

MASTER OF ENGINEERING

SPECIALIZATION: ENVIRONMENTAL

PROGRAMME SPECIFICATIONS

The Master of Engineering Specialization in Environmental is offered on a full-time basis at UTM Main Campus in Johor Bahru. The duration of study is one and a half (1.5) years to a maximum of four (4) years. This program is open for any bachelor graduate from science, technology and engineering courses. Graduates from other discipline but with relevant experiences are also encouraged to apply.

The programme is based on a 2-Semester per academic session. Generally, students are expected to undertake courses equivalent to between nine (9) to fifteen (15) credit hours per semester. The course assessment is based on courseworks, final examination and dissertation project given throughout the semester.

General Information

1. Awarding Institution	Universiti Teknologi Malaysia	
2. Teaching Institution	Universiti Teknologi Malaysia	
3. Programme Name	Master of Engineering	
4. Final Award	Master of Engineering Specialization: Environmental	
5. Programme Code	MKKN	
6. Professional or Statutory Body of Accreditation	MQA	
7. Language(s) of Instruction	English	
8. Mode of Study (Conventional, distance learning, etc)	Mixed-Mode	
9. Mode of operation (Franchise, self-govern, etc)	Self-governing	
10. Study Scheme (Full Time/Part Time)	Full Time	
11. Study Duration	Minimum : 1.5 years Maximum : 4 years	
Type of	No. of Semesters	No of Weeks/Semester

Semester	Min	Max	
Normal	3	8	14
Short	-		-

Course Classification

No.	Classification	Credit Hours	Percentage
i.	University Elective (2 courses)	6	13%
ii.	Programme Core	9	20%
iii.	Programme elective (3 courses)	9	20%
iv	Dissertation	21	47%
	Total	45	100%

Programme Educational Objectives (PEO)

PEO 1 Graduates are able to acquire advanced knowledge on the principles of environmental engineering and can practice in accordance to the acceptable standards in environmental engineering and related fields.

PEO 2 Graduates are able to work independently or in a group, able to search and manage knowledge and can readily adapt to the changing situations.

PEO 3 Graduates able to communicate effectively to different types of audience and can demonstrate consistent professional ethics with high integrity in serving their organisation and society.

Programme Learning Outcomes (PLO)

PLO 1 Graduates are able to integrate advanced scientific and technical knowledge of environmental engineering and related principles.

PLO 2 Graduates are able to generate hypotheses, design and carry out studies and scientific research to solve and explain phenomena that occur through the application of appropriate instruments and techniques.

PLO 3 Graduates are able to analyse and evaluate the problems in environmental engineering and is able to resolve through critical problem solving skill.

PLO 4 Graduates are able to demonstrate high ethical standard in professional practice including environmental and societal issues.

PLO 5 Graduates are able to communicate effectively through written and oral modes.

PLO 6 Graduates are able to perpetually seek advanced knowledge and

technology of environmental engineering and related fields for life-long learning.

GRADUATION CHECKLIST

To graduate, students must pass all the stated courses in this checklist. It is the responsibility of the students to ensure that all courses are taken and passed. Students who do not complete any of the course are not allowed to graduate.

NO	CODE	COURSE	CREDIT EARNED (JKD)	CREDIT COUNTED (JKK)	TICK (✓) IF PASSED
PROGRAMME CORE COURSES (Compulsory)					
1	MKKN 1003	Environmental Management and Sustainability	3	3	
2	MKKN 1413	Water Pollution Control	3	3	
3	MKKN 1513	Solid and Hazardous Waste Management	3	3	
TOTAL CREDIT OF CORE COURSES (a)			9	9	
PROGRAMME ELECTIVE COURSES (Choose only 3 Courses)					
4	MKKN 1063	Water Quality Assessment and Management	3	3	
5	MKKN 2123	Environmental Quality Analysis	3	3	
6	MKKN 2223	Environmental Laws & Institution	3	3	
7	MKKN 2233	Land Use & Environmental Planning	3	3	
8	MKKN 2243	Environmental Economics	3	3	
9	MKKN 2413	Physico-Chemical Treatment Processes	3	3	
10	MKKN 2423	Biological Treatment Process	3	3	
TOTAL CREDIT OF ELECTIVE COURSE (b)			9	9	
UNIVERSITY GENERAL COURSES					
11	U*** **3	University General Course	3	3	
12	UKKP 0013	Research Methodology	3	3	
TOTAL CREDIT OF UNIVERSITY GENERAL COURSE (c)			6	6	
DISSERTATION					
13	MKKN **80	Dissertation	25	HL	
TOTAL CREDIT OF DISSERTATION (d)			25	25	

	TOTAL CREDIT TO GRADUATE (a+b+c+d)	45	45	
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COURSE SYNOPSIS

CORE COURSES

MKKN 1003 - Environmental Management and Sustainability

This course is designed to expose students to various aspects in environmental management and the concept of sustainability. Topics discussed include the principles of sustainable development, understanding the environmental sensitive areas particularly the natural water bodies, catchment management, development of coastal and inland areas. Current issues related to environmental problems especially on climate change and water supply are the main aspects to be addressed. Some methods and concepts of sustainable approaches are introduced in order to promote and achieve sustainable development goals. At the end of the course, the students should be able to understand the concept of environmental sustainability. The course enables the students to understand, plan and incorporate the concept of sustainability in environmental management.

MKKN 1413 - Water Pollution Control

This course introduces students to water and domestic wastewater treatment system. The content is designed to enable students to understand the processes that are involved in treating water and domestic wastewater. Students will be introduced to characterization of water and wastewater based on basic water quality parameters. This is followed by water treatment processes, which include coagulation, flocculation, sedimentation, filtration and disinfection. Topics on domestic wastewater treatment includes suspended growth processes i.e. activated sludge, oxidation pond, aerated lagoon and biofilm process i.e. biofilter. Students will be given the basic concept of each process and its conceptual design and analysis.

MKKN 1513 - Solid and Hazardous Waste Management

The course aims to analyse the component of solid and hazardous waste management. Upon completion of the course, student should be able to apply the concept of solid and hazardous waste management and identify the issue in waste management. The course covers the analysis of sources, generation and characteristics of industrial and municipal wastes, selection and evaluation of collection systems, handling and disposal practices of municipal wastes, management of scheduled wastes, the design of waste treatment system and the pollution prevention and techniques.

ELECTIVE COURSES

MKKN 1063 - Water Quality Assessment and Management

This course is designed to expose students to current trends and various aspects in water quality assessment and management for river catchments, lakes,

reservoirs and wetlands. It tackles problems involving water pollution and its impacts on the environment and legislation. Water quality monitoring projects carried out by students will enable application of proper sampling and monitoring methods. At the end of the course students will then be able to assess water quality problems and plan mitigation and control measures for water pollution.

MKKN 2123 - Environmental Quality Analysis

This course is designed to expose and train students on analytical principles and method for analyzing environmental quality. Topics discussed will include the theory and practical approaches of analytical tools based on biological, chemical and physical properties and methods. The quality parameters are BOD, COD, TOC, DO, metals constituents, inorganic and organic impurities in air and water samples. Methods based on biological tools are also introduced to the students. Among instrumentations employed for the course are UV VIS spectrophotometer, HPLC, GC, AA spectrometer and IR spectrometer. The students are also required to conduct analysis in laboratory. At the end of the course, the student should be able to explain, determine and apply the methods for environmental analysis.

MKKN 2223 - Environmental Laws & Institution

This course is designed to equip students with the philosophy, knowledge and mechanism of resource and environmental law. Aspects included are the development of law governing resource and environment; sources of environmental law; principles and techniques of resource and environmental law; regulatory bodies for resource and environment; common law approach to environmental; historical context of environmental law in Malaysia; components and mechanism of Environmental Quality Act 1974; future challenges of environmental law

MKKN 2233 - Land Use & Environmental Planning

This course covers the fundamental concepts and mechanisms underlying land use and environmental planning from conceptual to its implementation. It focuses on the understanding of ecosystems, the impacts of land development activities along with the appropriate tools/techniques of environmental planning and management used to mitigate them. It provides an overview of the field, along with the fundamentals of land use planning, and presents a collaborative approach to environmental planning while explaining the principles of ecosystem management, restoration, and protection; land conservation; and the mitigation of natural hazards.

MKKN 2243 - Environmental Economics

The course aims to equip students with the application of relevant techniques and approaches in environmental economics. It requires students to understand the market failures concept in handling environmental resources,

apply the corrective measures by using the principles of market economics and economic valuation of environmental resources and undertake a specific research project in the application of techniques and approaches in environmental economics. It includes development and environmental relationship in order to balance economic development and environmental conservation, tools and instrument of sustainability assessment, the adverse impacts of development on economics and the environment, fundamental economic forces and the economic consequences on the current global environmental economic issues

MKKN 2413 - Physico-Chemical Treatment Processes

This course emphasizes on physico-chemical processes of water and wastewater treatment. The content is tailored to enable students to understand, analyze and apply essential theories and principles in removing various types of contaminant from water and wastewater using physico-chemical processes. Students will be introduced to process fundamentals which include thermodynamic and kinetics of reaction, mass balance concept and reactor analysis. Processes that will be discussed include aeration and air stripping, chemical oxidation, disinfection, chemical precipitation, coagulation, sedimentation, filtration, carbon adsorption, ion exchange and membrane processes. Students will be given the basic concept of each process, its applications, advantages and weaknesses. The conceptual design and analysis will be explained in detail.

MKKN 2423 - Biological Treatment Process

The course is designed to expose students to biological treatment processes in engineered wastewater system. It covers major wastewater engineering aspects such as process analysis and design, treatment technologies, modeling and membrane bioreactor. It will also demonstrate a typical calculation, design and analysis on common biological treatment processes. At the end of the course, students should be able to incorporate and utilize technology in the design of operational unit of wastewater engineering.

GENERAL COURSES

UKKP 0013 - Research Methodology

The aim of this course is to equip students with the essential knowledge and skills to do a research and write dissertation systematically. This course has 9 modules which will be conducted through weekly 3-hour seminar. Each seminar will be consisted a lecture, discussion and workshop. In the end of course, students need to produce a research proposal and have a mini conference as part of assessment and proposal presentation practice.

DISSERTATION

MKKN XX80 - Dissertation

For Dissertation, student needs to conduct research work in chemical laboratories, computer laboratories or companies and analyse the data critically to solve a research problem. The student then has to write a complete thesis which will be evaluated by examiners at the end of the course. Student also has to present and defend their findings.