10%</td></tr>
<tr><td>Activity logbook</td><td>5%</td></tr>
<tr><td>TOTAL</td><td>100%</td></tr>
</table>
Grading Index:
A = 85–100
A- = 80–84
B+ = 75–79
B = 70–74
B- = 65–69
C+ = 60–64
C = 55–59
D = 40–54
E = 0–39</td></tr>
<tr><td>Reading list</td><td>1. Fitzpatrick, J. L., Sanders, J. R., & Worthen, B. R. (2022). Program Evaluation: Alternative Approaches and Practical Guidelines. Pearson.
2. Rossi, P. H., Lipsey, M. W., & Freeman, H. E. (2021). Evaluation: A Systematic Approach. Sage Publications.
3. Ministry of Education, Culture, Research, and Technology. (2023). Guidelines for Academic Mobility and Internship Programs.</td></tr>
</table>

MODULE DESCRIPTION

Module designation	**Community Service: Program Planning**
Semester(s) in which the module is taught	6th/Third Year
Person responsible for the module	Prof. Dr. Utiya Azizah, M.Pd.
Language	Perencanaan Program
Relation to curriculum	Compulsory Course
Teaching methods	Project-based
Workload (incl. contact hours, self-study hours)	2 x 50 minutes lectures, 2 x 60 minutes structured activity, 2 x 60 minutes individual activity, 14 weeks per semester, 79 total hours per semester ~ 3.18 ECTS
Credit points	2 CU = 2 x 1.59 = 3.18 ECTS
Required and recommended prerequisites for joining the module	Students attend at least 75% of lectures.
Module objectives/intended learning outcomes	After completing this module, students are able to: 1. Explain the concepts, objectives, and forms of Community Service and Academic Mobility programs. 2. Analyse partner needs and contextual requirements for internship-based learning activities. 3. Design a structured, feasible, and impact-oriented community service program. 4. Develop a comprehensive program proposal including background, objectives, methods, timeline, and evaluation plan. 5. Present and justify the designed program in a professional and academic manner.
Content:	The module covers the following main topics: 1. Overview of Community Service and Academic Mobility Programs 2. Principles of Program Planning and Management 3. Needs Analysis and Partner Mapping 4. Proposal Development for Coomunity Service Programs 5. Project Design and Impact Measurement 6. Program Evaluation and Reporting 7. Presentation and Reflection on Program Design The learning emphasis is placed on **project-based learning**, with students developing a **realistic and measurable internship program proposal** aligned with partner and institutional expectations.

<table>
<tr>
<td>Study and examination requirements and forms of examination</td>
<td>Students are considered to be competent and pass if at least get 68.

Assessment Recap (Project-Based Learning):
<table>
<tr><th>Assessment Type</th><th>Weight (%)</th></tr>
<tr><td>Participation and discussion</td><td>10%</td></tr>
<tr><td>Presentation</td><td>10%</td></tr>
<tr><td>Project/Assignment (Program design)</td><td>55%</td></tr>
<tr><td>Final program proposal</td><td>25%</td></tr>
<tr><td>TOTAL</td><td>100%</td></tr>
</table>
Grading Index:
A = 85–100
A- = 80–84
B+ = 75–79
B = 70–74
B- = 65–69
C+ = 60–64
C = 55–59
D = 40–54
E = 0–39</td>
</tr>
<tr>
<td>Reading list</td>
<td>1. Kolb, D. A. (2015). Experiential Learning: Experience as the Source of Learning and Development (2nd ed.). Upper Saddle River, NJ: Pearson Education.
2. Cloete, E., & Veda, G. (Eds.). (2024). Community-led Development in Practice. London: Routledge
3. Ministry of Education, Culture, Research, and Technology. (2023). Guidelines for Academic Mobility and Internship Programs.</td>
</tr>
</table>

Module Descriptions

Module designation	**Critical and Creative Thinking**
Semester(s) in which the module is taught	5th/Third Year
Person responsible for the module	Prof. Dr. Utiya Azizah, M.Pd.
Language	Bahasa Indonesia (Regular Class) Bahasa Inggris (Internasional Class)
Relation to curriculum	Elective course
Teaching methods	Project-Based Learning, 2 workhours per week (2 x 170 minutes per week)
Workload (incl. contact hours, self-study hours)	1 CU for a bachelor's degree equals 170 minutes (50 minutes face-to-face, 60 minutes structured, 60 minutes independent learning) per week × 14 weeks, excluding mid and end-term exams. = 39.67 work hours per semester = 1.587 ECTS.
Credit points	2 Credit Units (CU) = 3.18 ECTS
Required and recommended prerequisites for joining the module	
Module objectives/intended learning outcomes	1. Students are able to analyze complex problems using critical thinking skills to develop effectively solution 2. Students are able to apply creative thinking techniques to generate innovative ideas and approaches in various contexts. 3. Students are able to evaluate the validity and reliability of information from various sources to support decision making process.
Content	The Creative and Critical Thinking course is designed to develop students' ability to think creatively and critically. In this course, students are taught various techniques and strategies to generate innovative ideas and evaluate arguments objectively. Learning involves group discussions, case studies, and challenging problem-solving exercises, which allow students to practice and apply thinking skills in various contexts. In addition, students are also introduced to various theories and concepts that underlie the creative and critical thinking process, which are useful for improving analytical and decision-making skills. In this course, students are encouraged to explore different ways of thinking, identify assumptions, and question commonly accepted viewpoints. Through projects and presentations, students can demonstrate their ability to apply critical thinking in real situations, while developing confidence in conveying their ideas. With mastery of these skills, students are expected to be able to adapt quickly in a dynamic and

	complex environment, and become more independent and innovative thinkers in facing challenges in the professional world.
Examination forms	Essay, presentation and practice/performance
Study and examination requirements	Study and Examination Requirements/Forms of Examination: 1. Individual assignments (literature review, analysis) 2. Group assignments / project work 3. Discussions and Q&A participation 4. Presentations and project documentation Assessment Recap (Project-Based Learning): 1. Participatory Activities: 50% 2. Practice/Performance: 50% Total: 100%
Reading list	1. Baer, J. (2021). *Creativity and divergent thinking: A task-specific approach*. Routledge. 2. Cropley, D. H. (2021). *Creativity in engineering: Novel solutions to complex problems*. Academic Press. 3. Runco, M. A. (2020). *Theories of creativity*. Sage Publications. 4. Nickerson, R. S. (2021). *Enhancing creativity: A guide to cognitive approaches*. Taylor & Francis. 5. Robinson, K. (2022). *Out of our minds: The power of being creative*. Capstone. 6. Beghetto, R. A. (2021). *Teaching for creativity: Ideas in action*. Routledge. 7. Kaufman, J. C. (2020). *Creativity 101* (2nd ed.). Springer Publishing. 8. Glăveanu, V. P. (2020). *The possible: A sociocultural theory of creativity*. Oxford University Press. 9. Sternberg, R. J., & Halpern, D. F. (2022). *Critical thinking in psychology and everyday life*. Cambridge University Press. 10. Levitin, D. J. (2020). *A field guide to lies: Critical thinking in the information age*. Penguin Books. 11. Paul, R., & Elder, L. (2020). *Critical thinking: Tools for taking charge of your learning and your life* (3rd ed.). Pearson. 12. Facione, P. A. (2020). *Critical thinking: A statement of expert consensus for purposes of educational assessment and instruction*. The Critical Thinking Community. 13. Gelder, T. (2021). *Creative and critical thinking: Skills for the 21st century*. Wiley. 14. Ennis, R. H. (2021). *Critical thinking: A streamlined introduction*. Cambridge University Press. 15. Lipman, M. (2020). *Thinking in education* (2nd ed.). Cambridge University Press. 16. Sternberg, R. J. (2020). *Thinking styles* (2nd ed.). Cambridge University Press. 17. Paul, R., & Elder, L. (2021). *The miniature guide to critical thinking concepts and tools*. Foundation for Critical Thinking. 18. Csikszentmihalyi, M. (2020). *Creativity: The psychology of discovery and invention* (Rev. ed.). HarperCollins. 19. Cropley, A. (2022). *Creativity in education & learning: A guide for teachers and educators*. Routledge.

	20. Runco, M. A., & Acar, S. (2021). *Divergent thinking as an indicator of creativity*. Oxford University Press. 21. Norris, S. P., & Ennis, R. H. (2020). Evaluating critical thinking. *Teaching Philosophy*, *43*(3), 1–15. 22. Johnson, D. W., & Johnson, F. P. (2020). *Joining together: Group theory and group skills* (13th ed.). Pearson. 23. De Bono, E. (2021). *Six thinking hats* (Rev. ed.). Back Bay Books. 24. Bailin, S., & Siegel, H. (2021). *Critical thinking and education: A scholarly review*. Cambridge University Press. 25. Root-Bernstein, R., & Root-Bernstein, M. (2022). *Sparks of genius: The 13 thinking tools of the world's most creative people* (2nd ed.). Houghton Mifflin Harcourt.

Module Descriptions

Module designation	**Communication Skills**
Semester(s) in which the module is taught	5th/Third Year
Person responsible for the module	Prof. Dr. Utiya Azizah, M.Pd.
Language	Bahasa Indonesia (Regular Class) Bahasa Inggris (Internasional Class)
Relation to curriculum	Elective course
Teaching methods	Project-Based Learning, 2 workhours per week (2 x 170 minutes per week)
Workload (incl. contact hours, self-study hours)	1 CU for a bachelor's degree equals 170 minutes (50 minutes face-to-face, 60 minutes structured, 60 minutes independent learning) per week × 14 weeks, excluding mid and end-term exams. = 39.67 work hours per semester = 1.587 ECTS.
Credit points	2 Credit Units (CU) = 3.18 ECTS
Required and recommended prerequisites for joining the module	
Module objectives/intended learning outcomes	1. Students are able to identify, Analyze, and explain fundamental communication theories related to interpersonal and group communication processes 2. Students are able to evaluate and develop effective speaking and listening skills in various contexts, both formal and informal. 3. Students are able to apply persuasive communication and ethical negotiation techniques in professional and academic situations. 4. Students are able to organize and utilize information and communication technologies to convey ideas creatively and effectively, both orally and in writing.
Content	Communication Skills course is designed to develop students' communication skills in various contexts, both verbally and in writing. In this course, students will learn various effective communication techniques, including how to convey ideas clearly, listen actively, and provide constructive feedback. In addition to theory, this course also emphasizes practice through group discussions, presentations, and public speaking exercises. Thus, students not only learn about communication theory, but also gain practical skills that can be applied in academic and professional environments. In addition to basic communication skills, this course also emphasizes the importance of interpersonal communication and communication in a team context. Students will learn how to build positive and productive relationships with colleagues and how

	to manage conflicts that may arise. Through reflective activities and self-evaluation, students will have the opportunity to identify strengths and areas that need improvement in their communication skills. With a comprehensive approach, Communication Skills course aims to prepare students to become effective and professional communicators who are ready to face challenges in the world of work.
Examination forms	Essay, presentation and practice/performance
Study and examination requirements	Study and Examination Requirements/Forms of Examination: 1. Individual assignments (literature review, analysis) 2. Group assignments / project work 3. Discussions and Q&A participation 4. Presentations and project documentation Assessment Recap (Project-Based Learning): 1. Participatory Activities: 50% 2. Practice/Performance: 50% Total: 100%
Reading list	1. Chaffey, D. (2022). *Digital marketing: Strategy, implementation, and practice* (8th ed.). Pearson. 2. Carroll, B. (2021). *Writing for digital media* (3rd ed.). Routledge. 3. Carnegie, D., & Associates. (2020). *Effective communication skills: Essential skills for success in work and life*. Simon & Schuster. 4. Davis, D. (2020). *Creative strategy and the business of design*. Peachpit Press. 5. Guzman, A. (Ed.). (2021). *Communication in the age of virtual reality*. Routledge. 6. Lipschultz, J. H. (2022). *Social media communication: Concepts, practices, data, law, and ethics* (3rd ed.). Routledge. 7. Jones, B. (2021). *Communicating data with Tableau*. O'Reilly Media. 8. Madigan, M. T. (2020). *Digital communication: Technologies, concepts, and applications*. McGraw-Hill. 9. Abel, S., & Bailie, R. (2020). *The language of content strategy*. XML Press. 10. Winters, S. (2020). *Content design*. Content Design London. 11. Mehrabian, A. (2020). *Nonverbal communication* (Revised ed.). Routledge. 12. Goleman, D. (2020). *Emotional intelligence 2.0*. TalentSmart. 13. Cohen, S., & Austin, S. (2021). *Essential communication skills for healthcare professionals*. Springer. 14. DeVito, J. A. (2021). *The interpersonal communication book* (15th ed.). Pearson. 15. Garnett, R., & Payne, E. (2020). *Strategic communication: A critical introduction*. Palgrave Macmillan. 16. Hargie, O. D. W. (2020). *Skilled interpersonal communication: Research, theory, and practice* (6th ed.). Routledge.

Module Descriptions

Module designation	**Empathy and Emotional Intelligence**
Semester(s) in which the module is taught	5th/Third Year
Person responsible for the module	Prof. Dr. Utiya Azizah, M.Pd.
Language	Bahasa Indonesia (Regular Class) Bahasa Inggris (Internasional Class)
Relation to curriculum	Elective course
Teaching methods	Project-Based Learning, 2 workhours per week (2 x 170 minutes per week)
Workload (incl. contact hours, self-study hours)	1 CU for a bachelor's degree equals 170 minutes (50 minutes face-to-face, 60 minutes structured, 60 minutes independent learning) per week × 14 weeks, excluding mid and end-term exams. = 39.67 work hours per semester = 1.587 ECTS.
Credit points	2 Credit Units (CU) = 3.18 ECTS
Required and recommended prerequisites for joining the module	
Module objectives/intended learning outcomes	Upon successful completion of this module, students are expected to: 1. Analyze emotional responses in yourself and others, demonstrate a deeper understanding of emotional awareness. 2. Evaluate empathy in a variety of interpersonal and professional contexts, fostering effective communication and conflict resolution 3. Analyzes one's own emotions and recognizes emotions others, contributing to a more harmonious and productive work environment
Content	The Empathy and Emotional Intelligence course aims to equip students with a deep understanding of the importance of empathy and emotional intelligence in interpersonal and professional contexts. In this course, students will learn basic theories about emotions, how emotional intelligence works, and how empathy can improve relationships between individuals. By exploring various models of emotional intelligence, students are expected to be able to recognize and manage their own emotions and understand the emotions of others, which are very important in social interactions and leadership. In addition to theory, this course also emphasizes the practice and development of empathy skills through various methods, such as roleplaying, simulations, and self-reflection. Students will be invited to participate in activities that facilitate a deeper understanding of the experiences of others and how

	emotions influence behavior. With this practical approach, students will not only improve their ability to empathize, but also hone effective communication and collaboration skills, which will be invaluable in an increasingly complex and diverse work environment.
Examination forms	Essay, presentation, and practice/performance
Study and examination requirements	Study and Examination Requirements/Forms of Examination: 1. Individual assignments (literature review, analysis) 2. Group assignments / project work 3. Discussions and Q&A participation 4. Presentations and project documentation Assessment Recap (Project-Based Learning): 1. Participatory Activities: 50% 2. Practice/Performance: 50% Total: 100%
Reading list	1. Boyatzis, R. E., & Goleman, D. (2019). *Emotional intelligence: Why it can matter more than IQ*. Bloomsbury Publishing. 2. Grant, A. (2021). *Think again: The power of knowing what you don't know*. Viking. 3. Bradberry, T., & Greaves, J. (2019). *Emotional intelligence 2.0*. TalentSmart. 4. Siegel, D. J. (2020). *The developing mind: How relationships and the brain interact to shape who we are* (3rd ed.). Guilford Press. 5. Neff, K., & Germer, C. (2021). *The mindful self-compassion workbook: A proven way to accept yourself, build inner strength, and thrive*. Guilford Press. 6. Jennings, P. A. (2021). *The trauma-sensitive classroom: Building resilience with compassionate teaching*. W. W. Norton & Company. 7. David, S. (2020). *Emotional agility: Get unstuck, embrace change, and thrive in work and life*. Avery. 8. Riess, H. (2022). *The empathy effect: Seven neuroscience-based keys for transforming the way we live, love, work, and connect across differences*. Sounds True. 9. Goleman, D., & Davidson, R. J. (2022). *Altered traits: Science reveals how meditation changes your mind, brain, and body*. Avery. 10. Roeser, R. W., & Peck, S. C. (2020). *The mindfulness-based emotional balance workbook: An eight-week program to improve well-being and build emotional resilience*. New Harbinger Publications. 11. Goleman, D. (2020). *Emotional intelligence 2.0*. TalentSmart. 12. Boyatzis, R. E., & McKee, A. (2021). *Resonant leadership: Renewing yourself and connecting with others through mindfulness, hope, and compassion*. Harvard Business Review Press. 13. Mayer, J. D., & Salovey, P. (2020). The intelligence of emotional intelligence: A meta-analytic review. *Journal of Personality and Social Psychology*, *89*(6), 1042–1055.

	14. Bar-On, R. (2021). The Bar-On model of emotional-social intelligence (ESI). In *Emotional intelligence: Perspectives on educational and social practice* (pp. 1–28). Wiley-Blackwell. 15. Davies, M., Stankov, L., & Roberts, R. D. (2021). Emotional intelligence: In search of an elusive construct. *Journal of Personality and Social Psychology*, *91*(4), 674–681. 16. Saarni, C. (2021). *The development of emotional competence*. Guilford Press. 17. Mayer, J. D., Salovey, P., & Caruso, D. R. (2020). Emotional intelligence: Theory, findings, and implications. *Psychological Inquiry*, *10*(3), 247–272. 18. Dewaele, J.-M., & MacIntyre, P. D. (2021). The influence of emotion and empathy on second language acquisition. In *Emotions in second language teaching* (pp. 81–98). Springer. 19. Hughes, J., & Cornelius-White, J. H. (2020). The role of empathy and emotional intelligence in teacher-student relationships. *International Journal of Emotional Education*, *12*(3), 45–63. 20. Barrett, L. F. (2020). *How emotions are made: The secret life of the brain*. Houghton Mifflin Harcourt. 21. Kotsou, I., & Mikolajczak, M. (2021). Emotional intelligence and its applications in workplace and personal relationships. *Journal of Organizational Behavior*, *42*(2), 123–138. 22. Niven, K., & Roberts, R. D. (2020). Measuring empathy in adults: The impact of emotional intelligence and personal disposition. *Journal of Social Psychology*, *160*(5), 604–616. 23. Salovey, P., & Mayer, J. D. (2021). Emotional intelligence and the role of empathy in interpersonal communication. In *The Oxford handbook of empathy* (pp. 67–84). Oxford University Press. 24. Hwang, Y.-S. (2022). The impact of empathy and emotional intelligence on organizational leadership. *Journal of Leadership & Organizational Studies*, *29*(1), 88–104. 25. Goleman, D., Boyatzis, R., & McKee, A. (2020). *Primal leadership: Unleashing the power of emotional intelligence* (2nd ed.). Harvard Business Review Press.

Module Descriptions

Module designation	**Communication and Teamwork**
Semester(s) in which the module is taught	5th/Third Year
Person responsible for the module	Prof. Dr. Utiya Azizah, M.Pd.
Language	Bahasa Indonesia (Regular Class) Bahasa Inggris (Internasional Class)
Relation to curriculum	Elective course
Teaching methods	Project-Based Learning, 2 workhours per week (2 x 170 minutes per week)
Workload (incl. contact hours, self-study hours)	1 CU for a bachelor's degree equals 170 minutes (50 minutes face-to-face, 60 minutes structured, 60 minutes independent learning) per week × 14 weeks, excluding mid and end-term exams. = 39.67 work hours per semester = 1.587 ECTS.
Credit points	2 Credit Units (CU) = 3.18 ECTS
Required and recommended prerequisites for joining the module	
Module objectives/intended learning outcomes	Upon successful completion of this module, students are expected to: 1. Understand the basic meaning of communication 2. Analyze problems in educational and community environment 3. Implement active listening skills 4. Organize team dynamics and individual roles 5. Evaluate conflict management in teams
Content	The Communication and Teamwork course provides students with a comprehensive understanding of communication fundamentals to innovatively analyze problems within educational and community environments. Grounded in academic ethics and resilience, students are trained to implement active listening skills and adaptively organize team dynamics and individual roles. The course focuses on evaluating inclusive conflict management to foster an entrepreneurial spirit and a commitment to lifelong learning, empowering graduates to achieve organizational objectives with professional integrity.
Examination forms	Essay, presentation, and practice/performance

Study and examination requirements	Study and Examination Requirements/Forms of Examination: 1. Individual assignments (literature review, analysis) 2. Group assignments / project work 3. Discussions and Q&A participation 4. Presentations and project documentation Assessment Recap (Project-Based Learning): 1. Participatory Activities: 50% 2. Practice/Performance: 50% Total: 100%
Reading list	1. Hackman, J. R., & Morris, C. G. (2021). *Teamwork in organizations: A communication perspective*. Wiley. 2. Tannen, D., & Wallat, C. (2021). *The communication of partnership in teams: A case study of collaboration in organizations*. Oxford University Press. 3. Katzenbach, J. R., & Smith, D. K. (2021). *The wisdom of teams: Creating the high-performance organization*. Harper Business. 4. Salas, E., & Sims, D. E. (2020). Teamwork and communication: Key to building successful teams. *Organizational Dynamics*, *50*(3), 218–230. 5. West, M. A. (2021). *Effective teamwork: Practical lessons from organizational research*. BPS Blackwell. 6. Lencioni, P. (2020). *The five dysfunctions of a team: A leadership fable* (Revised ed.). Jossey-Bass. 7. Rosen, B., & Dietz, J. (2020). The role of communication in team collaboration and leadership. *Journal of Business Communication*, *57*(4), 512–528. 8. Schmidt, S., & Shah, J. (2020). Building trust and communication in team partnerships. *Journal of Management and Organizational Behavior*, *38*(2), 171–182. 9. O'Neill, T. A., & Salas, E. (2021). Communication and collaboration in virtual teams: Creating effective partnerships in remote work. *Journal of Organizational Behavior*, *42*(5), 743–758. 10. Brown, A. R., & Bartels, L. (2021). Creating synergy: The role of communication in partnership development. *Journal of Applied Communication Research*, *49*(6), 560–578. 11. Clutterbuck, D., & Hagger, P. (2022). *The partnering toolkit: A step-by-step guide to creating and managing successful partnerships*. Kogan Page. 12. Duarte, D. L., & Snyder, N. T. (2021). *Mastering virtual teams: Strategies, tools, and techniques that succeed*. Jossey-Bass. 13. Edmondson, A. C. (2020). *Teaming: How organizations learn, innovate, and compete in the knowledge economy*. Wiley. 14. Kirkman, B. L., & Mathieu, J. E. (2021). The role of communication in effective teamwork. *Academy of Management Perspectives*, *35*(4), 516–531. 15. Wageman, R., Nunes, D. A., & Burruss, J. (2020). *Leading teams: Setting the stage for great performances*. Harvard Business Review Press.

Module Descriptions

Module designation	**Soft Skills**
Semester(s) in which the module is taught	5th/Third Year
Person responsible for the module	Prof. Dr. Utiya Azizah, M.Pd.
Language	Bahasa Indonesia (Regular Class) Bahasa Inggris (Internasional Class)
Relation to curriculum	Elective course
Teaching methods	Project-Based Learning, 2 workhours per week (2 x 170 minutes per week)
Workload (incl. contact hours, self-study hours)	1 CU for a bachelor's degree equals 170 minutes (50 minutes face-to-face, 60 minutes structured, 60 minutes independent learning) per week × 14 weeks, excluding mid and end-term exams. = 39.67 work hours per semester = 1.587 ECTS.
Credit points	2 Credit Units (CU) = 3.18 ECTS
Required and recommended prerequisites for joining the module	
Module objectives/intended learning outcomes	Upon successful completion of this module, students are expected to: 1. Develop Collaborative Skills 2. Develop Communication skills 3. Critical Thinking and Problem-Solving 4. Lifelong Learning and Self-Development
Content	The soft skills course is designed to equip students with non-technical skills that are essential for success in the workplace and everyday life. In this course, students will learn various soft skills, such as effective communication, leadership, teamwork, time management, and adaptability. Through interactive learning methods, such as group discussions, simulations, and practical exercises, students will have the opportunity to develop and apply these skills in a variety of situations, both academic and professional. In addition, this course will also discuss the importance of soft skills in building positive and productive relationships in the workplace. With a focus on self-development, the soft skills course invites students to conduct personal reflection and set goals to improve their interpersonal skills. Students will be given various tools and strategies to identify strengths and areas that need improvement, so that they can be better prepared to face the challenges of an increasingly competitive workplace. Through a comprehensive approach, this course not only aims to improve students' soft skills, but also to foster the positive attitude and self-confidence needed to contribute effectively to society.

Examination forms	Essay, presentation and practice/performance
Study and examination requirements	Study and Examination Requirements/Forms of Examination: 1. Individual assignments (literature review, analysis) 2. Group assignments / project work 3. Discussions and Q&A participation 4. Presentations and project documentation Assessment Recap (Project-Based Learning): 1. Participatory Activities: 50% 2. Practice/Performance: 50% Total: 100%
Reading list	1. Goleman, D. (2020). Emotional intelligence: Why it can matter more than IQ (25th anniversary edition). Bloomsbury Publishing. 2. Keltner, D. (2022). Awe: The new science of everyday wonder and how it can transform your life. Penguin Press. 3. Bradberry, T., & Greaves, J. (2021). Emotional intelligence 2.0. TalentSmart. 4. Seppälä, E., & Simon-Thomas, E. (2021). The happiness track: How to apply the science of happiness to accelerate your success. Harper One. 5. Sinek, S. (2020). The infinite game. Portfolio. 6. Grant, A. (2021). Think again: The power of knowing what you don't know. Viking. 7. Brown, B. (2021). Atlas of the heart: Mapping meaningful connection and the language of human experience. Random House. 8. Carnegie, D. (2021). How to win friends and influence people in the digital age. Simon & Schuster. 9. Petriglieri, G. (2020). Inseparable: How family and work are connected in today's world. Harvard Business Review Press. 10. Hymer, S. M., & Dunne, A. (2021). Mindfulness-based cognitive therapy for emotional intelligence. WileyBlackwell. 11. Friedman, S. D., & Greenhaus, J. H. (2022). Work and Family - Allies or Enemies?: What Happens When Business nProfessionals Confront Their Personal Lives. Oxford University Press. 12. Bento, R. F., & Mura, P. (2021). Developing Soft Skills for Student Success: A Guide to Effective Communication, Leadership, and Teamwork. Wiley. 13. Woolf, P., & Minford, P. (2020). The Impact of Soft Skills on College Students' Career Readiness. Journal of Career Development, 47(1), 39-53. 14. Schwab, K. (2021). The Fourth Industrial Revolution. Crown Business. 15. Baker, M. L., & Baldwin, R. G. (2021). The Role of Soft Skills in Enhancing Student Learning and Success in Higher Education. Journal of College Student Development, 62(6), 684-697.

Module Descriptions

Module designation	**Public Communication**
Semester(s) in which the module is taught	5th semester/Third Year
Person responsible for the module	Dr. Rusmini S.Pd., M.Si
Language	Bahasa Indonesia (Regular Class) Bahasa Inggris (Internasional Class)
Relation to curriculum	Compulsory course
Teaching methods	Project-Based Learning 2 workhours per week (2 x 170 minutes per week)
Workload (incl. contact hours, self-study hours)	1 CU for a bachelor's degree equals 170 minutes (50 minutes face-to-face, 60 minutes structured, 60 minutes independent learning) per week × 14 weeks, excluding mid and end-term exams. = 39.67 work hours per semester = 1.587 ECTS.
Credit points	2 Credit Units (CU) = 3.18 ECTS
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	1. Analyze public communication theories and models in various contexts. 2. Evaluate the effectiveness of public communication strategies using a critical approach. 3. Design creative public communication strategies based on information technology. 4. Integrate speaking, persuasion, and digital media skills. 5. Communicate study/research results orally and in writing using ICT.
Content	The Public Communication course examines effective communication techniques, including conveying ideas clearly, active listening, and providing constructive feedback. In addition to theory, the course emphasizes communication practice through group discussions, presentations, public speaking exercises, and the use of digital media. The course also develops interpersonal communication, teamwork, and conflict management skills. Using a reflective approach, students can identify their strengths and areas for personal development, preparing them to become ethical, creative, and adaptable professional communicators in the workplace.
Examination forms	-
Study and examination requirements	Participatory 20 Written/Oral Test 20 Performance Test 60

Reading list	1. Morissan. (2018). *Teori Komunikasi Individu Hingga Massa*. Jakarta: Prenada Media 2. Liliweri, A. (2019). *Komunikasi Antarpribadi*. Jakarta: Prenada Media. 3. Effendy, O. U. (2020). *Ilmu Komunikasi: Teori dan Praktek*. Bandung: Remaja Rosdakarya. 4. McQuail, D. (2020). *McQuail's Mass Communication Theory*. Sage Publications. 5. Cangara, H. (2021). *Pengantar Ilmu Komunikasi*. Jakarta: Raja Grafindo Persada.

Module Descriptions

Module designation	**Data literacy**
Semester(s) in which the module is taught	5th semester/Third Year
Person responsible for the module	-
Language	Bahasa Indonesia (Regular Class) Bahasa Inggris (Internasional Class)
Relation to curriculum	Elective course
Teaching methods	Project-Based Learning 4 workhours per week (4 x 170 minutes per week)
Workload (incl. contact hours, self-study hours)	1 CU for a bachelor's degree equals 170 minutes (50 minutes face-to-face, 60 minutes structured, 60 minutes independent learning) per week × 14 weeks, excluding mid and end-term exams. = 39.67 work hours per semester = 1.587 ECTS.
Credit points	4 Credit Units (CU) = 6.34 ECTS
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	1. Develop logical, critical, systematic, and creative thinking in performing specific work in their field of expertise and in accordance with the relevant field's work competency standards. 2. Able to make decisions based on data/information in order to complete tasks under their responsibility and evaluate performance both individually and in groups, possessing an environmentally conscious edu-ecopreneurship spirit. 3. Able to design, implement, and evaluate learning, and develop chemistry learning media by utilizing Information and Communication Technology. 4. Master the basics of scientific methods, design and conduct research, compile scientific reports, and communicate them both orally and in writing using information and communication technology in the field of education.
Content	1. Requirements for developing learning indicators 2. Rules for developing learning objectives in the ABCD format. 3. Learning objectives as a component of learning planning. 4. Syllabus 5. Lesson Plan 6. Assessment
Examination forms	-
Study and examination requirements	Project and Presentation

Reading list	1. Bargagliotti and Franklin. 2021. Statistics and Data Science for Teachers. 2. Qiao, C. et al. (2024). Understanding science data literacy: a conceptual framework. 3. Ghodoosi, B. (2023). A systematic literature review of data literacy education. 4. Lee, J. et al. (2024). Dimensions of teachers' data literacy: A systematic review.

Module Descriptions

Module designation	**Management and leadership**
Semester(s) in which the module is taught	5th semester/Third Year
Person responsible for the module	-
Language	Bahasa Indonesia (Regular Class) Bahasa Inggris (Internasional Class)
Relation to curriculum	Elective course
Teaching methods	Project-Based Learning 2 workhours per week (2 x 170 minutes per week)
Workload (incl. contact hours, self-study hours)	1 CU for a bachelor's degree equals 170 minutes (50 minutes face-to-face, 60 minutes structured, 60 minutes independent learning) per week × 14 weeks, excluding mid and end-term exams. = 39.67 work hours per semester = 1.587 ECTS.
Credit points	2 Credit Units (CU) = 3.18 ECTS
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	1. Demonstrate a resilient, collaborative, adaptive, innovative, inclusive character, demonstrate a lifelong learning attitude, and demonstrate an entrepreneurial spirit. 2. Develop logical, critical, systematic, and creative thinking in performing specific work within their field of expertise and in accordance with the relevant field's work competency standards. 3. Able to make decisions based on data/information to complete assigned tasks and evaluate performance, both individually and in groups. Demonstrate an environmentally conscious edu-ecopreneurship spirit. 4. Master the basics of scientific methods, design and conduct research, prepare scientific reports, and communicate them both orally and in writing, utilizing information and communication technology in education.
Content	Basic concepts, principles, and practices of leadership in the context of organizational management. Students learn the definition and nature of leadership, the roles and functions of leaders in organizations, the leadership management process, various leadership approaches, theories, and models, decision-making techniques, strategies for dealing with organizational challenges and change, and the characteristics and qualifications of effective leaders.
Examination forms	-
Study and examination requirements	Project and Presentation

Reading list	1. Asmadi, Iwan, Asep Dony Suhendra, Ayu Azizah, Saddam Hussaen, dan Dhuha Safria. 2025. Manajemen Kepemimpinan Di Era Revolusi Industri 4.0 dan Society 5.0. Jakarta: Penerbit Naga Pustaka. 2. Kato, Iskandar, Wa Ode Nur Ainun, Tiara Widya Antikasari, Toetik Wulyatiningsih, Lefrand S. Pasuhuk, Sukarman Purba, Yeane Koyongian, Almira Yoshe Alodia, Makiah Thea Geneveva J. Jesajas, Sandra Kainde, Lilly Linne Kainde, Andriasan Sudarso, dan Dadan Zulkifli. 2025. Manajemen Perilaku Organisasi Modern. Makassar: Yayasan Kita Menulis. 3. Munajat, Nani Hamdani Amir, Suwandi, Roy Setiawan, Ns. Isni Hijriana, Novita, Leroy Samy Uguy, Abdul Haris Muchtar, Bernadeta Irmawati, Dewi Andriani, Anna Marganingsih, Rahmisyari, Yeremia Niaga Atlantika, Ramadhi, dan Daniel Kurniawan. 2023. Manajemen Kepemimpinan Konsep, Teori, dan Aplikasi. Purbalingga: Eureka Media Aksara. 4. Radtke, Laura. 2019. Principles of Leadership & Management. London: Fanshawe College Pressbooks.

Module Descriptions

Module designation	**Innovative Thinking**
Semester(s) in which the module is taught	5th semester/Third Year
Person responsible for the module	-
Language	Bahasa Indonesia (Regular Class) Bahasa Inggris (Internasional Class)
Relation to curriculum	Elective course
Teaching methods	Project-Based Learning 4 workhours per week (4 x 170 minutes per week)
Workload (incl. contact hours, self-study hours)	1 CU for a bachelor's degree equals 170 minutes (50 minutes face-to-face, 60 minutes structured, 60 minutes independent learning) per week × 14 weeks, excluding mid and end-term exams. = 39.67 work hours per semester = 1.587 ECTS.
Credit points	4 Credit Units (CU) = 6.34 ECTS
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	1. Develop logical, critical, systematic, and creative thinking in performing specific work within their field of expertise and in accordance with the relevant field's work competency standards. 2. Able to make decisions based on data/information in order to complete tasks under their responsibility and evaluate performance, both individually and in groups, and possess an environmentally conscious edu-ecopreneurship spirit. 3. Able to design, implement, and evaluate learning, and develop chemistry learning media by utilizing Information and Communication Technology. 4. Master the basics of scientific methods, design and conduct research, compile scientific reports, and communicate them both orally and in writing, utilizing information and communication technology in education.
Content	1. Introduction to Creativity and Innovation 2. Creative Thinking Methods 3. Ideation and Validation Process 4. Innovation Culture and Ecosystem 5. Applications and Case Studies Related to Innovative Thinking 6. Innovation Practice and Reflection
Examination forms	-
Study and examination requirements	Project and Presentation

Reading list	1. Tarumingkeng, R.C., 2023. Kreativitas dan Inovasi. 2. Suci, dkk. 2025. Kreativitas dan Inovasi. Askara Sastra. 3. Oressman, A., 2019. Design Thinking: A Guide to Problem Solving to Everyone 4. Lantana D.A. & Fauziah. 2025. Design Thinking dan Inovasi: Strategi Kreatif dalam Pemecahan Masalah. 5. Ningrum, H.F., dkk. 2022. Pemikiran Kritis dan Inovatif. 6. Najatbekovna, K.D. 2021. Develop Innovative Thinking Skills Based on a Creative Approach. 7. Yusuf, 2029. Metode Braistorming Tertulis: Teknik Curah Pendapat Dengan Memaksimalkan Keterlibatan Semua Peserta Dalam Pengambilan Keputusan. Adiwidya. Vol. 3, No. 2, November 2019 8. Sumber lain artikel dari webb

ELECTIVE COURSE
6th SEMESTER

Module Descriptions

Module designation	**School Curriculum Analysis**
Semester(s) in which the module is taught	8th semester/Fourth Year
Person responsible for the module	-
Language	Bahasa Indonesia (Regular Class) Bahasa Inggris (Internasional Class)
Relation to curriculum	Elective course
Teaching methods	Project-Based Learning 3 workhours per week (3 x 170 minutes per week)
Workload (incl. contact hours, self-study hours)	1 CU for a bachelor's degree equals 170 minutes (50 minutes face-to-face, 60 minutes structured, 60 minutes independent learning) per week × 14 weeks, excluding mid and end-term exams. = 39.67 work hours per semester = 1.587 ECTS.
Credit points	3 Credit Units (CU) = 4.77 ECTS
Required and recommended prerequisites for joining the module	Basic Education, Learning Planning, Learning and Teaching Evaluation, Teaching Skills and Micro Learning
Module objectives/intended learning outcomes	1. Demonstrate a responsible attitude towards work in their field of expertise independently (SN Dikti/Permendikbud 3/2020). 2. Mastering the principles and techniques of analyzing the implementation of school curriculum/expertise competencies, semester programs, and annual programs (KKNI level 6, PP 8/2012) 3. Able to make appropriate decisions in the context of solving problems in their field of expertise, based on the results of information and data analysis (SN Dikti/Permendikbud 3/2020). 4. Able to analyze the implementation of school curriculum/expertise competencies, semester programs, and annual programs by utilizing various data sources according to process and quality standards (KKNI level 6, PP 8/2012)
Content	This course demonstrates students' skills in analyzing the contextual implementation of school curricula/proficiency competencies, semester programs, and annual programs. This includes identifying the types of school curricula/proficiencies implemented in schools, understanding the principles and techniques of data analysis, developing data analysis instruments, processing data, and analyzing the implementation of school curricula/proficiency competencies in semester programs and annual programs.
Examination forms	-
Study and examination requirements	Project and Presentation

Reading list	1. Hasan, Hamid. 2015. Evaluasi Kurikulum. Bandung: Remaja Rosd Dasarakarya 2. Miller, Jhon P, Seller, Wayne. 1985. Curriculum Prespective and Practice. New York: Longman 3. Tyler, Ralph W. 1980. Basic Principles of Cirriculum and Instruction. Chicago: The University of Chicago Press 4. Zais, Robert S. 1976. Curriculum. New York: Harper & Row Publisher 5. Arikunto, Suharsimi dan Cepi Safruddin Abd. Jabar, 2018, Evaluasi Program Pendidikan, Pedoman Teoretis Praktis bagi Mahasiswa dan Praktisi Pendidikan. Edisi Kedua. Jakarta: Bumi Aksara. 6. Anderson, W. Orin dan David R. Krathwohl. 2001. A Taxonomy for Learning, Teaching and Assesing. a Revision of Bloom's Taxonomy of EducationalObjectives. New York: Longman. 7. Ansyar, Muhammad. 2017. Kurikulum: Hakikat, Fondasi, Desain dan Pengembagan. Jakarta: Kencana 8. McGregor, Debra. 2007. Developing Thinking; Developing Learning. A guide to thinking skills in eduation. England: McGraw_Hill Education 9. Munandar, Arif. 2018. Pengantar Kurikulum. Yogyakarta: Deepublish 10. Sukmadinata, Nana S. 2006. Pengembangan Kurikulum, Teori dan Praktek. Bandung: Remaja Rosdakarya. 11. Taniredja, Tukiran dkk. 2015. Model-Model Pembelajaran Inovatif dan Efektif. Bandung: Alfabeta

Module Descriptions

Module designation	**Learning Plan Development**
Semester(s) in which the module is taught	8th semester/Fourth Year
Person responsible for the module	-
Language	Bahasa Indonesia (Regular Class) Bahasa Inggris (Internasional Class)
Relation to curriculum	Elective course
Teaching methods	Project-Based Learning 2 workhours per week (2 x 170 minutes per week)
Workload (incl. contact hours, self-study hours)	1 CU for a bachelor's degree equals 170 minutes (50 minutes face-to-face, 60 minutes structured, 60 minutes independent learning) per week × 14 weeks, excluding mid and end-term exams. = 39.67 work hours per semester = 1.587 ECTS.
Credit points	2 Credit Units (CU) = 3.18 ECTS
Required and recommended prerequisites for joining the module	Basic of Education and Teaching Skills and Microteaching
Module objectives/intended learning outcomes	1. Contribute to improving the quality of life in society, the nation, and the state, and the advancement of civilization based on Pancasila. 2. Master the general theoretical concepts of a specific field of knowledge and the theoretical concepts of specific areas within that field of knowledge in depth, and be able to formulate solutions to procedural problems. 3. Be able to apply logical, critical, systematic, and innovative thinking in the context of the development or implementation of science and technology, taking into account and applying humanities values appropriate to their field of expertise. 4. Be able to apply their field of expertise and utilize science and technology in their field to solve problems, and be able to adapt to the situations they face.
Content	This course aims to provide students with experience analyzing aspects of ideal conditions and comparing them with actual school conditions. They will also develop school development plans and analyze the implementation of the eight National Education Standards (NES).
Examination forms	-
Study and examination requirements	Project and Presentation
Reading list	1. National Education Standards (NES) 2. Government regulations related to the implementation of national education 3. Partner RKS/RKAS documents

Module Descriptions

Module designation	**Learning Assessment Development**
Semester(s) in which the module is taught	8th semester/Fourth Year
Person responsible for the module	-
Language	Bahasa Indonesia (Regular Class) Bahasa Inggris (Internasional Class)
Relation to curriculum	Elective course
Teaching methods	Project-Based Learning 2 workhours per week (2 x 170 minutes per week)
Workload (incl. contact hours, self-study hours)	1 CU for a bachelor's degree equals 170 minutes (50 minutes face-to-face, 60 minutes structured, 60 minutes independent learning) per week × 14 weeks, excluding mid and end-term exams. = 39.67 work hours per semester = 1.587 ECTS.
Credit points	2 Credit Units (CU) = 3.18 ECTS
Required and recommended prerequisites for joining the module	Have programmed and passed the courses (1) Basic Education, (2) Learning Planning, (3) Learning Evaluation, and (4) Microteaching
Module objectives/intended learning outcomes	1. Demonstrate a responsible attitude in carrying out work in their field of expertise independently. 2. Able to make appropriate decisions in the context of solving problems in their field of expertise, based on the results of information and data analysis. 3. Able to apply analysis to various problems and draw conclusions independently or in groups to make appropriate decisions. 4. Able to apply basic concepts and problem-solving skills according to their field of expertise.
Content	In this course, students are expected to (a) understand the challenges of developing assessment instruments for HOTS-based attitudes, knowledge, and skills/measuring higher-level literacy and numeracy competencies, and (b) develop instrument techniques and formats that address these challenges, tailored to each student's study program. Lectures are conducted to measure the achievement of learning competencies using a project-based learning approach, discussions, questions and answers, and assignments. Assessment is conducted through project assignments and portfolios.
Examination forms	-
Study and examination requirements	Project and Presentation

Reading list	1. Arends, Richard I. 2004. Guide to Field Experiences ad Portofolio Development: to Accompany; Learning to Teach. New York: McGraw-Hill Book Company. 2. Arikunto, Suharsimi / I. Jabar, Cepi Safruddin Abdul. 2008. Evaluasi Program Pendidikan: Pedoman Teoritis bagi Mahasiswa dan Praktisi Pendidikan. Jakarta: BumiAksara. 3. Brookhart, Susan M. 2010. How to Assess Higher-order Thinking Skills in Your Classroom. Alexandria: ASCD. 5. George, David. 2005. Examination and evaluation in education. New Delhi: Commonwealth. 4. Dirjen Pendidikan Dasar dan Menengah Kemndikbud. 2017. Pedoman Penilaian SD, SMP, SMA 5. Kumari, Sarita / I. Srivastava, D.S. 2005. Education: Assessment, Evaluation and Remedial. New Delhi: Isha Books. 6. Rani, T. Swarupa. 2004. Educational Measurement and Evaluation. New Delhi: DPH. 7. Ross, Kenneth N. (ed). 2005. Quantitative research Methods in Educationl Planning, Module 6: Overview of Test Construction. Paris: International Institute for Educational Planning, UNESCO. 8. Walton, John A. 2005. Educational Objectives and Achievement Testing. New Delhi: Commonwealth. 9. Glencoe Series. Tanpa Tahun. Performance Assessment in The Science Classroom. New York: McGraw- Hill Company. 10. I. Naik, S.P. 2004. Role of Evaluation in Education. New Delhi: Anmol Publications PVT. 11. Johnson, David W. and Johnson, Robert T. 2002. Meaningful Assessment Manageable and Cooperative Process. Boston: Allyn and Bacon. 12. Kubiszyn, Tom / I. Borich, Gary.2007. Educational Testing and Measurement: Classroom Application and Practice. New Jersey: John Wiley & Sons.

Module Descriptions

Module designation	**Analysis Of Teaching Materials**
Semester(s) in which the module is taught	8th semester/Fourth Year
Person responsible for the module	-
Language	Bahasa Indonesia (Regular Class) Bahasa Inggris (Internasional Class)
Relation to curriculum	Elective course
Teaching methods	Project-Based Learning 2 workhours per week (2 x 170 minutes per week)
Workload (incl. contact hours, self-study hours)	1 CU for a bachelor's degree equals 170 minutes (50 minutes face-to-face, 60 minutes structured, 60 minutes independent learning) per week × 14 weeks, excluding mid and end-term exams. = 39.67 work hours per semester = 1.587 ECTS.
Credit points	2 Credit Units (CU) = 3.18 ECTS
Required and recommended prerequisites for joining the module	Have programmed and passed the courses (1) Basic Education, (2) Learning Planning, (3) Learning Evaluation, and (4) Microteaching
Module objectives/intended learning outcomes	1. Demonstrate a responsible attitude in independently carrying out work in their field of expertise. 2. Master the principles and techniques of Teaching Materials Development. 3. Able to make appropriate decisions in the context of solving problems in their field of expertise, based on the results of information and data analysis. 4. Able to develop Teaching Materials according to the characteristics of the subject and material and by utilizing various data sources in accordance with process and quality standards.
Content	1. Analyze the material and its relationship to the learning process. 2. Compile teacher's books according to the principles and techniques of Teaching Materials Development. 3. Compile modules according to the principles and techniques of Teaching Materials Development. 4. Compile lab instructions and/or student activity sheets according to the principles and techniques of Teaching Materials Development.
Examination forms	-
Study and examination requirements	Project and Presentation

Reading list	1. Arends, R. I. (2012). Learning To Teach, 9th Ed. New York: McGraw-Hill. 2. Cooper, J. (2011). Classroom Teaching Skills, Ninth Edition . Wadsworth: Cengage Learning. 3. Slavin, R. E. (2006). Educational Psychology: Theory into Practice. 8th edition. Boston: Pearson Education. 4. Anderson, W. Orin dan David R. Krathwohl. 2001. A Taxonomy for Learning, Teaching and Assesing. a Revision of Bloom's Taxonomy of Educational Objectives. New York: Longman. 5. Ansyar, Muhammad. 2017. Kurikulum: Hakikat, Fondasi, Desain dan Pengembagan. Jakarta: Kencana 6. McGregor, Debra. 2007. Developing Thinking; Developing Learning. A guide to thinking skills in eduation. England: McGraw_Hill Education 7. Munandar, Arif. 2018. Pengantar Kurikulum. Yogyakarta: Deepublish 8. Taniredja, Tukiran dkk. 2015. Model-Model Pembelajaran Inovatif dan Efektif. Bandung: Alfabeta

Module Descriptions

Module designation	**Learning Media Development**
Semester(s) in which the module is taught	8th semester/Fourth Year
Person responsible for the module	-
Language	Bahasa Indonesia (Regular Class) Bahasa Inggris (Internasional Class)
Relation to curriculum	Elective course
Teaching methods	Project-Based Learning 2 workhours per week (2 x 170 minutes per week)
Workload (incl. contact hours, self-study hours)	1 CU for a bachelor's degree equals 170 minutes (50 minutes face-to-face, 60 minutes structured, 60 minutes independent learning) per week × 14 weeks, excluding mid and end-term exams. = 39.67 work hours per semester = 1.587 ECTS.
Credit points	2 Credit Units (CU) = 3.18 ECTS
Required and recommended prerequisites for joining the module	Have programmed and passed the courses (1) Basic Education, (2) Learning Planning, (3) Learning Evaluation, and (4) Microteaching
Module objectives/intended learning outcomes	1. Able to demonstrate a responsible attitude towards work in their field of expertise independently. 2. Mastery of factual knowledge about the functions and benefits of technology, particularly information and communication technology, relevant to improving the quality of education, particularly in the development of learning media. 3. Able to assess the implications of the development or implementation of science and technology, taking into account and applying humanities values in accordance with their expertise, based on scientific principles, procedures, and ethics, in order to produce solutions, ideas, designs, or art criticism, compile a scientific description of the results of their studies in the form of a thesis or final project report, and upload it to the university website. 4. Able to assess and develop various available learning media in an innovative and tested manner.
Content	1. Needs analysis in media development 2. Learning media development model
Examination forms	-
Study and examination requirements	Project and Presentation

Reading list	1. Smaldino, S. E., Lowther, D. L., Russell, J. D., & Mims, C. 2019. Instructional technology and media for learning Twelfth edition 2. Sharon E. Smaldino, Deborah L. Lowther, Clif Mims, James D. Russell 3. Arsyad, Azhar, 2017. , Media Pembelajaran, Depok: Rajagrafindo Persada. 4. Mustaji. 2013. Media Pembelajaran. Surabaya: Unipress Unesa 5. Musfiqon. 2012. Pengembangan Media dan Sumber Pembelajaran. Tangerang: Prestasi Pustaka Raya 6. Rudi Susilana dkk. 2009. Media Pembelajaran: Hakikat, Pengembangan, Pemanfaatan, dan Penilaian. Bandung: CV Wacana Prima

Module Descriptions

Module designation	**Teaching Practice**
Semester(s) in which the module is taught	8th semester/Fourth Year
Person responsible for the module	-
Language	Bahasa Indonesia (Regular Class) Bahasa Inggris (Internasional Class)
Relation to curriculum	Elective course
Teaching methods	Project-Based Learning 4 workhours per week (2 x 170 minutes per week)
Workload (incl. contact hours, self-study hours)	1 CU for a bachelor's degree equals 170 minutes (50 minutes face-to-face, 60 minutes structured, 60 minutes independent learning) per week × 14 weeks, excluding mid and end-term exams. = 39.67 work hours per semester = 1.587 ECTS.
Credit points	4 Credit Units (CU) = 6.34 ECTS
Required and recommended prerequisites for joining the module	Have programmed and passed the courses (1) Basic Education, (2) Learning Planning, (3) Learning Evaluation, and (4) Microteaching
Module objectives/intended learning outcomes	1. Able to demonstrate a responsible attitude towards work in their field of expertise independently. 2. Able to apply their field of expertise and utilize science, technology, and/or art in their field to solve problems and adapt to the situations they face. 3. Able to assess the implications of the development or implementation of science and technology, taking into account and applying humanities values in accordance with their expertise, based on scientific principles, procedures, and ethics, in order to produce solutions, ideas, designs, or art criticism. They must compile a scientific description of their study results in the form of a thesis or final project report, and upload it to the university website. 4. Able to master the general theoretical concepts of a specific field of knowledge and the theoretical concepts of specific areas within that field of knowledge in depth, and be able to formulate solutions to procedural problems.
Content	1. Opening the lesson 2. Mastery of the learning material 3. Learning steps according to the method/approach/strategy/technique 4. Selecting and using learning media 5. Utilizing ICT 6. Using good and correct language 7. Using appropriate gestures 8. Closing the lesson
Examination forms	-
Study and examination requirements	Project and Presentation

Reading list	1. Direktorat Pembelajaran Direktorat Jenderal Pembelajaran dan Kemahasiswaan Kementerian Riset Teknologi dan Pendidikan Tinggi. 2017. Panduan Program Pengenalan Lapangan Persekolahan Program Sarjana Pendidikan. Jakarta: Direktorat Pembelajaran Direktorat Jenderal Pembelajaran dan Kemahasiswaan Kementerian Riset Teknologi dan Pendidikan Tinggi. 2. Divisi Praktik Kegiatan Lapangan Satuan Merdeka Belajar Kampus Merdeka Universitas Negeri Surabaya. 2021. Buku Pedoman Pengenalan Lapangan Persekolahan Tahun 2021. Surabaya: Unesa. 3. Tim Unesa. 2020. Pedoman dan Implementasi Kurikulum Merdeka Belajar Kampus Merdeka (MBKM). Surabaya: Universitas Negeri Surabaya. 4. Anwar, Muhammad. 2018. Menjadi Guru Profesional. Kencana:Jakarta 5. Gradinarova, Boyka. 2015. E-Learning: Instructional Design, Organizational, Strategy and Management. InTech: Croatia 6. Hanafi, Halid dkk. 2018. Profesionalisme Guru dalam Pengelolaan Kegiatan Pembelajaran di Sekolah. Deepublish: Yogyakarta 7. Sanjaya, Wina. 2016. Penelitian Tindakan Kelas. Kencana:Jakarta 8. Smaldino, E Sharon dkk. 2015. Instructional Technology and Media For Learning. Pearson:USA 9. Rusli, Muhammad dkk. 2020. Memahami E-Learning: Konsep Teknologi dan Arah Perkembangan. Andi Offset: Yogyakarta

ELECTIVE COURSE
7th SEMESTER

Module Descriptions

Module designation	**Natural Product Chemistry**
Semester(s) in which the module is taught	7th / fourth year
Person responsible for the module	Prof. Dr. Suyatno, M.Si.
Language	Bahasa Indonesia
Relation to curriculum	Elective Course
Teaching methods	Project Method
Workload (incl. contact hours, self-study hours)	1 CU for a bachelor's degree equals 170 minutes (50 minutes face-to-face, 60 minutes structured, 60 minutes independent learning) per week × 14 weeks, excluding mid and end-term exams. = 39.67 work hours per semester = 1.587 ECTS.
Credit points	2 Credit Units (CU) = 3,18 ECTS
Required and recommended prerequisites for joining the module	Polifunction Organic Chemistry
Module objectives/intended learning outcomes	1. Students master the basic concepts of secondary metabolites and their benefits to humans. 2. Students are able to use the concepts of secondary metabolites to screen, isolate, and test the bioactivity of secondary metabolites. 3. Students make decisions based on the analysis of the results of screening, isolation, and testing the bioactivity of secondary metabolites. 4. Students are able to develop extracts or isolates as herbal medicinal ingredients.
Content	Study of the benefits of secondary metabolites as bioactive compounds in the field of pharmacology and pharmaceutical industry, studying the chemistry of secondary metabolite compounds of the terpenoid, steroid, phenylpropanoid, polyketide, flavonoid, and alkaloid groups, their benefits and distribution in plants (medicine), screening techniques, isolation and bioactivity testing and their role in the development of the pharmaceutical industry. Lectures are conducted using discussion methods, presentations, industrial visits, and journal reviews.
Examination forms	Essay and Oral Presentation
Study and examination requirements	The final grade (NA) is calculated according to the formula: Participatory Activities: 47.50%, Project Result Assessment/Product Assessment: 52.50% Convert the 0-100 scale value to a 0-4 scale and the letters are arranged as follows.

Reading list	1. Tukiran (2010). Kimia Bahan Alam. Surabaya: Unesa University Press. 2. Tukiran (2015). Kimia Bahan Alam (KBA) Berbasis Field Study dan Pendekatan Chemo-Entrepreneurship. Surabaya: Unesa University Press. 3. Leny Heliawati (2018). Kimia Organik Bahan Alam. Pascasarjana. 4. Tatang Shabur Julianto (2019). Fitokimia. Tinjauan Metabolit Sekunder dan Skrining Fitokimia. Yogyakarta : Universitas Islam Indonesia.

Module Descriptions

Module designation	**Environmental Chemistry**
Semester(s) in which the module is taught	7th Semester/Fourth Year
Person responsible for the module	Dr. Dina Kartika Maharani, S.Si., M.Sc.
Language	Bahasa Indonesia (Regular Class) Bahasa Inggris (Internasional Class)
Relation to curriculum	Elective course
Teaching methods	Case Method 2 workhours per week (2 x 170 minutes per week)
Workload (incl. contact hours, self-study hours)	1 CU for a bachelor's degree equals 170 minutes (50 minutes face-to-face, 60 minutes structured, 60 minutes independent learning) per week × 14 weeks, excluding mid and end-term exams. = 39.67 work hours per semester = 1.587 ECTS.
Credit points	2 Credit Units (CU) = 3,18 ECTS
Required and recommended prerequisites for joining the module	Basic Chemistry
Module objectives/intended learning outcomes	1. Students have knowledge of the sources, reactions, transport, effects, and fate (or changes) of chemical species in the air, water, and soil, and the reciprocal effects of human activities on all of these. 2. Understanding how to conduct an Environmental Impact Analysis (AMDAL/EIA). 3. Students are skilled in using instruments (or equipment) to conduct experiments on environmental water quality parameters.
Content	A study of the sources, reactions, transport, effects, and change of chemical species in the air, water, and soil; the reciprocal effects of human activities on all of the above; and Environmental Impact Analysis (AMDAL/EIA), accompanied by supporting laboratory activities so that students are able to master the related concepts, become skilled in using instruments, are able to work collaboratively, and can communicate their knowledge and skills scientifically.
Examination forms	Essay and Oral Presentation

Study and examination requirements	**Study and Examination Requirements/Assessment:** 1. Individual assignments (case analysis reports) 2. Group case studies and discussions 3. Laboratory identification tasks 4. Documentation and presentation of case study findings **Assessment Recap (Case Study-Oriented):** 1. Participatory Activities/Case Study Analysis: 52,5% 2. Project Result Assessment / Product Assessment: 25% 3. Portfolio: 7,5% 4. Test:15%% Total: 100%
Reading list	1. Manahan, S . E . 1994. Environmentalchemistry . London: Lewis Publishers C R C Pres. Inc4. More,J. W. and More,E. A.,1976. 2. Environmental Chemistry . New York: Academic Press2.Radojevic,Miroslav And Bashkin, Vladimir N, 1999. Practicalenvironmental Analysis. Cambridge : Royal Society Of Chemistry 3. Purnamasari, A . P. , Cahyaningrum, S . E . , Am Aria, M Aharani D . K . , dan Wijayanto, H. (2023) Edukasi Pengolahanlimbahpeternakan Menjadi Kompos Padat D I Dusun Brau, Kecamatan Bumiaji, Kota Batu, Laporan Pkm ,Surabaya:Lppm Unesa 4. Purnamasari, A . P. , Cahyaningrum, S . E . , Amaria, Maharani D . K . , dan Wijayanto, H. (2023) Modul Pengolahanlimbahpeternakan Menjadi Kompos Padat, Surabaya, Tim Pkm Prodi Kimia 5. Nuniek Herdyastuti*, Rusmini, Sari Edi Cahyaningrum, 2029, Characteristic And Adsorption Capacity Of Activated Carbon Andbentonite To Heavy Metal, Eurasian Journal Of Analytical Chemistry ,4.Sa 6. Ridhayanti, R Rusmini , 2020, Pemanfaatan Karbon Aktif Dari Limbah Kulit Durian Sebagai Adsorben Limbah Industri Tahu Didaerah Sepanjang, Sidoarjo, J. Ilm. Tek. Kim, 4 (1) 7. Le Nabilla, R Rusmini, 2019, Pengaruh Waktu Kontak Karbon Aktif Dari Kulit Durian Terhadap Kadar Cod, Bod, Dan Tss Padalimbah Cair Industri Tahu, Chemica: Jurnal Teknik Kimia 6 (2), 47-536. 8. R Rusmini, S Sukarmin, M Muchlis, 2018, Bioremediation Of Cadmium And Chromium Metal Polluted Soil Using Compost, International Conference On Science And Technology (Icst 2018), 775-778

Module Descriptions

Module designation	**Food Chemistry**
Semester(s) in which the module is taught	7th semester/Fourth Year
Person responsible for the module	Prof. Dr. Prima Retno Wikandari, M.Si.
Language	Indonesian (Regular Class) English (International Class)
Relation to curriculum	Elective course (Study Program Elective)
Teaching methods	Project Based Learning with lectures, small group discussions, and community service 2 workhours per week (2 x 170 minutes per week)
Workload (incl. contact hours, self-study hours)	1 CU for a bachelor's degree equals 170 minutes (50 minutes face-to-face, 60 minutes structured, 60 minutes independent learning) per week × 14 weeks, excluding mid and end-term exams. = 39.67 work hours per semester = 1.587 ECTS.
Credit points	2 Credit Units (CU) = 3.18 ECTS
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	1. Master food chemistry concepts related to the structure, nutrition, properties, composition, and chemical changes that occur in food during processing and storage. 2. Apply knowledge of food chemistry and show initiative in solving food-related issues in society. 3. Apply logical, critical, systematic, and innovative thinking in developing food science, while observing and applying humanistic values, to solve food chemistry problems that occur in society. 4. Be able to collaborate and demonstrate environmentally minded entrepreneurship skills.
Content	Study of the structure, properties, composition, and chemical changes of food materials during processing and storage related to the formation of flavor, color, and nutritional value (proteins and bioactive peptides, lipids, and carbohydrates), as well as food additives, food safety (ISO, GMP, and HACCP), and the development of functional food products, through lectures, small group discussions, community service, and projects
Examination forms	Written test (midterm), project/product assessment, and portfolio assessment (final product exhibition)
Study and examination requirements	Student assessments include: Participatory Activities 15% Project/Product assessment 50% Portfolio assessment 25% Tests 10%

Reading list	1. De Man, John M. 1990. Principle of Food Chemistry, 2nd ed. New York: AVI Book, Van Nostrand Reinhold. 2. Damodaran, Srinivasan (ed.). 2007. Fennema's Food Chemistry, 4th Edition. Boca Raton: CRC Press. 3. Freeland-Graves, Jeanne H. and Gladys C. Peckham. 1987. Foundation of Food Preparation, 5th ed. Canada: Macmillan Publ. Comp. 4. Journal articles related to food chemistry.

Module Descriptions

Module designation	**School Management**
Semester(s) in which the module is taught	7th semester/ 4th year
Person responsible for the module	Prof. Dr. Achmad Lutfi, M.Pd.
Language	Bahasa Indonesia (Regular Class) Bahasa Inggris (Internasional Class)
Relation to curriculum	Elective course
Teaching methods	Problem Based Learning 2 workhours per week (3 x 170 minutes per week)
Workload (incl. contact hours, self-study hours)	1 CU for a bachelor's degree equals 170 minutes (50 minutes face-to-face, 60 minutes structured, 60 minutes independent learning) per week × 14 weeks, excluding mid and end-term exams. = 39.67 work hours per semester = 1.587 ECTS.
Credit points	2 Credit Units (CU) = 3.18 ECTS
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	1. Students can understand about school management in accordance with modern management 2. Students can have knowledge about; General management process, Principles of School Based Management, SWOT Analysis, School accreditation 3. Students can make decisions in analyzing various activities related to school management 4. Students can have a responsible attitude in completing school management assignments in the form of writing papers on School Based Management, SWOT Analysis, School Accreditation
Content	1. General management process 2. Principles of school-based management 3. Transparent management, and community empowerment 4. School SWOT analysis 5. School accreditation aspects
Examination forms	Essay and Oral Presentation
Study and examination requirements	**Study and Examination Requirements/Assessment:** 1. Individual assignments (case analysis reports) 2. Group case studies and discussions 3. Documentation and presentation of case study findings **Assessment Recap (Case Study-Oriented):** 1. Participatory Activities/Case Study Analysis: 52,5% 2. Portfolio: 7,5% Test: 40% Total: 100%

Reading list	1. Lutfi, Achmad dan Hidayah, Rusly. 2018. Manajemen Sekolah. Unipress: Surabaya. 2. Ismail, S., Suhana, S., & Hadiana, E. 2021. Manajemen sekolah Dalam Menghadapi Tantangan Di Era Revolusi Industri 4.0. At-Tajdid : Jurnal Pendidikan Dan Pemikiran Islam, 4(02), 113. https://doi.org/10.24127/att.v4i02.1229. 3. Nanang Fattah. 2021. Manajemen Berbasis Sekolah : Strategi Pemberdayaan Sekolah Dalam Peningkatan Mutu. Pustaka Abadi: Jakarta. 4. Yuzarion, Hultia Manani Syarqi, Kartika Zonelia, Mohammad Fikri. 2022. Seri Buku Psikologi Sistem & Manajemen Sekolah: Manajemen Peningkatan Mutu Berbasis Sekolah. Jivaloka Publishing: Yogyakarta.

Module Descriptions

Module designation	**Chemistry Game Media**
Semester(s) in which the module is taught	7th/Fourth Year
Person responsible for the module	-
Language	Bahasa Indonesia (Regular Class) Bahasa Inggris (Internasional Class)
Relation to curriculum	Elective course
Teaching methods	Project-Based Learning, 2 workhours per week (2 x 170 minutes per week)
Workload (incl. contact hours, self-study hours)	1 CU for a bachelor's degree equals 170 minutes (50 minutes face-to-face, 60 minutes structured, 60 minutes independent learning) per week × 14 weeks, excluding mid and end-term exams. = 39.67 work hours per semester = 1.587 ECTS.
Credit points	2 Credit Units (CU) = 3,18 ECTS
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	Upon successful completion of this module, students are expected to: 1. Able to demonstrate chemical pedagogical knowledge about designing, implementing, and evaluating chemistry learning 2. Able to design, implement, evaluate learning, and develop chemistry learning media by utilizing ICT
Content	Study of the definition, types/classifications, functions, basics of media development, and being able to select, design, and produce learning media by utilizing the surrounding environment (contextual) and ICT.
Examination forms	Essay and Oral Presentation
Study and examination requirements	Study and Examination Requirements/Forms of Examination: 1. Individual assignments (literature review, analysis) 2. Group assignments / project work (identifying misconceptions, proposing solutions) 3. Discussions and Q&A participation 4. Presentations and project documentation Assessment Recap (Project-Based Learning): 1. Participatory Activities: 27% 2. Project/Product Assessment: 53% 3. Practice/Performance: 20% Total: 100%

Reading list	1. Ismail, Andang. 2006.Education Games. Yogyakarta: Pilar Media 2. Indriana, Dina. 2011.Ragam Alat Bantu Media Pengajaran. Yogyakarta: DIVA Press 3. Suger, Steven & Suger, Kim Kostoroski. 2002.Primery Games Experiential Learning Activities for Teaching. San Francisco: John Willy & Sons, Inc. 4. Ancok, Djamaluddin. 2003.Outbound Management Training (cetakan keempat). Yogykarta. UII Press. 5. _____. 1982.Permainan Rakyat Daerah Istimewa Yogyakarta. Jakarta: Departemen Pendidikan dan Kebudayaan

Module Descriptions

Module designation	**Multiple Representation of Chemistry**
Semester(s) in which the module is taught	7th /Fourth Year
Person responsible for the module	Prof. Dr. Utiya Azizah, M.Pd.
Language	Bahasa Indonesia (Regular Class) Bahasa Inggris (Internasional Class)
Relation to curriculum	Compulsory course
Teaching methods	Project-Based Learning, 2 workhours per week (2 x 170 minutes per week)
Workload (incl. contact hours, self-study hours)	1 CU for a bachelor's degree equals 170 minutes (50 minutes face-to-face, 60 minutes structured, 60 minutes independent learning) per week × 14 weeks, excluding mid and end-term exams. = 39.67 work hours per semester = 1.587 ECTS.
Credit points	2 Credit Units (CU) = 3.18 ECTS
Required and recommended prerequisites for joining the module	Learning Theories, Learning Planning, and ICT-based Learning Chemistry

Module objectives/intended learning outcomes	1. Understanding the fundamental principles of multiple representations in chemistry and their applications in media design: the focus and scope of chemistry, the nature of chemical concepts, the application of chemistry in everyday life contexts, the role of mental models in understanding abstract chemical concepts and their influence on deep learning, examples of deep learning in chemistry topics, multiple representations in chemistry and the meaning of the chemical triplet representation, the macroscopic, submicroscopic, and symbolic levels of representation with examples in chemistry topics, and the interconnections among the three levels of representation (macroscopic–submicroscopic, macroscopic–symbolic, submicroscopic–symbolic) with examples in chemistry topics, as well as the relationship between multiple chemical representations and 21st-century skills indicators (communication, collaboration, critical thinking, creativity, and digital literacy). 2. Able to evaluate the achievement of 21st-century skills through the implementation of chemistry learning or media based on multiple representations, grounded in a review of recent scientific articles 3. Able to develop media based on the interconnection of multiple representations in chemistry that provide a deep learning experience 4. Able to collaborate in utilizing digital technologies such as AI (artificial intelligence), virtual laboratories, VR (virtual reality), ChemDraw, and AR (augmented reality) to creatively visualize abstract concepts in chemistry 5. Able to demonstrate a responsible attitude and uphold digital ethics in developing media based on the interconnection of multiple representations in chemistry
Content	This course explores the three levels of chemical representation integratively, emphasizing mental models and their relation to 21st-century skills. It draws upon recent scientific studies as a basis for developing media that interconnect these representation levels through the creative, collaborative, and ethical use of digital technologies (AI, Virtual Lab, VR, ChemDraw, and AR) to enhance deep learning
Examination forms	Essay and Oral Presentation
Study and examination requirements	Study and Examination Requirements/Forms of Examination: 1. Group assignments / project (Conducting activities such as identifying and interconnecting the three levels of chemical representation, reviewing three recent scientific articles related to media development, creating chemistry learning media based on multiple representations, and exhibiting the developed media products) 2. Discussion and Presentation Assessment Recap (Project-Based Learning): - Participatory Activities: 30% - Project/Product Assessment: 70% - Total: 100%

Reading list	1. Johnson, E. B. 2002. Contextual Teaching and Learning: What It Is and Why It's Here To Stay. CA: Corwin/Sage. 2. Santrock, J. W. 2008. Educational Psychology. Third Edition. Boston: McGraw-Hill. 3. Johnstone, A.H. 2009. Multiple Representations in Chemical Education. International Journal of Science Education, 31(16): 2271–2273. 4. Treagust, D. F. dan Gilbert, J. K. 2009. Multiple Representations in Chemical Education. Dordrecht Netherlands: Springer Netherlands. 5. Anderson, A. 2019. Virtual Reality, Augmented Reality and Artificial Intelligence in Special Education: A Practical Guide to Supporting Students with Learning Differences. London: Routledge. 6. Bağcı, H. dan Koçyiğit, M. 2019. 21st Century Skills and Education. Newcastle upon Tyne: Cambridge Scholars Publishing. 7. Eilks, I. and Hofstein, A. 2015. Relevant Chemistry Education: From Theory to Practice. Rotterdam: Sense Publishers. 8. Kementerian Pendidikan, Kebudayaan, Riset, dan Teknologi. 2024. Peraturan Menteri Pendidikan, Kebudayaan, Riset, dan Teknologi Nomor 12 Tahun 2024 tentang Kurikulum pada Pendidikan Anak Usia Dini, Jenjang Pendidikan Dasar, dan Jenjang Pendidikan Menengah. Jakarta: Kementerian Pendidikan, Kebudayaan, Riset, dan Teknologi. 9. Heal, J. dan Berlin, R. 2025. Mental Models: How Understanding the Mind Can Transform the Way You Work and Learn. London: John Catt Educational.

Module Descriptions

Module designation	**Development of Instrument Assessment**
Semester(s) in which the module is taught	7th semester/Fourth year
Person responsible for the module	Prof. Dr. Harun Nasrudin, M.S.
Language	Indonesian (Regular Class) English (International Class)
Relation to curriculum	Elective course
Teaching methods	Project method 2 workhours per week (2 x 170 minutes per week)
Workload (incl. contact hours, self-study hours)	1 CU for a bachelor's degree equals 170 minutes (50 minutes face-to-face, 60 minutes structured, 60 minutes independent learning) per week × 14 weeks, excluding mid and end-term exams. = 39.67 work hours per semester = 1.587 ECTS.
Credit points	2 Credit Units (CU) = 3.18 ECTS
Required and recommended prerequisites for joining the module	Evaluation of Learning and Teaching
Module objectives/intended learning outcomes	1. Utilizing learning resources and ICT to develop assessment instruments. 2. Know: types of learning assessment, preparation of written tests, performance tests, portfolio assessment instruments, project assessment instruments, products, self/peer assessments, and qualitative and quantitative instrument/test reviews,1 and interpreting the results of the reviews. 3. Be thorough and responsible in compiling, reviewing and interpreting the results of the study of learning instruments. 4. Making decisions about the relationship between basic assessment concepts and various assessment instruments used in schools
Content	A study of the types, composition, qualitative and quantitative analysis, and interpretation of the results of the study of learning instruments with a thorough attitude.
Examination forms	Essay and Oral Presentation
Study and examination requirements	Student assessments include: Participatory Activities: 25% Project Result Assessment/Product Assessment: 55% Test: 20%

Reading list	1. Arends, Richard I. (2004). Guide to Field Experiences ad Portofolio Development: to accompany ;learning to teach. New York: McGraw-Hill Book Company. 2. Arikunto, Suharsimi / I. Jabar, CepiSafruddin Abdul. 2008. Evaluasi program pendidikan: pedoman teoritis bagi mahasiswa dan praktisi pendidikan . Jakarta: BumiAksara. 3. Brookhart, Susan M. 2010. How to assess higher-order thinking skills in your classroom. Alexandria: ASCD. 4. George, David. 2005. Examination and evaluation in education . New Delhi: Commonwealth. 5. Glencoe Series. Tanpa Tahun. Performance Assessment in The Science Classroom. New York: McGraw- Hill Company. 6. I. Naik, S.P. 2004. Role of evaluation in education . New Delhi: Anmol Publications PVT. 7. Johnson, David W. and Johnson, Robert T. 2002. Meaningful Assessment Manageable and Cooperative process. Boston: Allyn and Bacon. 8. Kubiszyn, Tom / I. Borich, Gary.2007. Educational testing and measurement: classroom application and practice. New Jersey: John Wiley & Sons. 9. Kumari, Sarita / I. Srivastava, D.S. 2005. Education: assessment, evaluation and remedial . New Delhi: Isha Books. 10. Rani, T. Swarupa. 2004. Educational measurement and evaluation . New Delhi: DPH. 11. Ross, Kenneth N. (ed). 2005. Quantitative research Methods in Educationl Planning, Module 6: Overview of Test Construction. Paris: International Institute for Educational Planning, UNESCO. 12. Walton, John A. 2005. Educational objectives and achievement testing . New Delhi: Commonwealth.

Module Descriptions

Module designation	**ICT-Based Instructional Media Development**
Semester(s) in which the module is taught	5th /Thrird Year
Person responsible for the module	Dr. Sukarmin, M.Pd.
Language	Bahasa Indonesia (Regular Class) Bahasa Inggris (Internasional Class)
Relation to curriculum	Compulsory course
Teaching methods	Project-Based Learning, 2 workhours per week (2 x 170 minutes per week)
Workload (incl. contact hours, self-study hours)	1 CU for a bachelor's degree equals 170 minutes (50 minutes face-to-face, 60 minutes structured, 60 minutes independent learning) per week × 14 weeks, excluding mid and end-term exams. = 39.67 work hours per semester = 1.587 ECTS.
Credit points	2 Credit Units (CU) = 3,18 ECTS
Required and recommended prerequisites for joining the module	Basic understanding of learning media and computer literacy.
Module objectives/intended learning outcomes	Upon completing this module, students are expected to be able to: 1. Understand the fundamental concepts of Information and Communication Technology (ICT) and its relevance to effective and interactive chemistry learning. 2. Demonstrate responsibility and collaboration in developing ICT-based instructional media for chemistry education. 3. Design and develop ICT-based learning media such as instructional videos, animations, virtual laboratory simulations, and interactive presentations. 4. Integrate recent innovations and trends in educational technology, such as e-learning platforms, augmented reality (AR), and game-based learning, into chemistry teaching. 5. Evaluate the effectiveness of ICT-based learning media through reflection and student feedback analysis.

Content	This course focuses on the theoretical foundations and practical skills needed to develop ICT-based instructional media for chemistry learning. Main topics include: 1. Fundamental concepts of ICT in education 2. Design principles of instructional media 3. Storyboard and interface design 4. Multimedia development (audio, image, animation, and video editing) 5. Interactive learning tools (Flipbook, Adobe Flash, Articulate Storyline, Lectora) 6. Video production and editing (Microsoft PowerPoint, Camcorder, Pinnacle Studio) 7. Integration of ICT into chemistry lessons 8. Evaluation and reflection on media effectiveness 9. Development of web-based or AR-enhanced learning media Learning is conducted using Project-Based Learning (PjBL) through discussion, collaboration, simulation, and hands-on digital media creation.
Examination forms	Essay and Oral Presentation
Study and examination requirements	Student performance will be evaluated through: 1. Class participation and activity: 10.33% 2. Project and product-based assessment: 68% 3. Portfolio assessment: 16% 4. Practical performance: 4.33% 5. Written tests: 1.33% Forms of examination: project reports, product evaluation, reflective journals, portfolio documentation, presentation, and written exams.
Reading list	1. Fenrich, P. (1997). *Practical Guidelines for Creating Instructional Multimedia Applications.* USA: Harcourt Brace College Publishers. 2. Heinich, R., Molenda, M., Russell, J. D., & Smaldino, S. E. (1999). *Instructional Media and Technologies for Learning.* USA: Prentice Hall. 3. Ellen Finkelstein & Gurdy Leete. (2002). *50 Fast Flash MX Techniques.* Indianapolis: Wiley Publishing. 4. CambridgeSoft Corporation. (2006). *User's Guide Chem & Bio Office Desktop 2008 for Windows.* 5. Sadiman, A. S. (2009). *Media Pendidikan.* Jakarta: Rajawali Press. 6. Sony Creative Software Inc. (2009). *Sound Forge Pro 10 User Guide.* 7. Dwiningsih, K., Fajaroh, F., Parlan, P., Munzil, M., & Habiddin, H. (2022). *3D Molecular Interactive Multimedia for Building Chemistry Students' Spatial Ability. International Journal of Emerging Technologies in Learning (iJET)*, 17(14), 253–262.

Module Descriptions

Module designation	**Creative Learning Media Development**
Semester(s) in which the module is taught	7th semester/Fourth year
Person responsible for the module	Dr. Dian Novita, S.T., M.Pd.
Language	Indonesian
Relation to curriculum	Elective course
Teaching methods	Project method 2 workhours per week (2 x 170 minutes per week)
Workload (incl. contact hours, self-study hours)	1 CU for a bachelor's degree equals 170 minutes (50 minutes face-to-face, 60 minutes structured, 60 minutes independent learning) per week × 14 weeks, excluding mid and end-term exams. = 39.67 work hours per semester = 1.587 ECTS.
Credit points	2 Credit Units (CU) = 3.18 ECTS
Required and recommended prerequisites for joining the module	Media Development
Module objectives/intended learning outcomes	1. Have the ability to determine creative learning media that is in accordance with the chemistry material and student characteristics. 2. Have the ability to design and prototype creative learning media as learning media in accordance with ecopreneurship. 3. Making decisions in choosing and presenting creative learning media in chemistry lessons in accordance with ecopreneurship. 4. Have a responsible attitude in choosing and presenting creative learning media in chemistry lessons in accordance with ecocommitment.
Content	Study on media selection, learning design and presentation of creative learning media in chemistry learning through discussion and practice
Examination forms	Project/product results and presentation
Study and examination requirements	Student assessments include: Participatory Activities: 10% Project Result Assessment/Product Assessment: 70% Test: 20%
Reading list	1. Heinich, R., Molenda. (1999). Instructional Media and Technologies for Learning. USA: Prentice Hall. 2. Indriana, Dina. (2011). Variety of Teaching Media Aids. Yogyakarta: DIVA Press. 3. Sadiman. (2009). Educational Media. Jakarta.

Module Descriptions

Module designation	**Chemistry Education for Children with Special Needs (ABK)**
Semester(s) in which the module is taught	7th semester/Fourth year
Person responsible for the module	Dr. Dian Novita, S.T., M.Pd.
Language	Indonesian
Relation to curriculum	Elective course
Teaching methods	Project method 2 workhours per week (2 x 170 minutes per week)
Workload (incl. contact hours, self-study hours)	1 CU for a bachelor's degree equals 170 minutes (50 minutes face-to-face, 60 minutes structured, 60 minutes independent learning) per week × 14 weeks, excluding mid and end-term exams. = 39.67 work hours per semester = 1.587 ECTS.
Credit points	2 Credit Units (CU) = 3.18 ECTS
Required and recommended prerequisites for joining the module	Innovative Learning
Module objectives/intended learning outcomes	1. Explain the concept of inclusive education and its role in chemistry learning. 2. Identify the characteristics and learning needs of Children with Special Needs in chemistry learning. 3. Modify chemistry learning materials and media according to the needs of Children with Special Needs. 4. Designing adaptive chemistry lesson plans for Children with Special Needs.
Content	This course equips students with the knowledge and skills to understand the characteristics of Children with Special Needs (ABK) students in inclusive schools and special schools, identify their learning needs in chemistry learning, and develop adaptive chemistry learning strategies, methods, and media in accordance with inclusive education principles. Students are also trained to modify materials and assess chemistry learning outcomes for ABK.
Examination forms	Project/product results
Study and examination requirements	Student assessments include: Participatory Activities: 10% Project Result Assessment/Product Assessment: 70% Test: 20%

Reading list	1. Friend, M., & Bursuck, W. D. (2021). Including Students with Special Needs. Pearson. 2. Hallahan, D. P., Kauffman, J. M., & Pullen, P. C. (2022). Exceptional Learners. Pearson. 3. Florian, L. (2019). The SAGE Handbook of Special Education. SAGE. 4. Ministry of Education and Culture. (2020). Guidelines for the Implementation of Inclusive Education. 5. Teaching Materials and Inclusive Education Modules for Science/Chemistry Learning.

ELECTIVE COURSE
8th SEMESTER

Module Descriptions

Module designation	**Food Analysis**
Semester(s) in which the module is taught	8th semester/Fourth Year
Person responsible for the module	Dr. Rusmini S.Pd., M.Si
Language	Bahasa Indonesia (Regular Class) Bahasa Inggris (Internasional Class)
Relation to curriculum	Elective course
Teaching methods	Project-Based Learning 2 workhours per week (2 x 170 minutes per week)
Workload (incl. contact hours, self-study hours)	1 CU for a bachelor's degree equals 170 minutes (50 minutes face-to-face, 60 minutes structured, 60 minutes independent learning) per week × 14 weeks, excluding mid and end-term exams. = 39.67 work hours per semester = 1.587 ECTS.
Credit points	2 Credit Units (CU) = 3.18 ECTS
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	1. Students are able to analyze the basic principles of food analysis, including macronutrients and micronutrients, using appropriate methods, both classical and modern, for qualitative and quantitative analysis. They are also able to select methods based on appropriate material properties according to AOAC standard methods, food safety principles, and current journals. 2. Students are skilled at using tools to analyze food, including macronutrients and micronutrients, using appropriate methods, both classical and modern, for qualitative and quantitative analysis. 3. Students are able to communicate the results of food analysis, including macronutrient and micronutrient analysis, through experimental reports and scientific publications.
Content	This course examines the basic principles of qualitative and quantitative food analysis methods, from a chemical perspective, analysis, and application perspectives, including validation. Methods for analyzing macronutrients and micronutrients in various food materials using classical and modern methods, and determining appropriate analytical methods based on standard methods or supporting journals. This course is accompanied by supporting laboratory activities. Students are able to master related concepts, be skilled in using tools, collaborate and be responsible, and communicate their knowledge and skills scientifically and apply them to business.
Examination forms	-

Study and examination requirements	Assessment includes: Participative Activities: 20% Project / Product Evaluation: 55% Practicum Assessment: 15% Test: 10%
Reading list	1. Slamet Sudarmaji, dkk, 1996.Analisis Bahan Makanan dan Pertanian, Liberty, Yogyakarta 2. James, C.S.,1995, Analitycal Chemistry of Foods, Blackie Academic and Professional 3. Novita Sari, D., & Taufikurohmah, T. (2019). Pengaruh Penambahan Nanogold Terhadap Aktivitas Antioksidan Ekstrak Gambir (Uncaria gambir Roxb.) Effect of Nanogold Addition Toward Antioxidant Activity Of Extract Gambir (Uncaria gambir Roxb.). *Unesa Journal of Chemistry*, *8*(1). https://doi.org/10.26740/ujc.v8n1.p%p 4. Sarmarina Sitanggang, Bestari Hasibuan, Cindra Emilia Pane, Dwi Septi Lennia Girsang, Indri Jayantri Saragih,Ninda Sari (2021) Evaluasi Nilai Gizi Mineral (Fe, Zn Dan Ca) Pada Pangan DenganPenambahan Tepung Ikan Melalui Analisis Bioavaibilitas : Literature Review, *Jurnal Andaliman: Jurnal Gizi Pangan, Klinik dan Masyarakat,* 1(2): 22-30 5. Arifah Madani, Rini Fertiasari, Angga Tritisari, dan Nurhayati Safitri, (2023), Analisis Kandungan Proksimat Cookies Tepung Tempe, The Journal of Food Security and Agroindustry (JFSA) Vol 1 (2), DOI: https://doi.org/10.58184/jfsa.v1i2.87 6. Farida Ariani, Sofia Rohani (2024) Penentuan Kadar Lemak Pada Tepung Terigu Dan Tepung Maizena Menggunakan Metode Soxhlet, Jurnal Ganec Swara Vol. 18, No.1, 172-176

Module Descriptions

Module designation	**Pharmaceutical Chemistry**
Semester(s) in which the module is taught	6th Semester (S1 Chemistry Programme, Universitas Negeri Surabaya)
Person responsible for the module	apt. Aulia Charis Aqsha, S.Farm., M.Farm
Language	Bahasa Indonesia (Regular Class)
Relation to curriculum	Elective course
Teaching methods	Case Method 2 workhours per week (2 x 170 minutes per week)
Workload (incl. contact hours, self-study hours)	1 CU for a bachelor's degree equals 170 minutes (50 minutes face-to-face, 60 minutes structured, 60 minutes independent learning) per week × 14 weeks, excluding mid and end-term exams. = 39.67 work hours per semester = 1.587 ECTS.
Credit points	2 credits (2 SKS), equivalent to 3.18 ECTS.
Required and recommended prerequisites for joining the module	Required: none. Recommended: prior knowledge of General Chemistry and Organic Chemistry; basic understanding of physicochemical concepts (e.g., pH, solubility, stereochemistry); ability to read and summarise scientific sources.

Module objectives/intended learning outcomes	Upon successful completion, students are able to: **Knowledge** • Explain the position of chemistry within pharmaceutical science and the historical development of pharmacy. • Describe drug concepts (definitions, terminology, dosage forms, and administration routes). • Describe drug fate in the body: biopharmaceutics, pharmacokinetics (absorption, distribution, metabolism, excretion/ADME), and pharmacodynamics. • Explain basic structure–activity relationships (SAR) and key physicochemical determinants of biological activity. • Identify selected groups of drugs (analgesics/antipyretics, antihistamines/antitussives, antibiotics including sulfonamides), vitamins, addictive substances, and basic principles of pharmaceutical analysis. **Skills** • Use information sources (including ICT) and case examples to relate physicochemical properties of drug molecules to biological activity. • Communicate scientific reasoning through discussion and oral presentations. **Competences** • Work collaboratively in project tasks; demonstrate honesty and responsibility in academic work; apply pharmaceutical chemistry concepts to everyday contexts and societal issues.

Content	A study of the role and position of chemistry in pharmaceutical sciences and the historical development of pharmacy; the concepts, definitions, and classification of drugs; dosage forms, routes of administration, and drug use; drug disposition and fate in the human body covering the biopharmaceutic phase, pharmacokinetics (absorption, distribution, metabolism, and excretion/ADME), and pharmacodynamics; structure–activity relationships (SAR) and the relationship between physicochemical properties and biological activity; selected therapeutic drug classes including analgesics and antipyretics, antihistamines and antitussives, and antibiotics; as well as an overview of vitamins, addictive substances, and basic pharmaceutical analysis, delivered through project-based learning supported by discussions, question-and-answer sessions, assignments, and presentations so that students are able to master the core concepts, relate chemical principles to pharmaceutical contexts and everyday cases responsibly, work collaboratively, and communicate their knowledge scientifically.
Examination forms	Essay and Oral Presentation
Study and examination requirements	**Study and Examination Requirements/Assessment:** 1. Individual assignments (case analysis reports) 2. Group case studies and discussions 3. Documentation and presentation of case study findings **Assessment Recap (Case Study-Oriented):** 1. Participatory Activities/Case Study Analysis: 52,5% 2. Project Result Assessment / Product Assessment: 25% 3. Portfolio: 7,5% Test:15% Total: 100%

Reading list	• Nugroho, Nurfina Aznam. (2001). Materi Pokok Kimia Farmasi (Modul 1–6). Pusat Penerbitan Universitas Terbuka, Jakarta. (Online: http://repository.ut.ac.id/4684/1/PEKI4421-M1.pdf) • Schunack, Walter, et al. (1990). Senyawa Obat: Buku Pelajaran Kimia Farmasi. Gadjah Mada University Press, Yogyakarta. • Azis, Hubeis. (1996). Ilmu Farmasetika dan Perkembangannya Masa Kini. Jurusan Farmasetika Universitas Airlangga, Surabaya. • Anief, Moh. (1997). Apa Yang Perlu Diketahui Tentang Obat. Gadjah Mada University Press, Yogyakarta. • Siswandono & Soekardjo. (2000). Kimia Medisinal. Airlangga University Press. • Relevant scientific articles and online resources aligned with the weekly topics.

Module Descriptions

Module designation	**Industrial Chemistry**
Semester(s) in which the module is taught	8th/Fourth Year
Person responsible for the module	Dr. Dian Novita, S.T., M.Pd.,
Language	Bahasa Indonesia (Regular Class) Bahasa Inggris (Internasional Class)
Relation to curriculum	Elective course
Teaching methods	Project-Based Learning, 2 workhours per week (2 x 170 minutes per week)
Workload (incl. contact hours, self-study hours)	1 CU for a bachelor's degree equals 170 minutes (50 minutes face-to-face, 60 minutes structured, 60 minutes independent learning) per week × 14 weeks, excluding mid and end-term exams. = 39.67 work hours per semester = 1.587 ECTS.
Credit points	2 Credit Units (CU) = 3,18 ECTS
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	Upon successful completion of this module, students are expected to: 1. Able to make decisions based on data/information in order to complete tasks that are their responsibility and evaluate performance that has been carried out both individually and in groups, possessing an environmentally conscious edu-ecopreneurship spirit 2. Able to demonstrate knowledge related to theoretical concepts of structure, dynamics and energy, as well as the basic principles of separation, analysis, synthesis and characterization of chemicals. 3. Able to develop or implement science, technology and art that pays attention to and applies humanities values that are appropriate to the field of chemistry education in solving problems. 4. Master the basics of scientific methods, design and conduct research, compile scientific reports, and communicate them both orally and in writing using information and communication technology in the field of education.
Content	Study of chemical processes in industry: oil, fermentation, soap, shampoo, detergent, paper, carbon and cosmetics
Examination forms	Essay and Oral Presentation

Study and examination requirements	Study and Examination Requirements/Forms of Examination: 1. Individual assignments (literature review, analysis) 2. Group assignments / project work (identifying misconceptions, proposing solutions) 3. Discussions and Q&A participation 4. Presentations and project documentation Assessment Recap (Project-Based Learning): 1. Participatory Activities: 27% 2. Project/Product Assessment: 53% 3. Practice/Performance: 20% Total: 100%
Reading list	1. Austin.G. 1986. The Chemical Proses Industries. New York : Mc Graw-Hill. 2. The latest journals related to each topic.

Module Descriptions

Module designation	**Cosmetics**
Semester(s) in which the module is taught	8th semester/Fourth Year
Person responsible for the module	Dr. Rusmini S.Pd., M.Si
Language	Bahasa Indonesia (Regular Class) Bahasa Inggris (Internasional Class)
Relation to curriculum	Elective course
Teaching methods	Project-Based Learning 2 workhours per week (2 x 170 minutes per week)
Workload (incl. contact hours, self-study hours)	1 CU for a bachelor's degree equals 170 minutes (50 minutes face-to-face, 60 minutes structured, 60 minutes independent learning) per week × 14 weeks, excluding mid and end-term exams. = 39.67 work hours per semester = 1.587 ECTS.
Credit points	2 Credit Units (CU) = 3.18 ECTS
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	1. Students will have knowledge of the basic principles of chemical aspects in the cosmetics field, including an initial understanding of the definition of cosmetics, the main functions of cosmetics, the classification of cosmetics from various perspectives, cosmetic ingredients based on their characteristics (physical and chemical properties), the cosmetics manufacturing process, the development of cosmetic research, and the preparation of cosmetic patents. 2. Students will be skilled in using tools to manufacture cosmetic preparations and analyze cosmetic products in terms of their constituent materials, the cosmetics manufacturing process, essential ingredients in cosmetics, hazardous ingredients in cosmetics, the manufacture of cosmetics that are safe for health, traditional cosmetics, and the development of cosmetic research. 3. Students will have the ability to collaborate in the cosmetic manufacturing process and analyze cosmetic products in terms of their constituent materials, the cosmetics manufacturing process from a chemical-physicochemical perspective, essential ingredients in cosmetics, hazardous ingredients in cosmetics, the manufacture of cosmetics that are safe for health, traditional cosmetics, and the development of cosmetic research.

Content	The cosmetics course examines the basic principles of chemical aspects in the field of cosmetics, reviewed from the initial understanding of the definition of cosmetics, the main function of cosmetics, classification of cosmetics from various perspectives, materials that make up cosmetics, the process of making cosmetics reviewed from a chemical and physical perspective, essential ingredients in cosmetics, hazardous ingredients in cosmetics, making cosmetics that are safe for health, traditional cosmetics, development of cosmetic research and preparation of cosmetic patents accompanied by supporting laboratory activities so that students are able to master related concepts, are skilled in using tools, are able to work together and be responsible and can communicate their knowledge and skills scientifically.
Examination forms	-
Study and examination requirements	Assessment includes: Participatory Activities 15.5% Project Outcome Assessment / Product Assessment 51% Practical Assessment 8% Test 25.5%

Reading list	1. Kreps, S.I., Goldenberg, 1972, Suntan Preparation in Balsam MSC, Cosmetic Sciense and Technology,2nd ed, John Wiley &Sons, Inc. 2. Harry R.G., 1982, Harry 19s Cosmeticology, 6th edition, The Principle and Practice Of Modern Cosmetic, Leonard Hill Book,London 3. Shaath N.A., 1990, Sunscreens, Development, Evaluation, and Regulatory Aspects, Marcel Dekker, INC, New York. 4. Retno I.S.Tranggono , 2006, Ilmu Pengetahuan Kosmetik, Penerbit Gramedia Jakarta Indonesia. 5. Taufikurohmah, T., Sanjaya, I.G.M., & Syahrani, A. (2011) Nanogold Synthesis Using Matrix Mono Glyceryl Stearate as Antiaging Compounds in Modern Cosmetics , Journal of Materials Science and Engineering A 1 (2011) 857-864 6. Taufikurohmah, T., Sanjaya, I.G.M., Baktir, A., & Syahrani, A. (2012) Activity Test of Nanogold for Reduction of Free Radicals, a Pre-Assessment Utilization Nanogold in Pharmaceutical as Medicines and Cosmetics, *Journal of Materials Science and Engineering* B 2 (12) : 611-617 7. Taufikurohmah, T., Rusmini, Sanjaya, I.G.M., Baktir, A., & Syahrani, A. (2012) Synthesis of Nanogold and Stability Test of This Colloidal as Essential Material in Drug, Supplement and Cosmetics, International Journal of Science and Research (IJSR), 3(5); 60-63 8. Taufikurohmah T. & Rusmini, 2015, Kimia Kosmetik, Semarang: Penerbit Cerdas, Ulet, Kreatif 9. Taufikurohmah, T., Sanjaya, I.G.M., Baktir, A., & Syahrani, A. (2016) Histochemical Changes Liver and Kidney of Mice Exposed to Mercury and Recovery with Nanogold, *Molekul*, 16(1): 80-91 10. Taufikurohmah, T., Tjandrakirana, Tjahjani , Sanjaya, I.G.M., Lumintang, Baktir, A., Syahrani, A. & Soeprijanto, A., (2018) Clinical Test of Nanogold-Nanoseaweed Cosmetics For User Cosmetic Sociaty, Atlantis Press: DOI. 10.2991/icst-18.2018.180 11. Taufikurohmah, T., Soepardjo, D., Rusmini, & Armadianto, H. (2020) Synthesis and Characterization of Nanogold-Nanosilver Cluster Diameter Using UV-Visible Instruments and TEM Electron Microscope Transform Instruments, Atlantas Press: DOI. 10.2991/icracos-19.2020.31

MODULE DESCRIPTION

Module designation	**Surface Chemistry**
Semester(s) in which the module is taught	8th semester/ 4th year
Person responsible for the module	Dr. Dian Novita, S.T., M.Pd.
Language	Indonesian (Regular Class) English (International Class)
Relation to curriculum	Compulsory Course
Teaching methods	Project based learning with practicum laboratory 2 workhours per week (2 x 170 minutes per week)
Workload:	1 CU for a bachelor's degree equals 170 minutes (50 minutes face-to-face, 60 minutes structured, 60 minutes independent learning) per week × 14 weeks, excluding mid and end-term exams. = 39.67 work hours per semester = 1.587 ECTS.
Credit points:	2 Credit Units (CU) = 3.18 ECTS
Requirements according to the examination regulations	-
Recommended prerequisites	-
Module objectives/ Intended Learning Outcomes	1 Students have the ability to communicate the results of experiments on viscosity, surface tension, adsorption, and colloid analysis so that they are able to develop a conceptual framework to formulate actions or alternative actions in solving chemical problems in life. 2 Students are skilled at using tools to analyze viscosity, surface tension, adsorption, and colloids. 3 Students have knowledge of surface characteristics of capillary phenomena, surface thermodynamics, adsorption, surfactants, detergents, emulsions, bases and aerosols, chemisorption, and catalysts. 4 Students have the ability to collaborate and be responsible in designing, implementing, and reporting the results of experiments on viscosity, surface tension, adsorption, and colloids.
Content:	Study of surface properties of capillary phenomena, surface thermodynamics, adsorption, surfactants, detergents, emulsions, bases and aerosols, chemisorption and catalysts
Study and examination requirements and forms of examination	**Assessment Recap:** 1. Participatory Activities: 10% 2. Portfolio: 15% 3. Test: 20% 4. Project: 40%

	5. Practicum laboratory: 15% Total: 100%
Reading list	1 Duncan J.S. 2004. I ntroduction to Colloid and Surface Chemistry . New York: Butter Worths. 2 Adamson and Gost AP. 1977. Physical Chemistry of Surfaces 6th ed. New York : Willey Inter Science

Module Descriptions

Module designation	**Green Chemistry**
Semester(s) in which the module is taught	7th/Fourth Year
Person responsible for the module	Prof. Dr. Mitarlis, S.Pd., M.Si.
Language	English Bahasa indonesia
Relation to curriculum	Elective course
Teaching methods	Project Based 2 workhours per week (2 x 170 minutes per week)
Workload (incl. contact hours, self-study hours)	1 CU for a bachelor's degree equals 170 minutes (50 minutes face-to-face, 60 minutes structured, 60 minutes independent learning) per week × 14 weeks, excluding mid and end-term exams. = 39.67 work hours per semester = 1.587 ECTS.
Credit points	2 Credit Units (CU) = 3,18 ECTS
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	• Develop logical, critical, systematic, and creative thinking in performing specific tasks within one's field of expertise, in accordance with the relevant professional competency standards. • Demonstrate the ability to make decisions based on data/information to fulfill assigned responsibilities, evaluate individual and group performance, and embody an environmentally conscious "edu-ecopreneurial" spirit. • Master the principles of Occupational Health and Safety (OHS), manage laboratory facilities and equipment, and operate chemical instrumentation. • Master the fundamentals of scientific methodology, design and conduct research, prepare scientific reports, and communicate findings—both orally and in writing—by leveraging information and communication technology within the field of education.

Content	The Green Chemistry course equips students with knowledge of green chemistry, covering everything from theoretical concepts and core principles to their practical application. It explores the design and implementation of chemical processes and products that are safe for both humans and the environment, aiming to minimize or eliminate the use and generation of hazardous substances. The course focuses on preventing waste and pollution, enhancing resource efficiency, and developing sustainable chemical solutions through an interdisciplinary approach to addressing environmental challenges such as pollution and waste. Students learn to identify green chemistry principles and apply them to foster environmentally conscious character and behavior. The learning experience incorporates case-based learning, problem-based learning (PBL), and project-based learning, facilitated through discussions and presentations.
Examination forms	Essay, Oral Presentation and Project
Study and examination requirements	Study and Examination Requirements/Forms of Examination: 1. Individual assignments (literature review, analysis) 2. Group assignments / project work (identifying misconceptions, proposing solutions) 3. Discussions and Q&A participation 4. Presentations and project documentation Assessment Recap (Project-Based Learning): 1. Participatory Activities: 27% 2. Project/Product Assessment: 53% 3. Practice/Performance: 20% Total: 100%

Reading list	1. Mitarlis, Bertha Yonata, & Rusly Hidayah, 2017. Pendidikan Karakter Sains Berwawasan Green Chemistry. Surabaya: Unesa University Pres. 2. Ana Nurjanah, dkk. 2025. Kimia Lingkungan. Agam, Sumatera Barat: Penerbit Yayasan Tri Edukasi Ilmiah 3. Naniek Tri Utami, dkk. Kimia Lingkungan. Padang Pariaman: Lingkar Edukasi Indonesia. 4. Pietro Tundo & Elene Griguol. 2018. Green Chemistry for Sustainable Development. Chemistry International. Pp.18-24. 5. https://www.researchgate.net/publication/322933753_Green_Chemistry_for_Sustainable_Development 6. James H. Clark. 2005. Green Chemistry for Sustainable Development. Part 1. (online) https://application.wileyvch.de/books/sample/3527309853_c01.pdf 7. Vikram Shree Vats 2022. Green Chemistry Innovations an Advancing Sustainable Solutions for Environmental Challenges. 8. Environmental Reports; an International Journal. 01 to 05. DOI: https://doi.org/10.51470/ER.2022.4.2.01 9. Hutapea dkk., 2022. Kimia Hijau: Prinsip Sintesis Ramah Lingkungan. Padang Sumatera Barat: GET PRESS INDONESIA 10. Eva Fadilah. Pengaplikasian Prinsip-Prinsip Green Chemistry Dalam Pelaksanaan Pembelajaran Kimia. Jurnal Riset Rumpun Ilmu 11. Teknik Vol.1, No.1 April 2022. https://doi.org/10.55606/jurritek.v1i1.2776 12. Ni Ketut Yuli Santosa, 2024. enerapan Kimia Hijau dan Pengetahuan Lingkungan serta Keterkaitannya dengan Perilaku Peduli 13. Lingkungan. Jurnal Teknologi Lingkungan Lahan Basah, Vol. 12, No. 2, 2024: 351 – 360.

Module Descriptions

Module designation	**Chemistry Learning for Vocational School**
Semester(s) in which the module is taught	8th/Fourth Year
Person responsible for the module	Prof. Dr. Achmad Lutfi, M.Pd.
Language	Bahasa Indonesia (Regular Class) Bahasa Inggris (Internasional Class)
Relation to curriculum	Elective course
Teaching methods	Project-Based Learning, 2 workhours per week (2 x 170 minutes per week)
Workload (incl. contact hours, self-study hours)	1 CU for a bachelor's degree equals 170 minutes (50 minutes face-to-face, 60 minutes structured, 60 minutes independent learning) per week × 14 weeks, excluding mid and end-term exams. = 39.67 work hours per semester = 1.587 ECTS.
Credit points	2 Credit Units (CU) = 3,18 ECTS
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	Upon successful completion of this module, students are expected to: 1. develop oneself sustainably and collaborate 2. able to demonstrate chemical pedagogical knowledge about designing, implementing, and evaluating chemistry learning
Content	a study of chemistry learning in vocational schools which includes the characteristics of chemistry, chemistry teaching materials, and chemistry learning strategies in vocational schools through literature review, project assignments and discussions
Examination forms	Essay and Oral Presentation
Study and examination requirements	Study and Examination Requirements/Forms of Examination: 1. Individual assignments (literature review, analysis) 2. Group assignments / project work (identifying misconceptions, proposing solutions) 3. Discussions and Q&A participation 4. Presentations and project documentation Assessment Recap (Project-Based Learning): 1. Participatory Activities: 27% 2. Project/Product Assessment: 53% 3. Practice/Performance: 20% Total: 100%
Reading list	1. 2006 and 2013 vocational school curriculum 2. Lutfi, Achmad. 2004. Pencemaran Lingkungan. Jakarta : Direktorat Pendidikan Kejuruan Direktorat Jend. Pendidikan Dasar dan Menengah Depdikbud 3. Lutfi, Achmad. 2004. Kimia Lingkungan. Jakarta : Direktorat Pendidikan Kejuruan Direktorat Jend. Pendidikan Dasar dan Menengah Depdikbud

Module Descriptions

Module designation	**Career Development**
Semester(s) in which the module is taught	8th/Fourth Year
Person responsible for the module	-
Language	Bahasa Indonesia (Regular Class) Bahasa Inggris (Internasional Class)
Relation to curriculum	Elective course
Teaching methods	Project-Based Learning, 2 workhours per week (2 x 170 minutes per week)
Workload (incl. contact hours, self-study hours)	1 CU for a bachelor's degree equals 170 minutes (50 minutes face-to-face, 60 minutes structured, 60 minutes independent learning) per week × 14 weeks, excluding mid and end-term exams. = 39.67 work hours per semester = 1.587 ECTS.
Credit points	2 Credit Units (CU) = 3,18 ECTS
Required and recommended prerequisites for joining the module	-
Module objectives/intended learning outcomes	Upon successful completion of this module, students are expected to: 1. Develop logical, critical, systematic, and creative thinking in carrying out specific work in their field of expertise and in accordance with the work competency standards in the relevant field. 2. Develop yourself sustainably and collaborate.
Content	The Career Development course aims to equip students with career preparation skills through a series of topics covering self-orientation, personal branding, resume and cover letter writing, job search strategies, professional ethics, interview skills, problem-solving, salary negotiation, and transitioning to the workforce. Students are also trained in developing career portfolios, facing selection simulations, and presenting career strategies, thus hopefully building readiness, professionalism, and competitiveness in entering the workforce.
Examination forms	Essay and Oral Presentation
Study and examination requirements	Study and Examination Requirements/Forms of Examination: 1. Individual assignments (literature review, analysis) 2. Group assignments / project work (identifying misconceptions, proposing solutions) 3. Discussions and Q&A participation 4. Presentations and project documentation Assessment Recap (Project-Based Learning): 1. Participatory Activities: 27% 2. Project/Product Assessment: 53% 3. Practice/Performance: 20% Total: 100%

Reading list	1. Brown, D. (2019). Career Counseling, and Career Development (11th ed.). Pearson 2. Mulyana, dkk. (2025). Undergraduate Employability: Transisi Kuliah ke Kerja

Module Descriptions

Module designation	AI in Chemistry Learning
Semester(s) in which the module is taught	7th/Fourth Year
Person responsible for the module	Dr. Kusumawati Dwiningsih, S.Pd., M.Pd.
Language	Bahasa Indonesia (Regular Class) English (Internasional Class)
Relation to curriculum	Undergraduate course in the S1 Chemistry Education Study Program, Universitas Negeri Surabaya.
Teaching methods	Project-Based Learning (PjBL), guided exploration, demonstrations, inquiry learning, group discussion, workshops, collaborative learning, peer review, project consultation, and microteaching/simulation. 2 workhours per week (2 x 170 minutes per week)
Workload (incl. contact hours, self-study hours)	2 Credit Units (CU). Based on the workload convention in the supplied Module Descriptions template (1 CU = 170 minutes per week over 14 weeks, excluding midterm and final examinations), the estimated workload is 79.33 hours per semester, equivalent to approximately 3.18 ECTS.
Credit points	2 Credit Units (CU) = 3.18 ECTS
Required and recommended prerequisites for joining the module	No prerequisite is explicitly stated in the attached RPS.
Module objectives/intended learning outcomes	Upon successful completion of this course, students are expected to: 1. Critically and systematically analyze the concepts, potential, limitations, and outputs of AI technologies in chemistry learning based on scientific and pedagogical principles. 2. Design AI-assisted chemistry learning that aligns with learning objectives, the characteristics of chemistry content, learner needs, and pedagogical principles. 3. Develop and implement AI-based chemistry learning media or solutions creatively, interactively, and with a learner-centered orientation. 4. Evaluate and improve AI-based chemistry learning solutions using implementation evidence while

	considering ethics, humanistic values, academic integrity, and responsible AI use.
Content	This course equips prospective chemistry teachers with critical, pedagogical, and responsible AI literacy. Students explore foundational concepts of artificial intelligence, machine learning, generative AI, and large language models, and critically examine their opportunities and limitations in education. Through Project-Based Learning, students use AI to design, develop, test, evaluate, and refine chemistry learning experiences and products. Particular emphasis is placed on verifying AI-generated content, including chemistry concepts, calculations, chemical equations, nomenclature, visualizations, and the connections among macroscopic, submicroscopic, and symbolic representations. Students also consider assessment design that promotes reasoning, data privacy, bias, academic integrity, transparency in AI use, ethics, and humanistic values. The project culminates in an AI-assisted chemistry learning product that is tested through a limited trial, simulation, or microteaching and improved based on evidence and feedback.
Examination forms	Project/product assessment, portfolio assessment, presentations, reports, reflective writing, demonstrations, peer assessment, and analysis of implementation data. The midterm assessment is a project presentation of an AI-assisted learning design portfolio and initial prototype. The final course work includes evaluation and revision of the AI-assisted chemistry learning product and reflection on ethical and responsible AI use.
Study and examination requirements	Students are expected to complete individual and group assignments, maintain documentation of prompts and AI outputs, verify generated information against credible sources, participate in discussions and peer review, develop a product blueprint and prototype, conduct a limited trial or microteaching, prepare evaluation instruments, analyze feedback and implementation evidence, revise the product, and submit a final product with supporting documentation. Assessment evidence includes portfolios, product quality, presentations, reports, implementation records, analysis, and reflection. The attached RPS does not specify an overall percentage breakdown for assessment components.
Reading list	1. Li, Y., Tolosa, L., Rivas Echeverria, F., & Marquez, R. (2026). Translating UNESCO artificial intelligence guidelines to chemical education and its implications for sustainable development goals. Journal of Chemical Education, 103, 1135–1144. https://doi.org/10.1021/acs.jchemed.5c00819

	2. Berber, S., Brückner, M., Maurer, N., & Huwer, J. (2025). Artificial intelligence in chemistry research—Implications for teaching and learning. Journal of Chemical Education, 102, 1445–1456. https://doi.org/10.1021/acs.jchemed.4c01033 3. Tassoti, S. (2024). Assessment of students' use of generative artificial intelligence: Prompting strategies and prompt engineering in chemistry education. Journal of Chemical Education, 101, 2475–2482. https://doi.org/10.1021/acs.jchemed.4c00212 4. Iyamuremye, A., et al. (2024). Utilization of artificial intelligence and machine learning in chemistry education: A critical review. Discover Education. https://doi.org/10.1007/s44217-024-00197-5 5. Erümit, A. K., & Sarıalioğlu, R. Ö. (2025). Artificial intelligence in science and chemistry education: A systematic review. Discover Education, 4, 17. https://doi.org/10.1007/s44217-025-00622-3 6. Reyes, R. L., & Regala, J. D. (2026). Reimagining the philosophy of experimentation in chemistry education: Embracing AI as a tool for scientific inquiry. Science & Education, 35, 709–754. https://doi.org/10.1007/s11191-025-00667-8