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.