

**EDUCATIONAL IMPLEMENTATION
GUIDELINES
GRADUATE PROGRAM IN ENVIRONMENTAL
ENGINEERING**



**GRADUATE PROGRAM IN ENVIRONMENTAL ENGINEERING
BIOLOGY DEPARTMENT
FACULTY OF SCIENCE AND TECHNOLOGY
AIRLANGGA UNIVERSITY
2023**

FOREWORD

Assalamualaikum Wr. Wb.

We express our thanks to the presence of Allah SWT, the Almighty God, because of His permission this guideline can be prepared. This guide contains learning outcomes for graduates of the Environmental Engineering Study Program at Airlangga University, the curriculum structure and related brief rules.

This guideline is used to carry out educational and learning activities according to the curriculum that applies to students starting from the Class of 2021. This guideline must be known by lecturers, lecturers and students starting from the Class of 2021 within the Environmental Engineering Study Program at Airlangga University.

Hopefully this guide can be useful.

Walaikumsalam Wr. Wb.

Surabaya, August 1 2023

Environmental Engineering Undergraduate Study Program Coordinator

Dr. Eko Prasetyo Kuncoro, ST, DEA

**LEARNING ACHIEVEMENTS OF GRADUATES OF THE ENVIRONMENTAL ENGINEERING PROGRAM, AIRLANGGA
UNIVERSITY**

ATTITUDE LEARNING OUTCOMES

A	Description
A1	Have faith in God Almighty and be able to show a religious attitude.
A2	Upholding human values in carrying out duties based on religion, morals and ethics.
A3	Contribute to improving the quality of life in society, nation and state, and the progress of civilization based on Pancasila.
A4	Acting as a citizen who is proud and loves the country, has nationalism and a sense of responsibility to the state and nation.
A5	Respect the diversity of cultures, views, religions and beliefs, as well as the original opinions or findings of others.
A6	Work together and have social sensitivity and concern for society and the environment.
A7	Obey the law and be disciplined in social and state life.
A8	Internalize academic values, norms and ethics.
A9	Demonstrate a responsible attitude towards work in their field of expertise independently.
A10	Internalize the spirit of independence, struggle and entrepreneurship.

GENERAL SKILLS LEARNING OUTCOMES

G	Description
G1	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 humanities values in accordance with their field of expertise.
G2	Able to demonstrate independent, quality and measurable performance.
G3	Able to study the implications of developing or implementing technological science by paying attention to 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, compiling scientific descriptions of the results of their studies in the form of a thesis or final assignment report , and upload it on the college page.
G4	Compile a scientific description of the results of the study above in the form of a thesis or final assignment report and upload it to the university website.

G5	Able to make appropriate decisions in the context of solving problems in the field of environmental engineering, based on the results of information and data analysis.
G6	Able to maintain and develop working networks with supervisors, colleagues, colleagues both inside and outside the institution.
G7	Able to be responsible for the achievement of group work results and supervise and evaluate the completion of work assigned to workers under his/her responsibility.
G8	Able to carry out a self-evaluation process for work groups under his/her responsibility, and able to manage learning independently.
G9	Able to document, store, secure and retrieve data to ensure validity and prevent plagiarism.

KNOWLEDGE LEARNING OUTCOMES

K	Description
K1	Mastering the theoretical concepts of science, engineering principles needed for analyzing environmental problems and designing environmental management systems in at least one aspect, namely environmental protection, environmental preservation or environmental restoration.
K2	Mastering the concepts of natural sciences and the application principles of engineering mathematics to analyze environmental management system problems.
K3	Mastering the principles, methodology and techniques for designing environmental management systems with an integrated approach.
K4	Master the latest principles and issues in economics, society, ecology in general.
K5	Master communication techniques and the latest and most recent technological developments.

SPECIFIC SKILLS LEARNING OUTCOMES

SS	Description
SS1	Able to apply engineering methods in environmental management to protect public health and the environment.
SS2	Able to identify, formulate and design drinking water supply and drinking water treatment systems technically and practically; waste pollution control systems (liquid, solid and gas) as well as technical and practical drainage and sanitation.
SS3	Able to identify and design occupational health and safety systems.
SS4	Able to identify, formulate and solve problems in environmental management systems (AMDAL, EMS, Clean Production, Water Resources and Natural Resources in general).
SS5	Able to make decisions and determine the impacts and risks of work and production processes (buildings, services, systems, locations, mapping or infrastructure) on the environment, health and safety of workers and the community based on academic studies.
SS6	Able to use modern engineering tools for practical needs.
SS7	Able to work in teams involving other related areas of expertise or with stakeholders.

SS8	Able to apply and develop environmental engineering knowledge and ready to carry out lifelong learning.
SS9	Professional ethics (honest and responsible) in practicing his expertise in the field of environmental engineering.
SS10	Able to identify and utilize Indonesia's potential in the application of environmental engineering science in various industrial fields

CURRICULUM STRUCTURE OF THE ENVIRONMENTAL ENGINEERING PROGRAM OF AIRLANGGA UNIVERSITY

SEMESTER 1

CODE	MK	SKS	PRECONDITION
	Religion	2	-
NOP 103	Pancasila	2	-
NOP 104	Civic	2	-
BAI 101	Indonesian	2	-
SIP 107	Data and Libraries	2	-
BID 101	Basic Biology	2	-
KID 101	Basic Chemistry	2	-
BID 102	Lab Practice for Basic Biology	1	-
KID 102	Lab Practice for Basic Chemistry	1	-
LKB 104	Introduction to Environmental Science and Technology	2	-
Sub-Amount		18	

SEMESTER 2

CODE	MK	SKS	PRECONDITION
PHP 103	Logic and Critical Thinking	2	-
MNM 107	Introduction to Scientific Collaboration	2	-
MNM 106	Communication and Self Development	2	-
MAA 101	Calculus	3	-
FID 113	Basic Physics	2	-
FID 114	Lab Practice for Basic Physics	1	-
LKB 201	General Ecology	2	-
LKB 203	Lab Practice for General Ecology	1	-
LKT 208	Engineering Drawing	2	-
LKT 314	Practice for Engineering Drawing	1	-
BAE 111	English I	2	-
Sub-Amount		20	

3RD SEMESTER

CODE	MK	SKS	PRECONDITION
MAT 218	Mathematics for Environmental Engineering	2	Calculus
FID 206	Fluid Mechanics	3	Basic Physics
LKT 203	Structure Knowledge	2	Basic Physics
LKK 301	Environment Chemistry	2	Basic chemistry
LKK 302	Lab Practice for Environmental Chemistry	1	Basic chemistry
BIM 303	Environmental Microbiology	2	Basic Biology
BIM 309	Lab Practice for Environmental Microbiology	1	Basic Biology
LKD 303	Methods of Environmental Analysis Techniques	2	Basic Physics, Basic Chemistry, General Ecology
LKD 304	Lab Practice Methods of Environmental Analysis Techniques	1	Basic Physics, Basic Chemistry, General Ecology
LKB 204	Natural Resource Management	2	General Ecology
Sub-Amount		18	

CHOICE

CODE	MK	SKS	PRECONDITION
LKT 308	Environmental Remote Sensing	2	General Ecology
LKB 304	Watershed Management	2	General Ecology
LKB 311	Integrated Management of Coastal and Marine Areas	2	General Ecology
LKB 307	Marine Pollution and Its Control	2	General Ecology
Sub-Amount		8	

SEMESTER 4

CODE	MK	SKS	PRECONDITION
MAT 219	Environmental Engineering Mathematics II	2	Environmental Engineering Mathematics I
LKT 303	Soil Mechanics and Hydrogeology	2	Basic Physics
LKT 227	Environmental Engineering Operations Unit	3	Fluid Mechanics, Environmental Chemistry
LKT 228	Environmental Engineering Operations Unit Practicum	1	Fluid Mechanics, Environmental Chemistry
LKT 229	Environmental Engineering Process Unit	3	Fluid Mechanics, Environmental Chemistry, Environmental Microbiology
LKT 230	Environmental Engineering Process Unit Practicum	1	Fluid Mechanics, Environmental Chemistry, Environmental Microbiology
LKB 205	Ecotoxicology	2	Environmental Chemistry, General Ecology
MAB 249	Environmental Statistics	2	
MNM 205	Company and Organization Management	2	
Sub-Amount		18	

CHOICE

CODE	MK	SKS	PRECONDITION
SII 307	Environmental Geographic Information System	2	General Ecology
LKB 302	Biomonitoring	2	Environmental Analysis Engineering Methods
LKT 211	Plumbing and Pump Planning	2	Fluid Mechanics
LKT 231	New and Renewable Energy	2	Natural resource management
Sub-Amount		8	

5TH SEMESTER

CODE	MK	SKS	PRECONDITION
LKT 206	Drinking Water Supply System	2	Environmental Engineering Operations Unit
LKT 213	Lab Practice for Drinking Water Supply System	1	Environmental Engineering Operations Unit
LKT 338	Wastewater Distribution System	2	Environmental Engineering Operations Unit
LKT 339	Lab Practice for Wastewater Distribution System	1	Environmental Engineering Operations Unit
LKT 301	Solid Waste Management	2	Environmental Engineering Operations Unit, Environmental Microbiology
LKT 316	Lab Practice Solid Waste Management	1	Environmental Engineering Operations Unit, Environmental Microbiology
LKT 340	Air Pollution Prevention and Control	3	Environmental Engineering Operations Unit, Environmental Engineering Process Unit

LKT 341	Introduction to Environmental Documents	2	Natural Resource Management, Environmental Analysis Engineering Methods
PNT 497	Research Methods	2	Environmental Statistics, Environmental Analysis Technique Methods, Introduction to Environmental Science and Technology
Sub-Amount		16	

CHOICE

CODE	MK	SKS	PRECONDITION
LKT 342	Management and Quality of Water Resources	2	Natural Resource Management, Environmental Analysis Engineering Methods
LKT 343	City Territory and Spatial Planning	2	Natural Resource Management, Environmental Analysis Engineering Methods
LKT 344	Environmental Bioremediation and Phytotechnology	2	Environmental Engineering Operations Unit, Environmental Engineering Process Unit
LKT 345	Environmental Geotechnic	2	Soil Mechanics and Hydrogeology
LKT 346	Conversion Engineering and Energy Efficiency	2	Environmental Engineering Operations Unit, Environmental Engineering Process Unit
Sub-Amount		10	

6TH SEMESTER

CODE	MK	SKS	PRECONDITION
LKT 309	Lab Practice for Drinking Water Treatment Building Planning	3	Drinking Water Supply System
LKT 309	Lab Practice for Drinking Water Treatment Building Planning	1	Drinking Water Supply System
LKT 307	Hazardous Waste Management	2	Environmental Engineering Operations Unit, Environmental Engineering Process Unit, Ecotoxicology
MNK 204	Project Management	2	Communication and Personal Development
KMK 201	Occupational Health and Safety	2	
HKA 104	Environmental Law	2	
	Technopreneurship	2	
	Religion II	2	
Sub-Amount		16	

CHOICE

CODE	MK	SKS	PRECONDITION
	Environmental Management System	2	General Ecology
	Life Cycle Analysis (LCA)	2	Environmental Engineering Operations Unit, Environmental Engineering Process Unit
	Landfill Planning	2	Solid Waste Management

	Environmental Sanitation Infrastructure	2	Waste Water Distribution System
	Environmental Drainage	2	Waste Water Distribution System
	Sub-Amount	10	

7TH SEMESTER

CODE	MK	SKS	PRECONDITION
	Wastewater Processing Building Planning	3	Waste Water Distribution System
	Lab Practice for Wastewater Processing Building Planning	1	Waste Water Distribution System
KLT 301	Internship	3	SKS requirements
KNT 401	Community Service	3	SKS requirements
PNT 498	Thesis proposal	2	SKS requirements
	Sub-Amount	12	

CHOICE

CODE	MK	SKS	PRECONDITION
	Industrial Waste Treatment	2	Environmental Engineering Operations Unit, Environmental Engineering Process Unit
	Strategic Environmental Assessment (KLHS)	2	Introduction to Environmental Documents
	Rehabilitation, Restoration and Environmental Conservation	2	Natural resource management
	Economics and Environmental valuation	2	
	Sub-Amount	8	

SEMESTER 8

CODE	MK	SKS	PRECONDITION
PNT 499	Thesis	6	Thesis proposal
	Sub-Amount	6	

CHOICE

CODE	MK	SKS	PRECONDITION
	Current Issues in Environmental Engineering	2	
	Environmental Engineering Materials Knowledge	2	Structure Knowledge
LKM 202	Environmental Modeling	2	Environmental Engineering Mathematics II
	Sub-Amount	6	

MBKM

CODE	MK	SKS
KAT301	Teaching Assistance A	6
KAT302	Teaching Assistance B	6
KAT303	Teaching Assistance C	8
KKT301	Research Internship A	6
KKT302	Research Internship B	6
KKT303	C Research Internship	8
KKT304	D Research Internship	6
KKT305	E Research Internship	6
KKT306	F Research Internship	8
KKT311	Industrial Job Internship A	6

KKT312	Industry B Internship	6
KKT313	C Industry Internship	8
KKT314	Industrial Work Internship D	6
KKT315	E Industry Job Internship	6
KKT316	F Industrial Internship	8
KNT301	Project in Village A	6
KNT302	Project in Village B	6
KNT303	Project in Village C	8
KNT304	Student Humanity Project A	6
KNT305	Student Humanity Project B	6
KNT306	Student Humanity Project C	8
MBS301	Student A's Independent Study	6
MBS302	B Student Independent Study	6
MBS303	Student Independent Study C	8
MBW301	Student Entrepreneurship A	6
MBW302	Student Entrepreneurship B	6
MBW303	Student Entrepreneurship C	8
MBW304	Student Entrepreneurship D	6
MBW305	Student Entrepreneurship E	6
MBW306	Student Entrepreneurship F	8

RULES FOR IMPLEMENTING THE CURRICULUM FOR THE ENVIRONMENTAL ENGINEERING PROGRAM OF AIRLANGGA UNIVERSITY

Important things (general):

1. The maximum credits per semester is 24 credits.
2. To graduate, students must complete a minimum of 144 credits
3. Thesis proposal is taken after the student has completed a minimum of 110 credits
4. The thesis is taken after the student has passed the Thesis Proposal

Important things (MBKM):

1. MBKM activities are guided by guidelines from Jakarta and UnAir
2. All MBKM activities must have the permission and knowledge of the guardian lecturer and KPS
3. All MBKM documents must be documented to get recognition from UnAir
4. Students can not take elective courses, instead they can take MBKM courses

Other matters that have not been conveyed will be arranged according to circumstances and needs by prioritizing student interests.