

MASTER OF SCIENCE (SAFETY, HEALTH & ENVIRONMENT)

PROGRAMME SPECIFICATIONS

The UTM Master of Science (Safety, Health & Environment) programme is offered on a full-time basis at the UTM main campus in Johor Bahru and also on a part-time basis (Offshore) (weekend classes) in Kuala Lumpur. The duration of the study is one to three years for full-time and two to four years for part-time. This programme is open for any graduate with a degree in science, technology and engineering. Graduates from other disciplines but with relevant experiences are also encouraged to apply.

General Information

1. Awarding Institution	Universiti Teknologi Malaysia			
2. Teaching Institution	Universiti Teknologi Malaysia			
3. Programme Name	Master of Science (Safety, Health & Environment)			
4. Final Award	Master of Science (Safety, Health & Environment)			
5. Programme Code	MKKH			
6. Professional or Statutory Body of Accreditation	MQA			
7. Language(s) of Instruction	English and Bahasa Melayu			
8. Mode of Study (Conventional, distance learning, etc.)	Conventional, Active and Cooperative Learning (Taught Course)			
9. Mode of operation (Franchise, self-govern, etc.)	Self-governing			
10. Study Scheme (Full Time/Part Time)	Full-Time and Part-Time (Offshore)			
11. Study Duration	<p><i>Full-Time</i> Minimum: 1 year Maximum: 3 years</p> <p><i>Part-Time (Offshore)</i> Minimum: 2 years Maximum: 4 years</p>			
Type of Semester	No. of Semesters		No. of Weeks	
	Full Time	Part Time	Full Time	Part Time
Normal	2	4	14	14
Short	1	1	8	8

Course Classification

No	Classification	Credit Hours	Percentage
i.	University General Courses	3	6.5%
ii.	Programme Core	21	45.6%
iii.	Programme Electives	9	19.6%
iv	Research Skills	13	28.3%
	Total Credit Hours	46	100%

Programme Educational Objectives (PEO)

PEO1- To equip graduate students with knowledge of safety, health and environment discipline that can contribute to improving the quality of safety, health, and environment of operations in industries.

PEO2- To train graduate students applying the knowledge of safety, health and environment in the employee management, concept, business strategy, and organization goals.

PEO3- To equip graduate students with skills for reviewing documents and making decisions related to safety, health, and environment.

PEO4- To equip graduate students with problem-solving skills related to safety, health, and environment in any activities and industries.

Programme Learning Outcomes (PLO)

PLO1- Ability to master the knowledge in safety, health & environmental discipline.

PLO2- Ability to apply research knowledge in safety, health & environmental discipline.

PLO3- Ability to demonstrate several methodologies to analyze problems in safety, health & environmental field using scientific and critical thinking approaches.

PLO4- Ability to apply to legal, ethical and professional code of practice in safety, health & environmental discipline.

PLO5- Ability to deliver effective communication on safety, health & environmental issues.

PLO6- Ability to apply the concept of lifelong learning in safety, health & environmental field.

PLO7- Ability to adapt and interact in society on safety, health & environmental aspects.

PLO8- Ability to work effectively in a team towards achieving common goal and interest.

PLO9- Ability to demonstrate leadership qualities with peers and stakeholders.

PLO10- Ability to manage relevant information in safety, health & environmental field.

PLO11- Ability to identify business opportunity in safety, health & environmental field.

GRADUATION CHECKLIST

To graduate, students must pass all the stated courses in this checklist with minimum B grade. Students must achieve a total of 46 credit hours with a minimum of cumulative B grade or CGPA of 3.0 and passed master research project and has submitted the approved project report to UTM. 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 EARNE D (JKD)	CREDIT COUNTED (JKK)	TICK (√) IF PASSED
PROGRAMME CORE COURSES (Compulsory)					
1	MKKH 1213	Risk Assessment & Accident Modeling	3	3	
2	MKKH 1353	Safety and Health Legislations	3	3	
3	MKKH 1363	Safety and Health Management	3	3	
4	MKKH 1433	Occupational Safety	3	3	
5	MKKH 1443	Occupational Health	3	3	
6	MKKH 1513	Environmental Management	3	3	
7	MKKH 1523	Pollution Control Technology	3	3	
TOTAL CREDIT OF CORE COURSES (a)			21	21	
PROGRAMME ELECTIVE COURSE (Choose only 4 Courses)					
8	MKKH 1223	Inherent Safety & Health Design	12	12	
9	MKKH 1233	Emergency Response Management			
10	MKKH 1243	Process Safety & Loss Prevention			
11	MKKH 1253	Asset Integrity			
12	MKKH 1343	Incident Investigation			
13	MKKH 1373	Human Factor			
TOTAL CREDIT OF ELECTIVE COURSE (b)					12
UNIVERSITY GENERAL COURSE					
14	U*** **3	University General Course	3	3	
TOTAL CREDIT OF UNIVERSITY GENERAL COURSE (c)			3	3	
RESEARCH SKILLS					
15	MKKH 1113	Research Methodology & Design of Experiment	3	3	
16	MKKH 1614	SHE Project 1	4	4	
17	MKKH 1626	SHE Project 2	6	6	
TOTAL CREDIT OF RESEARCH SKILLS (d)			13	13	
TOTAL CREDIT TO GRADUATE [(a)+(b)+(c)+(d)]			46	46	

COURSE SYNOPSIS

CORE COURSES

MKKH 1213 - Risk Assessment & Accident Modeling

Students learn to assess risks associated to safety (e.g. risk of fire and explosion from process plant), health (e.g. risk of occupational disease), and environment (e.g. eco-system risk assessment), security (e.g. risk of terrorist attacks) with emphasis on those that are related to the process industry. Students build and interpret causal models of risks and test the accuracy of these models against incidence reports. The course includes various accident modelling techniques, qualitative and quantitative risk assessment methods, tolerability criteria, and mitigating measures.

MKKH 1353 - Safety and Health Legislations

This course explains in depth about the principles of Occupational Safety and Health (OSH) and Legislations. OSH legislations are a set of standards that must be met in order to ensure the safety and health of all employees and others that might be affected at the workplace, and responsible for the workplace protection. OSH consists of important regulations such as Occupational Safety and Health (OSH) Act 1994, Factories and Machinery (FMA) Act 1967, Fire Service Act 1988, Petroleum Safety Measures Act 1984, Gas Supply Act 1993 etc. OSH laws must be abide to ensure any accidents/incidents that might results from abnormal work activity can be prevented while maintaining a safe and properly controlled working environment.

MKKH 1363 - Safety and Health Management

This course presents the principles and methodology of occupational safety and health management systems. In particular, it emphasises on the key elements of management systems which include policy, planning, implementation and operation, checking and corrective action, management review and continual improvement. The course features extensive use of case studies from industry through group presentation.

MKKH 1433 - Occupational Safety

Occupational safety is an area concerned with the safety, health and well-being of people engaged in work or employment. It is a two way relationship between work environment and safety. Occupational safety is a part of the safety science curriculum. Compared to process safety, occupational safety concerns more on the workers welfare merely due to day-to-day work activities than the impacts on lives, assets and environment due to abnormal process operation. This course introduces concepts of occupational safety with primary focus on various types of occupational hazards in typical workplace environment. For each type of hazard, students are provided with detailed discussion, ranging from understanding the hazard to the factors that may cause the accidents in the workplace. Also, the types of injuries that may be caused by the hazards are also discussed before appropriate recommendations and strategies to avoid or reduce the hazards are presented. Overall, through this course, students will acquire the knowledge and judgment to function as an entry-level practitioner in occupational safety and health. Students also should be able to contribute to the development and maintenance of a safe and healthy work environment.

MKKH 1443 - Occupational Health

This course provides a comprehensive knowledge in the field of occupational health, with a focus on workplace-related diseases and industrial hygiene. This course covers the knowledge of occupational health and strategies to deal with occupational health issues. It presents information related to the recognition, evaluation and control of the chemical, physical and environmental factors that can have impact on human health in the workplace and in the community. The course also enables graduates to facilitate the application of principles of occupational health to control the risks in their workplace. Graduates of this will be able to identify occupational health hazards and seek solutions and interventions to bring about change in the workplace.

MKKH 1513 - Environmental Management

This course covers environmental management system principle, environmental act and international protocols or framework in achieving global sustainable development. This course also includes discussion on the fundamental of environmental cycle, carbon footprint and life cycle assessment. A range of underlying drivers for unsustainable use of the environment are also analysed: the economics of global climate change; resource consumption and climate change mitigation. This course will use Massive Open Online Course (MOOC) Blended learning approach in delivering selected subjects.

MKKH 1523 - Pollution Control Technology

This course introduces the cause, effect and method to control pollution from industries. The course covers the three major categories of industrial pollution: water pollution, air pollution and industrial waste management. In the first part, the course includes the source and types of water pollutants, environmental regulations pertaining to waste water discharge, and techniques to treat raw water and waste water before discharging to the environment. The second part of the course covers the solid and hazardous waste characteristics and effect of air pollution, regulations requirement for air pollution control, technology to control air pollution emissions from industries. The third part covers the management of industrial waste that includes definition of scheduled waste, scheduled waste regulations, and technique to manage the waste.

MKKH 1113 - Research Methodology and Design Of Experiment

This course provides guidelines for preparing a research proposal and defends it. It provides the rationale for the research, the research objectives, the proposed methods for data collection, and data analysis. The proposal is based on the individual interest either in safety, health and environment topic. In the proposal you will present the research and statistical methodology and with expected result and discussion

MKKH 1614 - SHE Project 1

This course is a first stage of the Master's Project which involve in preliminary studies and planning of research activity on selected safety, health and environment (SHE) topics. The study may include the work on accident data analysis, process simulation, modelling, survey, experiment and case study. The research project is designed to expose the students in writing a research proposal that covers literature review, writing a problem statement, scope identification, objective and method determination. At the end of the course, students should

be able to write a research proposal in a professional practice. The students should also be able to manage and plan their research project according the time given.

MKKH 1626 - SHE Project 2

This course is a second stage of the Master's Project which is continuity of SHE Project 1 (MKKH 1614). The proposed study in project 1 will be reviewed, modified (if any) and implemented. In this course, the work of data analysis, process simulation, modelling, survey, experiment and case study is carried out systematically as planned. The students should also be able to manage and plan their research according the time given. It is expected the students to analyze, discuss and report the finding of the study at the end of the semester. He or she is required to share and communicate the result effectively through written and oral presentation.

ELECTIVE COURSES

MKKH 1223 - Inherent Safety and Health Design

The main goal of any HSE design of new process plant or modification of existing plant should be to apply the principles of inherent safety. The concept of inherent safety professes that a plant should be designed to be fundamentally safer rather than relying on external add-on control systems. Basically, this concept of inherent safety as well as its principles are introduced to the students in this course. Besides, the students will be exposed to the methods available for inherent safety assessment before they are taught on systematic approaches for inherently safer design. This course also covers inherent occupational health, a new concept which is originated from inherent safety. Students will be taught on how to assess the inherent occupational health performance of a plant using different methods at different stages of process design. Fugitive emissions will also be covered in detailed including the quantification of the amount released and the estimation of the associated health risk among the workers exposed. At the end of the course, students will be introduced to several simple techniques for multi-criteria decision making in designing a chemical plant which is both inherently safer and healthier.

MKKH 1233 - Emergency Response Management

This course offers students the basics steps to recognise the common major hazard in the chemical process industry (CPI) and the ways to handle emergency situation at work. Unwanted event such as toxic release, chemical spills, fire, and explosion are frequently occur in the chemical process industry. The readiness and effectiveness of response during emergency depends on many factors such as knowledge, planning, system implemented, and training. In this cause, students will be exposed the current issue in the CPI and fundamental of emergency management which is covers identifying, preventing, controlling, and mitigating the emergency situations.

MKKH 1243 - Process Safety & Loss Prevention

This course is concerned with all aspects of Chemical Process Safety and Loss Prevention. The course emphasizes quantitative engineering analysis based upon the application of mass and energy balances, transport phenomena, process control and process design. The course

emphasize on the appreciation for orders of magnitude estimation and relative significance. In addition, concepts of management and individual responsibility are stressed, along with the ability to work as a team.

MKKH 1253 - Asset Integrity

This course provides the practices of asset integrity, legislation and management practices related to managing of asset and facility in the process industries. The course covers basics of process safety management, corrosion, risk assessment, maintenance programmed, Malaysia and international law, asset integrity management and its key asset integrity elements. Element of process safety management will be discussed based on PSM element by PSM USA and risk control system UK_HSE. Standard code of practices in the industries such as API, ASME, IEC will be discussed. In making discussion, the method such as cost and benefit, life cycle cost analysis will be explained. Emphasis is given in managing oil and gas, chemical and power plant's asset integrity. The course also to open discussion on exploring the business opportunity related with asset integrity management in Malaysia.

MKKH 1343 - Incident Investigation

This course presents the principles and methodology of incident investigation. In loss prevention, the strategy can be divided to proactive and reactive. Proactive strategy is about activity that provides feedback on safety performance within an organization before an accident, case of ill-health or an incident. Meanwhile, reactive monitoring measures accidents, cases of ill-health and incidents. The idea being to identify the causes of these failures and to take remedial action which will prevent them occurring again. Results of these activities will allow organization to measure its effectiveness as well as assisting them in charting future action plan for improvement. In Malaysia, accident investigation is a legal requirement under OSHA 1994.

MKKH 1373 - Human Factor

This course introduces a basic knowledge of human factors design principles and the nature of human interaction with their physical work environment. The content of this course includes cognitive engineering, ergonomics, socio-technical systems, and the nature of human performance in the workplace.