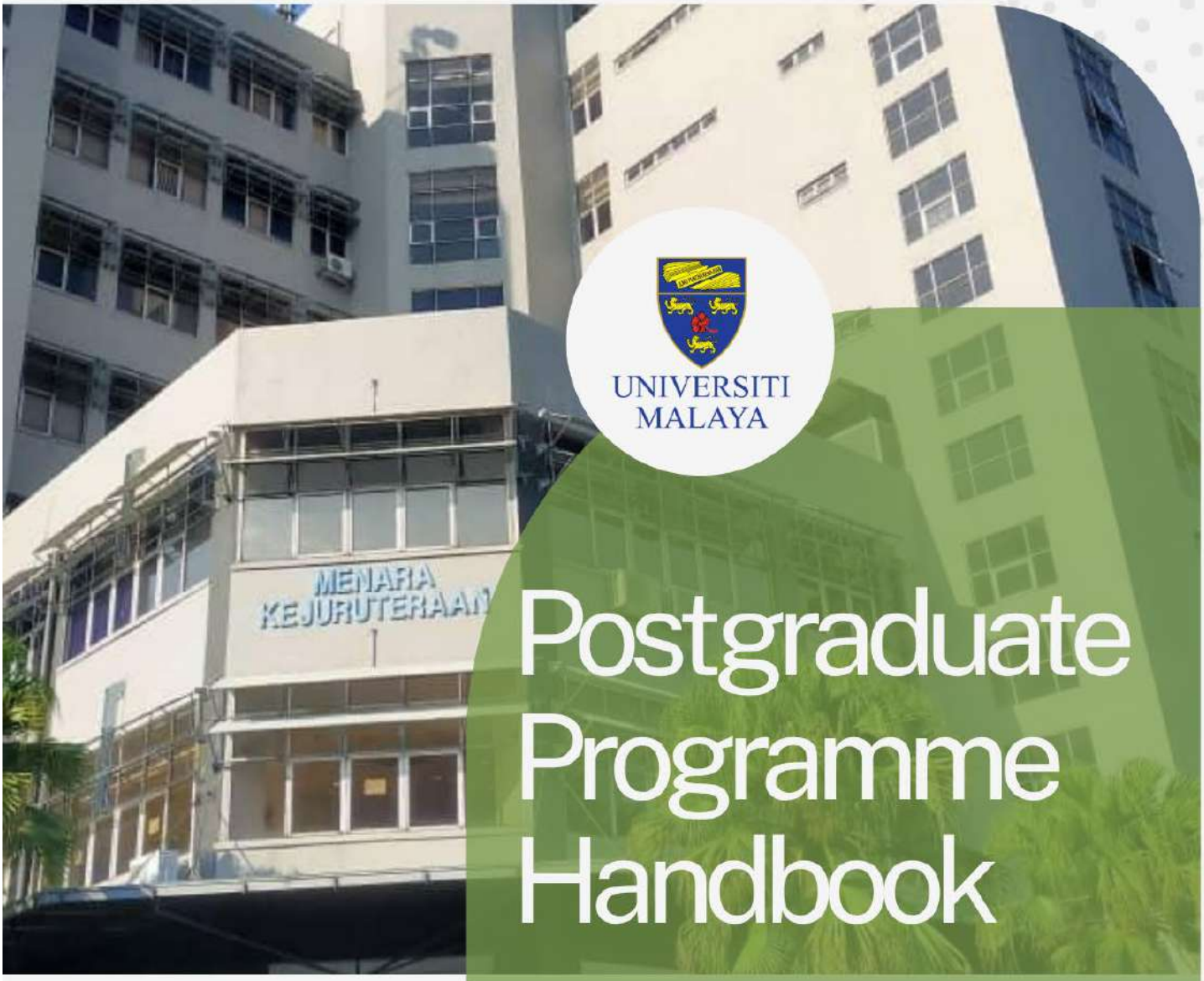

UNIVERSITI
MALAYA

Postgraduate Programme Handbook

Academic Session 2026/2027

2026/
2027

Faculty of Engineering

engine.um.edu.my

UNIVERSITI MALAYA

FACULTY OF ENGINEERING

POSTGRADUATE PROGRAMME HANDBOOK

ACADEMIC SESSION

2026/2027

OFFICE OF THE DEPUTY DEAN (POSTGRADUATE STUDIES)

Block L, Engineering Tower, Faculty of Engineering

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GOVERNING LEGISLATION, RULES AND REGULATIONS

Postgraduate candidature at the Faculty of Engineering is governed by the applicable University instruments and requirements set out below, as amended from time to time.

MASTER'S DEGREE PROGRAMMES

Master's candidates are governed by:

- Universiti Malaya (Master's Degree) Rules 2024 - Version 3 (LPU 02.07.2025)
- Universiti Malaya (Master's Degree) Regulations 2024 - Version 6 (Senate 27.02.2025)

DOCTOR OF PHILOSOPHY (PhD) PROGRAMME

PhD candidates are governed by:

- Universiti Malaya (Doctoral Degree) Rules 2024 - Version 4 (LPU 02.07.2025)
- Universiti Malaya (Doctoral Degree) Regulations 2024 - Version 6 (Senate 27.02.2025)

University-wide obligations

In addition, every postgraduate candidate is subject to:

- Universities and University Colleges Act 1971 [Act 30];
- Constitution of University of Malaya 2010 [P.U. (A) 444/2010];
- Universities and University Colleges (University of Malaya) (Discipline of Students) Rules 2024 [P.U. (A) 384/2024]; and
- all other statutes, rules, regulations, policies, guidelines, procedures, requirements and decisions currently applicable at Universiti Malaya, including those issued or amended from time to time.

Candidate responsibility. Candidates are responsible for familiarising themselves with, and complying with, the latest applicable University rules, regulations, policies and Faculty requirements. If any provision in this handbook is inconsistent with an official University instrument, the official instrument shall prevail.

Official reference: UMSITS Guide - Rules and Regulations

Version numbers stated above are those adopted for this handbook at the time of publication and remain subject to subsequent amendment by Universiti Malaya.

UNIVERSITI MALAYA

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Postgraduate Handbook | Academic Session 2026/2027

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MESSAGE FROM THE DEAN | ACADEMIC SESSION 2026/2027

Welcome to your next chapter

A postgraduate journey defined by curiosity, purpose and impact

Prof. Ir. Dr. Nik Nazri Nik Ghazali

DEAN
FACULTY OF ENGINEERING

"Your postgraduate journey is an opportunity not only to master knowledge, but to create value that matters."

CURIOSITY
INTEGRITY
PURPOSE

EXPLORE THE FACULTY ↗

Dear Postgraduate Students,

On behalf of the Faculty of Engineering, Universiti Malaya, it is my great pleasure to welcome you and to congratulate you on reaching this important milestone. Your decision to pursue postgraduate study reflects not only your academic ability, but also your readiness to question, discover and lead.

At the Faculty of Engineering, postgraduate education is more than the pursuit of an advanced qualification. It is an opportunity to become part of a scholarly community committed to developing engineering solutions that improve lives, strengthen society and shape a more sustainable future. Whether you are undertaking a coursework-based, research-based or Open and Distance Learning programme, your experience here should broaden both your expertise and your sense of purpose.

Engineering today is being transformed by rapid technological change, climate and sustainability challenges, new models of mobility and energy, and the growing importance of responsible innovation. During your time with us, you will learn alongside accomplished academics, researchers, industry partners and peers from diverse backgrounds. I encourage you to make full use of this environment - participate in seminars, exchange ideas across disciplines, build professional networks and remain open to perspectives different from your own.

Approach this journey with curiosity, courage and discipline. Ask thoughtful questions. Test assumptions. Be prepared to learn from setbacks as well as achievements. Some of the most meaningful discoveries begin when we are willing to explore beyond familiar boundaries and work collaboratively towards a shared goal.

Postgraduate study requires independence, but it should never mean isolation. Your supervisors, programme coordinators, academic departments and the Postgraduate Office are here to support you. Seek guidance early, communicate openly and take ownership of your progress. The relationships you build during this journey may become among the most valuable and enduring outcomes of your time at Universiti Malaya.

As you progress, remember that excellence is not measured solely by grades, publications or the completion of a thesis. It is also reflected in the integrity of your work, the quality of your thinking and the positive impact you create. I hope that you will leave this Faculty not only with deeper knowledge, but also with the confidence to shape industries, advance research, inform policy and serve society with distinction.

Welcome to the Faculty of Engineering. May the 2026/2027 academic session mark the beginning of a rewarding journey of discovery, contribution and lifelong achievement.

With my very best wishes,

Prof. Ir. Dr. Nik Nazri Nik Ghazali
Dean, Faculty of Engineering
Universiti Malaya

BEGIN WITH CURIOSITY • LEAD WITH INTEGRITY • CREATE WITH PURPOSE

ABOUT THE FACULTY

Engineering excellence, impacting the world.

Vision, mission and faculty commitments

VISION

A centre of engineering excellence impacting the world.

MISSION

Pushing the boundaries of knowledge, nurturing aspiring leaders and fostering strategic partnership with industries.

Our commitments

The Faculty's stated objectives place students and academic quality at the centre of its work.

STUDENTS

Developing capable, principled and globally minded graduates.

- Continue to produce highly competent and skilled individuals with leadership qualities and good interpersonal skills.
- Contribute to nation-building by producing good citizens who respect universal human values.
- Have students of diverse backgrounds who respect and internalise diversity.
- Inculcate social awareness and a sense of obligation.
- Develop students to have an international outlook and outreach.
- Develop highly competent engineers capable of identifying, formulating and solving problems creatively and innovatively.

ACADEMIC PROGRAMMES

Keeping curricula current, accredited and connected to society and industry.

- Ensure academic programmes are relevant, current, innovative and internationally recognised to meet national and global needs.
- Continuously develop academic programmes that inspire and tap students' potential.
- Ensure academic programmes are accredited by local and international engineering professional bodies.
- Continuously develop programmes that are relevant to industrial requirements.

OUR HISTORY

A legacy of engineering education

The Faculty's story began before the Kuala Lumpur campus took shape. Across more than seven decades, it evolved from a single engineering department into a multidisciplinary faculty serving education, research, industry and society.

1950	**The idea takes shape** A Board of Studies recommended establishing a Department of Engineering within the then Universiti Malaya in Singapore.
1954-56	**Engineering teaching begins** The Engineering Department was established with C. A. M. Gray as the first Professor of Engineering. Teaching began in the 1955/1956 session; the early programme was centred on Civil Engineering.
1957-58	**From Singapore to Kuala Lumpur** The Department moved to the Kuala Lumpur campus in July 1957. In 1958 it was elevated to the Faculty of Engineering at Lembah Pantai, with C. A. M. Gray as the first elected Dean; Mechanical Engineering was introduced in the same year.
1959-74	**The core disciplines expand** Electrical Engineering was added in 1959 and Chemical Engineering in 1970. In 1974, the Faculty's four divisions were upgraded to departments.
1993-96	**New fields emerge** A Computer-Aided Design and Manufacturing unit was established in 1993. In the 1996/1997 session, new areas included Telecommunications, Environmental, Materials, Computer-Aided Design and Manufacturing, and Biomedical Engineering.
2001-13	**Disciplines consolidate** The Department of Biomedical Engineering was established in 2001. A Bachelor of Biomedical Engineering (Prosthetics and Orthotics) was introduced in 2009. In 2013, the Department of Engineering Design and Manufacture merged with the Department of Mechanical Engineering.
TODAY	**A multidisciplinary postgraduate community** The Faculty currently comprises five academic departments: Biomedical, Chemical, Civil, Electrical and Mechanical Engineering. Its postgraduate portfolio spans coursework, research and doctoral study, supporting advanced professional practice and knowledge creation.

Official sources: Faculty home and history | Mission & Vision | Biomedical Engineering history | Archived Faculty handbook | Study@UM postgraduate listing

FACULTY ORGANISATIONAL CHART | 2026/2027

Meet the Team Shaping Engineering

Management and academic leadership | Faculty of Engineering, Universiti Malaya

Prof. Ir. Dr. Nik Nazri Nik Ghazali
DEAN

01 EXECUTIVE LEADERSHIP

Prof. Ir. Dr. Ong Zhi Chao
DEPUTY DEAN
Postgraduate

Assoc. Prof. Dr. Raja Ariffin Raja Ghazilla
DEPUTY DEAN
Undergraduate

Prof. Ir. Dr. Mohd Faizul Mohd Sabri
DEPUTY DEAN
Research

Dr. Suhana Koting
DEPUTY DEAN
Student Affairs

Assoc. Prof. Ir. Dr. Nasrul Anuar Abd Razak
DEPUTY DEAN
Development

Mdm. Vigneshree King
FACULTY MANAGER
Administration

02 HEADS OF DEPARTMENT

Assoc. Prof. Ir. Dr. Huzaifa Hashim
HEAD OF DEPARTMENT
Civil Engineering

Assoc. Prof. Dr. Juliana Usman
HEAD OF DEPARTMENT
Biomedical Engineering

Assoc. Prof. Ir. Dr. Anis Salwa Mohd Khairuddin
HEAD OF DEPARTMENT
Electrical Engineering

Assoc. Prof. Dr. Hanee Farzana Hizaddin
HEAD OF DEPARTMENT
Chemical Engineering

Dr. Muhammad Khairi Faiz Ahmad Hairuddin
HEAD OF DEPARTMENT
Mechanical Engineering

Select a name to view the academic profile | **Explore the full Faculty directory**

POSTGRADUATE PROGRAMME COORDINATORS | 2026/2027

Meet your programme coordinators

Your first point of contact for five taught Master's programmes

01 / COURSEWORK

Master of Biomedical Engineering

Dr. Salmah Binti Karman
PROGRAMME COORDINATOR

salmah_karman@um.edu.my
+603 7967 7694

VIEW ACADEMIC PROFILE ↗

02 / COURSEWORK

Master of Safety, Health & Environment Engineering

Dr. Mohd Izzudin Izzat Zainal Abidin
PROGRAMME COORDINATOR

izzudinizzat@um.edu.my
+603 7967 7657

VIEW ACADEMIC PROFILE ↗

03 / COURSEWORK

Master of Road Safety Engineering

Assoc. Prof. Ir. Ts. Dr. Yuen Choon Wah
PROGRAMME COORDINATOR

yuencw@um.edu.my
+603 7967 5355

VIEW ACADEMIC PROFILE ↗

04 / COURSEWORK

Master of Systems Engineering

Dr. Tengku Faiz Bin Tengku Mohmed Noor Izam
PROGRAMME COORDINATOR

tengkufaiz@um.edu.my
+603 7967 5205

VIEW ACADEMIC PROFILE ↗

05 / COURSEWORK

Master of Mechanical Engineering

Dr. Khoo Shin Yee
PROGRAMME COORDINATOR

khooshinyee@um.edu.my
+603 7967 2176

VIEW ACADEMIC PROFILE ↗

Select an email, telephone number or profile link to connect | **Explore postgraduate programmes**

OPEN & DISTANCE LEARNING | PROGRAMME COORDINATORS

Your ODL programme contacts

01 / OPEN & DISTANCE LEARNING

Master of Biomedical Engineering

MASTER'S PROGRAMME • ODL MODE

Assoc. Prof. Ir. Dr. Nur Azah Binti Hamzaid

ODL PROGRAMME COORDINATOR

EMAIL azah.hamzaid@um.edu.my

TELEPHONE +603 7967 4487

VIEW ACADEMIC PROFILE ↗

02 / OPEN & DISTANCE LEARNING

Master of Safety, Health and Environment Engineering

MASTER'S PROGRAMME • ODL MODE

Ir. Dr. Jegalakshimi A/P Jewaratnam

ODL PROGRAMME COORDINATOR

EMAIL jegalaxmi24@um.edu.my

TELEPHONE +603 7967 7689

VIEW ACADEMIC PROFILE ↗

LEARN FROM WHEREVER YOU ARE Flexible access. Direct academic support. UM quality.

EXPLORE POSTGRADUATE PROGRAMMES ↗

CONNECT IN THREE QUICK STEPS

01 CHOOSE YOUR PROGRAMME
Identify the ODL Master's programme that matches your goals.

02 MEET YOUR COORDINATOR
Review the programme contact and academic profile.

03 START THE CONVERSATION
Select an email address or telephone number above.

Research Programme Coordinators

DEPARTMENT REPRESENTATIVES | FACULTY OF ENGINEERING | UNIVERSITI MALAYA

POSTGRADUATE RESEARCH — Direct academic contact for research postgraduate programmes

01 / CIVIL ENGINEERING

Dr. Alsidqi Hasan
RESEARCH PROGRAMME COORDINATOR
Department of Civil Engineering
E alsidqi@um.edu.my
T +603 7967 5203
FOCUS Geotechnical Engineering
VIEW ACADEMIC PROFILE ↗

02 / ELECTRICAL ENGINEERING

Prof. Ir. Dr. Mahidzal Bin Dahari
RESEARCH PROGRAMME COORDINATOR
Department of Electrical Engineering
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T +603 7967 7659
VIEW ACADEMIC PROFILE ↗

03 / MECHANICAL ENGINEERING

Assoc. Prof. Ir. Dr. Salwa Hanim Binti Abdul Rashid
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E salwa_hanim@um.edu.my
T +603 7967 6832
VIEW ACADEMIC PROFILE ↗

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Dr. Farina Binti Muhamad
RESEARCH PROGRAMME COORDINATOR
Department of Biomedical Engineering
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T +603 7967 6898
VIEW ACADEMIC PROFILE ↗

05 / CHEMICAL ENGINEERING

Assoc. Prof. Ir. Dr. Nur Awanis Binti Hashim
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Department of Chemical Engineering
E awanis@um.edu.my
T +603 7967 6892
FOCUS Membrane technology and fabrication
VIEW ACADEMIC PROFILE ↗

ACADEMIC GUIDANCE

Contact the representative for your department when seeking guidance on research pathways, supervision and programme matters.

EXPLORE RESEARCH PROGRAMMES ↗

ACADEMIC GUIDANCE • RESEARCH PATHWAYS • DEPARTMENT CONTACT

FACULTY OF ENGINEERING ↗

Programme Coordinators (By Research)

RESEARCH PROGRAMMES | FACULTY OF ENGINEERING | UNIVERSITI MALAYA

POSTGRADUATE RESEARCH | Programme-level academic contact for postgraduate research candidates

01 / RESEARCH PROGRAMME

Doctor of Philosophy (PhD)

Dr. Nor Ishida Binti Zainal Abidin

VIEW ACADEMIC PROFILE ↗

PROGRAMME COORDINATOR • BY RESEARCH

Department of Mechanical Engineering

EMAIL ishida@um.edu.my

TELEPHONE +603 7967 2174

02 / RESEARCH PROGRAMME

Master of Engineering Science (MEngSc)

Prof. Dr. Hendrik Simon Cornelis Metselaar

VIEW ACADEMIC PROFILE ↗

PROGRAMME COORDINATOR • BY RESEARCH

Department of Mechanical Engineering

EMAIL h.metselaar@um.edu.my

TELEPHONE +603 7967 4451

YOUR FIRST ACADEMIC CONTACT

Connect with the relevant coordinator for programme guidance, candidature planning and research progression matters.

EXPLORE RESEARCH PROGRAMMES ↗

Academic guidance • Research pathways • UM support

CONNECT IN THREE QUICK STEPS

01 SELECT YOUR PROGRAMME

Choose the research degree that aligns with your academic goals.

02 REVIEW THE COORDINATOR

Open the academic profile to learn more about the coordinator.

03 START THE CONVERSATION

Use the email address or telephone number in the relevant card.

ACADEMIC CALENDAR 2026/2027 ACADEMIC SESSION
(MASTER AND DOCTORATE LEVEL)
AMENDMENT

SEMESTER I					
Orientation *(Week of Welcome) - WOW*	1	week	26.09.2026	-	04.10.2026
Lectures	8	weeks*	05.10.2026	-	29.11.2026
Mid Semester I Break	1	week	30.11.2026	-	06.12.2026
Lectures	6	weeks*	07.12.2026	-	17.01.2027
Revision Week	1	week*	18.01.2027	-	24.01.2027
Semester I Final Examination	2	weeks*	25.01.2027	-	04.02.2027
Semester I Break	3	weeks*	05.02.2027	-	28.02.2027
	22	weeks			
SEMESTER II					
Lectures	7	weeks*	01.03.2027	-	18.04.2027
Mid Semester II Break	1	week	19.04.2027	-	25.04.2027
Lectures	7	weeks*	26.04.2027	-	13.06.2027
UM iFest 2027	*1*	*week*	*08.06.2027*	-	*11.06.2027*
(No teaching and learning (T&L) activities shall be conducted during this period. Participation is mandatory for all final-year students / students undertaking the Final Year Project (FYP).)					
Revision Week	1	week	14.06.2027	-	20.06.2027
Semester II Final Examination	2	weeks	21.06.2027	-	04.07.2027
Semester II Break	3	weeks	05.07.2027	-	25.07.2027
	21	weeks			
SPECIAL SEMESTER					
Lectures	7	weeks*	19.07.2027	-	05.09.2027
Special Semester Final Examination	1	week	06.09.2027	-	12.09.2027
Special Semester Break	1	week*	13.09.2027	-	19.09.2027
	9	weeks			

Notes:

(1) The Module Registration and Examination Schedule can be reffered to at https://umsitsguide.um.edu.my. All information is subject to change.

(*) The Academic Calendar has taken into account public and festive holidays and is subject to change:

Deepavali	08 November 2026 (Sunday)	*Hybrid Class on 6 November 2026 (Friday)
Christmas Day	25 December 2026 (Friday)	*Hybrid Class on 24 December 2026 (Thursday)
New Year	01 January 2027 (Friday)	
Thaipusam	22 January 2027 (Friday)	
Federal Territory Day	01 February 2027 (Monday)	
Chinese New Year	06 & 07 February 2027 (Saturday & Sunday)	
Nuzul Al-Quran	24 February 2027 (Wednesday)	
Eidul Fitri	10 & 11 March 2027 (Wednesday & Thursday)	*Hybrid Class on 1 - 12 March 2027 (Monday - Friday)
Labour Day	01 May 2027 (Saturday)	
Eidul Adha	17 May 2027 (Monday)	
Wesak Day	20 May 2027 (Thursday)	
Kaamatan Festival	30 May 2027 (Sunday)	*Hybrid Class on 31 May 2027 (Monday)
Gawai Day	01 June 2027 (Tuesday)	*Hybrid Class on 31 May 2027 (Monday)
Awal Muharram	06 June 2027 (Sunday)	
His Majesty the King's Birthday	07 June 2027 (Monday)	
Prophet Muhammad's (Maulidur Rasul)	15 August 2027 (Sunday)	
National Day	31 August 2027 (Tuesday)	
Malaysia Day	16 September 2027 (Thursday)	
(#) Academia Day	05 October 2026 (Monday)	
International Week	19 – 23 October 2026 (Monday - Friday)	
UM iFest 2027	08 – 11 June 2027 (Tuesday - Friday) (No teaching and learning (T&L) activities shall be conducted during this period. Participation is mandatory for all final-year students / students undertaking the Final Year Project (FYP).)	

*Senate July 22, 2026

FACULTY DIRECTORY | ACADEMIC SESSION 2026/2027

Meet the officers behind your journey

01 START HERE

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Muhammad Hazim Hamidon

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VIEW THE LIVE DIRECTORY ↗

RESEARCH SUPPORT | ACADEMIC SESSION 2026/2027

Connect with our research officers

03 RESEARCH EXPERTISE AT A GLANCE

RESEARCH OFFICER

Dr. Mohd Fadzil Jamaludin

EXPERTISE Precision joining, additive manufacturing and product design

T +603 7967 7633
E ibnjamaludin@um.edu.my

VIEW ACADEMIC PROFILE ↗

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EXPERTISE Biomechanics, rehabilitation engineering and motion analysis

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E hanie_nadia@um.edu.my

VIEW ACADEMIC PROFILE ↗

RESEARCH OFFICER

Nik Ibtishamiah Haji Ibrahim

EXPERTISE Urban transport and planning

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E nikibibr@um.edu.my

VIEW ACADEMIC PROFILE ↗

RESEARCH OFFICER

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EXPERTISE Microalgae and bioenergy

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E meiyee_cheah@um.edu.my

VIEW ACADEMIC PROFILE ↗

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ChM Dr. Chanthiriga Ramasindarum

EXPERTISE Nanoparticle synthesis and materials characterisation techniques

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E chanthi@um.edu.my

VIEW ACADEMIC PROFILE ↗

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Norazkifni Faizura Dzulkifli

EXPERTISE Bio-based dielectric fluids, green chemistry and green technology

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E norazkifnifaizura@um.edu.my

VIEW ACADEMIC PROFILE ↗

VIEW THE LIVE DIRECTORY ↗

POSTGRADUATE OFFICE | ACADEMIC SESSION 2026/2027

Meet the Postgraduate Office team

DEPUTY DEAN (POSTGRADUATE STUDIES)
Prof. Ir. Dr. Ong Zhi Chao

SECRETARY
Nuur Hakimah Binti Mohd Din

SENIOR ASSISTANT REGISTRAR (POSTGRADUATE)
Norhasliza Abu Hasan

ASSISTANT ADMINISTRATIVE OFFICER
Nurfaizah Binti Mohd Jabir
Admissions · ODL · Accreditation · Curriculum

SENIOR ADMINISTRATIVE ASSISTANT
Nor Hayati Binti Muen
Research Programmes · (Mechanical & Biomedical)

ADMINISTRATIVE ASSISTANT
Nur Fatihah Binti Abd Rahim
Research Programmes · (Electrical)

SENIOR ADMINISTRATIVE ASSISTANT N2
Noraslinda Binti Azahari
Research Programmes · (Civil & Chemical)

ADMINISTRATIVE ASSISTANT
Muhammad Alsaddam Bin Suhaimi
Master's Programmes by Coursework

ADMINISTRATIVE ASSISTANT
Nur Ashiqin Binti Mohd Supi
Admin, Students Confirmation Letter

POSTGRADUATE OFFICE +603 7967 4477 • fk_tdit@um.edu.my • Official Faculty Management Directory ↗

POSTGRADUATE OFFICE · LEADERSHIP & COORDINATION

Meet the team supporting your postgraduate journey

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Prof. Ir. Dr. Ong Zhi Chao

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SECRETARY

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ONE OFFICE, THREE WAYS WE SUPPORT YOU

01 Academic direction	02 Office coordination	03 Administration
Leadership and postgraduate policy	Appointments and executive support	Candidature and student services

CONTACT THE POSTGRADUATE OFFICE

START HERE Postgraduate Office · +603 7967 4477 · fk_tdit@um.edu.my

OPEN THE OFFICIAL FACULTY MANAGEMENT DIRECTORY ↗

POSTGRADUATE OFFICE · PROGRAMME & STUDENT SUPPORT

Find the right person, faster

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Nurfaizah Binti Mohd Jabir

Admissions · ODL · Accreditation · Curriculum

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Nor Hayati Binti Muen

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(Mechanical & Biomedical)

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Nur Fatihah Binti Abd Rahim

Research Programmes

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Noraslinda Binti Azahari

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T +603 7967 4481

ADMINISTRATIVE ASSISTANT

Nur Ashiqin Binti Mohd Supi

Admin, Students Confirmation Letter

E ashiqin@um.edu.my
T +603 7967 4480

QUICK LINKS

FACULTY MANAGEMENT

View the current management directory ↗

ACADEMIC STAFF

Explore academic staff profiles ↗

COURSEWORK PROGRAMME | KQK

01

Master of Mechanical Engineering

COURSE TYPE	MODE OF STUDY	INDICATIVE DURATION
Coursework	Full-time	2 semesters + 1 special semester

PROGRAMME AT A GLANCE

Designed for engineers ready to move into higher-value technical and leadership roles, this programme blends advanced analysis, experimentation, simulation and engineering management. Students engage with emerging areas including renewable energy, advanced materials, artificial intelligence, additive manufacturing, digital twins and the Internet of Things, building practical capabilities relevant to energy, manufacturing, automotive, aerospace, semiconductor and automation industries.

View the official programme page

Source: Universiti Malaya Study portal | Page last updated 16 May 2026

FACULTY OF ENGINEERING

Master of Mechanical Engineering

Academic Programme Information

MME	42	FULL TIME
PROGRAMME REFERENCE	TOTAL CREDITS	TYPE OF STUDY

ACADEMIC SESSION 2026/2027
Universiti Malaya

Contents

This section presents the current programme profile, admission requirements, outcomes, curriculum and indicative study sequence for the Master of Mechanical Engineering.

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Programme Overview

The Master of Mechanical Engineering is a curriculum is a full-time coursework programme designed to strengthen advanced knowledge, professional judgement and critical problem-solving in mechanical engineering. It integrates engineering data analytics, thermal systems, energy conversion, applied mechanics, fatigue and fracture mechanics, research methodology and project management with a substantial research project. Elective study enables students to deepen their expertise in fluids, HVAC, sensors, vibration, power generation, sustainable energy, finite element analysis, materials, manufacturing, product development and pump applications.

Programme at a Glance

Programme name	Master of Mechanical Engineering
Malay name	Sarjana Kejuruteraan Mekanikal
Abbreviation	MME
Academic programme code	SCWKQKFTCV03
Faculty	Faculty of Engineering
Field of study	Engineering and Engineering Trades
National Education Code	0714 Mechanics and Metal Trades
Medium of instruction	English
Mode of study	Coursework
Type and delivery	Full time Conventional
Total credits	42 credits
Indicative sequence	Two regular semesters and one special semester
Intakes	Semester 1 October and Semester 2 March subject to availability

Curriculum Composition

Core courses	Research Project	Elective courses	Programme Total
21 credits	**12 credits**	**9 credits**	**42 credits**

Admission Requirements

Applicants must fulfil the General University Requirements and hold a Bachelor's Degree in Engineering, Science, Computing or a related field.

Academic Qualification

Applicants with a CGPA of at least 3.00 may be considered on the basis of the recognised Bachelor's Degree qualification stated above.

Applicants with a CGPA from 2.50 to 2.99 must meet at least one of the following criteria:

- Graduate of Universiti Malaya.
- At least one year of work experience in a related field.
- Publication in a related field.
- Recipient of a scholarship.
- Staff member of a government agency.
- Pass an interview conducted by the Faculty.
- Pass a special evaluation conducted by the Faculty.

English Language Requirement for International Applicants

An international applicant whose previous degree was awarded by an institution where English was not the medium of instruction must obtain at least one of the following results:

Qualification	Minimum result
Malaysian University English Test (MUET)	Band 4.0
IELTS Academic	Band 6.0
TOEFL iBT Centre based	Score 60
TOEFL Essentials Online	Score 8.5
Pearson Test of English Academic	Score 59
Cambridge B1 Preliminary B2 First C1 Advanced or C2 Proficiency	Score 169

Programme Goal and Educational Objectives

Programme Goal

The programme aims to develop knowledgeable and competitive mechanical engineering graduates who demonstrate strong professional and ethical values, apply critical thinking and make well-founded decisions on complex engineering issues through a structured curriculum grounded in core knowledge and specialist expertise.

Programme Educational Objectives

Objective	Graduate achievement	Supporting outcomes
PEO1	Graduates hold a senior or decision-making position in mechanical engineering or a related field in the public or private sector.	PLO1, PLO2, PLO6
PEO2	Graduates engage in research and development activities in mechanical engineering or a related field for their career advancement.	PLO3, PLO4, PLO5
PEO3	Graduates contribute actively to sustainable development and the well-being of society.	PLO7, PLO8

What These Objectives Emphasise

Professional leadership strategic decision-making and leadership across engineering sectors.

Research and innovation advanced technical capability, R&D and continuous career development.

Sustainable impact responsible engineering solutions that advance society and environmental well-being.

Programme Learning Outcomes

On successful completion of the programme, graduates should be able to demonstrate the following outcomes.

Code	Learning outcome	Competency domain and taxonomy
PLO1	Demonstrate continuing advanced knowledge and apply that knowledge in solving complex mechanical engineering problems.	CLS1 Knowledge and Understanding
PLO2	Analyse and evaluate complex mechanical engineering problems or issues critically and provide solutions through the application of mechanical engineering concepts.	CLS2 Cognitive Skills
PLO3	Formulate and design solutions for complex mechanical engineering problems using appropriate methods and tools.	CLS3A Practical Skills
PLO4	Communicate critically based on mechanical engineering knowledge using oral or written media as an individual or in a group.	CLS3B Interpersonal and Communication Skills
PLO5	Demonstrate competency by incorporating advanced numerical concepts and adopting relevant digital technologies in solving complex mechanical engineering problems.	CLS3C Digital and Numeracy Skills
PLO6	Demonstrate significant leadership skills in project management and technical projects in the context of complex mechanical engineering applications.	CLS3D Leadership, Autonomy and Responsibility
PLO7	Identify the need for continuous professional development and entrepreneurial elements in the context of the mechanical engineering discipline.	CLS4 Personal and Entrepreneurial Skills
PLO8	Plan and execute technical or research projects ethically and professionally as a socially responsible mechanical engineer.	CLS5 Ethics and Professionalism

Curriculum Structure

Students complete **33 credits of core courses** including research project **and 9 credits of electives** for a programme total of 42 credits. The research component is delivered through two sequential projects worth 12 credits in total.

Core Courses

Course code	Course title	Credits
KQK7018	Research Project	12
KQK7002	Engineering Data Analytics	3
KQK7003	Thermal Systems Engineering	3
KQK7004	Energy Conversion and Storage	3
KQK7005	Applied Mechanics	3
KQK7006	Fatigue and Fracture Mechanics	3
KQX7001	Research Methodology	3
KQX7002	Project Management	3
Total core credits		**33**

Research Sequence

Foundation	Development	Completion
KQX7001 Research Methodology	KQK7018 Research Project 1 (P1)	KQK7018 Research Project 2 (P2)

Integrated Learning Path

Stage	Subject keywords	Graduate capability
UNDERSTAND	Thermal systems; energy conversion; applied mechanics; fatigue and fracture; research foundations	Build advanced theoretical and technical knowledge across the principal mechanical engineering domains.
EVALUATE	Engineering data analytics; CFD; vibration; FEA; energy and materials analysis	Critically analyse complex evidence, compare alternatives and justify engineering decisions using appropriate tools.
APPLY	Research project; sensors and actuators; HVAC; manufacturing; product development; project management	Integrate analytical methods, digital capability, design judgement and ethical practice to address authentic engineering problems.

Elective Course Guide

Students complete **9 elective credits** by selecting **three approved three-credit courses**. The thematic guide below helps readers navigate the available courses; it is an editorial grouping for handbook use and does not represent formal specialisations.

Theme	Focus
Fluid and thermal systems	Computational fluid dynamics, HVAC, building energy management, power plants and pump applications.
Dynamics and condition monitoring	Sensors, actuators, machinery vibration and condition monitoring.
Energy and sustainability	Power generation, sustainable energy technology and energy-related applications.
Materials and structural analysis	Finite element analysis and materials selection in mechanical design.
Manufacturing and product development	Advanced manufacturing and integrated computer aided product development.

Elective Directory

Course code	Course title	Credits
KQK7007	Computational Fluid Dynamics	3
KQK7008	HVAC and Building Energy Management	3
KQK7009	Sensors and Actuators	3
KQK7010	Machinery Vibration and Condition Monitoring	3
KQK7011	Power Plant Engineering	3
KQK7012	Sustainable Energy Technology	3
KQK7013	Finite Element Analysis	3
KQK7014	Materials Selection in Mechanical Design	3
KQK7015	Advanced Manufacturing Technology	3
KQK7016	Integrated Computer Aided Design in Product Development	3
KQK7017	Pump Characteristics and Applications	3
Elective credits required		9

Indicative Study Plan

The official specification places the core curriculum across Semester 1, Semester 2 and Semester 3 or the Special Semester. Elective courses totalling 9 credits are completed within the candidature according to programme advice and course availability.

Study period	Core courses	Core credits	Elective planning
Semester 1	KQX7001 Research Methodology KQK7002 Engineering Data Analytics KQK7003 Thermal Systems Engineering KQK7004 Energy Conversion and Storage	12	Register approved elective course or courses as advised.
Semester 2	KQX7002 Project Management KQX7018 Research Project 1 KQK7005 Applied Mechanics KQK7006 Fatigue and Fracture Mechanics	15	Continue the approved elective plan.
Semester 3 or Special Semester	KQK7018 Research Project 2	6	Complete the remaining elective requirement.

Core	Research Project	Electives	Total
21 credits	**12 credits**	**9 credits**	**42 credits**

Planning Notes

- The study plan is an indicative academic sequence based on the supplied programme specification.
- Research Project 1 precedes Research Project 2 in the programme sequence.
- Students should confirm elective availability and registration requirements with the programme coordinator each semester.

Programme Alignment

The PLO to PEO mapping shows how learning achieved during the programme supports longer-term graduate objectives.

Learning outcome	PEO1	PEO2	PEO3
PLO1	YES		
PLO2	YES		
PLO3		YES	
PLO4		YES	
PLO5		YES	
PLO6	YES		
PLO7			YES
PLO8			YES

Alignment Summary

Objective	Primary emphasis	Supporting outcomes
PEO1	Advanced knowledge, critical problem-solving and leadership in mechanical engineering	PLO1, PLO2, PLO6
PEO2	Research, design, communication and digital capability for career advancement	PLO3, PLO4, PLO5
PEO3	Professional development, entrepreneurship, ethics and responsible contribution	PLO7, PLO8

Important Academic Information

Course registration, elective offerings and candidature requirements are governed by current Universiti Malaya regulations and Faculty decisions. Students should use this handbook section together with their offer letter, registration notices and official programme advice.

Career Prospects

The Master of Mechanical Engineering prepares graduates for advanced technical, research and leadership roles across high-value engineering industries. Its emphasis on analysis, experimentation, simulation, engineering management and emerging technologies supports careers in the following areas:

Career area	Examples
Mechanical Design and Simulation	Mechanical Design Engineer, CAE Engineer, Simulation Engineer, Computational Modelling Engineer, Product Development Engineer
Energy and Thermal Systems	Energy Engineer, Renewable Energy Engineer, Thermal Systems Engineer, HVAC Engineer, Energy Efficiency Consultant
Advanced Manufacturing and Industry 4.0	Manufacturing Engineer, Automation Engineer, Smart Manufacturing Specialist, Industrial Systems Engineer, Industry 4.0 Engineer
Advanced Materials and Additive Manufacturing	Materials Engineer, Additive Manufacturing Engineer, Manufacturing Process Engineer, Product Innovation Engineer
Artificial Intelligence, IoT and Digital Engineering	Digital Twin Engineer, Industrial IoT Engineer, Predictive Maintenance Engineer, Engineering Data Analyst, Intelligent Systems Engineer
Automotive and Sustainable Mobility	Automotive Engineer, Vehicle Systems Engineer, Electric Vehicle Engineer, Testing and Validation Engineer, Mobility Technology Specialist
Aerospace Engineering	Aerospace Systems Engineer, Structural Analysis Engineer, Propulsion Engineer, Aircraft Maintenance and Reliability Engineer
Semiconductor and High-Precision Industries	Mechanical Systems Engineer, Equipment Engineer, Facilities Engineer, Process Equipment Engineer, Reliability Engineer
Plant, Maintenance and Asset Management	Maintenance Engineer, Reliability Engineer, Asset Integrity Engineer, Rotating Equipment Engineer, Plant Engineer
Engineering Consultancy and Project Management	Mechanical Engineering Consultant, Project Engineer, Engineering Project Manager, Technical Manager, Engineering Solutions Specialist
Research and Technology Development	Research Engineer, R&D Engineer, Technology Development Engineer, Innovation Specialist, Research Scientist
Academic and Professional Advancement	Lecturer, Academic Researcher, Technical Trainer, Professional Engineer, Doctoral Research Candidate
Technical Leadership and Entrepreneurship	Engineering Manager, Technical Lead, Operations Manager, Technology Entrepreneur, Engineering Consultancy Founder

Official References

Programme page: Study@UM – Master of Mechanical Engineering (Coursework)

Faculty information: Faculty of Engineering – Postgraduate Programmes

Department information: https://engine.um.edu.my/about-mechanical-engineering

FACULTY OF ENGINEERING

Master of Mechanical Engineering Study Planners

Academic Session 2026/2027

42	21	9	12
TOTAL CREDITS	CORE-COURSE CREDITS	ELECTIVE CREDITS	RESEARCH CREDITS

How to Read the Planner

1 Follow the stages	2 Build 9 elective credits	3 Confirm registration
Complete the semester sequence shown for your intake.	Select 6 credits from Semester I offerings and 3 credits from Semester II offerings.	Check course availability, prerequisites and Research Project eligibility with the Faculty each semester.

Programme code SCWKQKFTCV03 **Mode** Full time coursework **Medium** English

Planner for Master of Mechanical Engineering

Semester I Intake

STAGE 1 SEMESTER I	STAGE 2 SEMESTER II	STAGE 3 SPECIAL SEMESTER
Entry semester	**Second study period**	**Final study period**
CORE COURSES **KQX7001** Research Methodology **[3]** **KQK7002** Engineering Data Analytics **[3]** **KQK7003** Thermal Systems Engineering **[3]** **KQK7004 Energy** Conversion and Storage **[3]** **ELECTIVE OPTIONS** **KQK7007** Computational Fluid Dynamics **[3]** **KQK7008** HVAC and Building Energy Management **[3]** **KQK7010** Machinery Vibration and Condition Monitoring **[3]** **KQK7014** Materials Selection in Mechanical Design **[3]** **KQK7016** Integrated Computer Aided Design in Product Development **[3]** **Select 2 elective subjects [6 elective credits]** **PLANNED LOAD 12 required + 6 elective = 18 credits**	**CORE COURSES** **KQX7002** Project Management **[3]** **KQK7018 Research** Project (P1) **[6]** **KQK7005** Applied Mechanics **[3]** **KQK7006 Fatigue** and Fracture Mechanics **[3]** **ELECTIVE OPTIONS** **KQK7009** Sensors and Actuators **[3]** **KQK7011** Power Plant Engineering **[3]** **KQK7012** Sustainable Energy Technology **[3]** **KQK7013** Finite Element Analysis **[3]** **KQK7015** Advanced Manufacturing Technology **[3]** **KQK7017** Pump Characteristics and Applications **[3]** **Select 1 elective subject [3 elective credits]** **PLANNED LOAD 15 required + 3 elective = 18 credits**	**CORE COURSES** **KQK7018** Research Project (P2) **[6]** **ELECTIVE OPTIONS** *No elective allocation in the standard sequence.* **PLANNED LOAD 6 required + 0 elective = 6 credits**

Core courses	Electives	Research projects	Programme total
21 credits	**9 credits**	**12 credits**	**42 credits**

Planner for Master of Mechanical Engineering

Semester II Intake

STAGE 1 SEMESTER II	STAGE 2 SPECIAL SEMESTER	STAGE 3 SEMESTER I
Entry semester	**Second study period**	**Final study period in the following academic session**
CORE COURSES **KQX7001 Research** Methodology [3] **KQK7005 Applied** Mechanics [3] **KQK7006 Fatigue** and Fracture Mechanics [3] **ELECTIVE OPTIONS** **KQK7009** Sensors and Actuators [3] **KQK7011** Power Plant Engineering [3] **KQK7012** Sustainable Energy Technology [3] **KQK7013** Finite Element Analysis [3] **KQK7015** Advanced Manufacturing Technology [3] **KQK7017 Pump** Characteristics and Applications [3] **Select 1 elective subject [3 elective credits]** **PLANNED LOAD 15 required + 3 elective = 18 credits**	**CORE COURSES** **KQK7018 Research** Project (P1) [6] **ELECTIVE OPTIONS** *No elective allocation in the standard sequence.* **PLANNED LOAD 6 required + 0 elective = 6 credits**	**CORE COURSES** **KQX7002 Project** Management [3] **KQK7002 Engineering** Data Analytics [3] **KQK7003** Thermal Systems Engineering [3] **KQK7004 Energy** Conversion and Storage [3] **KQK7018 Research** Project (P1) [6] **ELECTIVE OPTIONS** **KQK7007** Computational Fluid Dynamics [3] **KQK7008** HVAC and Building Energy Management [3] **KQK7010** Machinery Vibration and Condition Monitoring [3] **KQK7014** Materials Selection in Mechanical Design [3] **KQK7016** Integrated Computer Aided Design in Product Development [3] **Select 2 elective subjects [6 elective credits]** **PLANNED LOAD 12 required + 6 elective = 18 credits**

Core courses	Electives	Research projects	Programme total
21 credits	**9 credits**	**12 credits**	**42 credits**

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Jabatan *Department*	Jabatan Kejuruteraan Mekanik	*Department of Mechanical Engineering*
Nama Program Akademik Name of Academic *Programme*	Sarjana Kejuruteraan Mekanikal	*Master of Mechanical Engineering*
Kod Kursus* *Course Code**	KQK7018	*KQK7018*
Tajuk Kursus* *Course Title**	Projek Penyelidikan	*Research Project*
Kredit* *Credit**	12	*12*
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	480	*480*
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*	Tiada	*None*
Hasil Pembelajaran Kursus* *Course Learning Outcomes**	Di akhir kursus ini, pelajar dapat: 1. Menentukan kajian literatur dan kajian teori yang diperlukan untuk penyelidikan. 2. Merekabentuk kaedah untuk membuat kajian eksperimen atau teori. 3. Menyelesaikan masalah penyelidikan melalui metodologi dan alat yang ditentukan.	*At the end of the course, students are able to:* *1. Determine literature review and theoretical study required for the research.* *2. Design a methodology to carry out experimental or theoretical research* *3. Solve a research problem through a defined methodology and tools.*

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	4. Menilai data dan penemuan penyelidikan menggunakan alat digital yang sesuai. 5. Menggunakan kemahiran pengurusan projek yang sesuai dalam menyelesaikan projek penyelidikan. 6. Menunjukkan hasil projek penyelidikan kepada latar belakang khalayak yang berbeza melalui pembentangan. 7. Meneliti kesan kewangan dan ekonomi daripada hasil penyelidikan yang dilakukan 8. Menghubungkaitkan hasil penyelidikan yang diperolehi dengan impak kepada masyarakat.	*4. Evaluate the data and findingsof the research using the appropriate digital tools.* *5. Apply appropriate project management skills in completing the research project.* *6. Demonstrate the outcome of research project to different background of audience through presentation.* *7. Examine the financial and economic impacts of the research outcomes.* *8. Relate the research results obtained to the impact on society*
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Projek penyelidikan akan mendedahkan pelajar dalam menjalankan penyelidikan bermula daripada membuat ulangkaji risalah yang berkaitan dengan topik kajian. Kemudian diikuti dengan merancang dan menjalankan kajian dengan kaedah yang bersesuaian. Data kajian akan dikumpulkan dan dianalisa bagi menyelesaikan permasalahan penyelidikan. Laporan projek penyelidikan dan pembentangan hasil penyelidikan pada akhir semester.	*Research projects will expose students in conducting research starting from reviewing the literature review related to the topic of study. Then followed by planning and conducting a research by utilizing an appropriate method. The data will be collected and analysed to solve the research problems. Research project reports and presentation of research results will be done at the end of the semester*
Pemberatan Penilaian* *Assessment Weightage**	Penilaian Berterusan: 100% Peperiksaan Akhir: 0%	*Continuous Assessment:100%* *Final Examination:0%*
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	Ditampal di papan notis atau dimaklumkan melalui talian.	*Results will be notified through notice board and online*
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-kaedah Universiti Malaya (Ijazah Sarjana) 2019. Peraturan-peraturan Universiti Malaya (Ijazah Sarjana) 2019.	*University of Malaya Rules (Master's Degree) 2019* *University of Malaya Regulations (Master's Degree) 2019*

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Jabatan *Department*	Jabatan Kejuruteraan Mekanik	*Department of Mechanical Engineering*
Nama Program Akademik Name of Academic *Programme*	Sarjana Kejuruteraan Mekanikal	*Master of Mechanical Engineering*
Kod Kursus* *Course Code**	KQK7002	*KQK7002*
Tajuk Kursus* *Course Title**	Analisis Data Kejuruteraan	*Engineering Data Analytics*
Kredit* *Credit**	3	*3*
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	120	*120*
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*	Tiada	*None*
Hasil Pembelajaran Kursus* *Course Learning Outcomes**	Di akhir kursus ini, pelajar dapat: 1. Menganalisa data kejuruteraan dengan mengunakan kaedah berangka 2. Menganalisa data kejuruteraan dengan mengunakan kaedah pemprosesan isyarat digit.	*At the end of the course, students are able to:* *1. Analyse engineering data using numerical methods.* *2. Analyse engineering data using digital signal processing methods.*

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	3. Meramal suatu hasil kejuruteraan yang diinginkan dengan menggunakan sifat data dan algoritma pembelajaran mesin yang sesuai.	*3. Predict a desired engineering outcome using suitable data feature and machine learning algorithm.*
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Proses membuat keputusan berasaskan data adalah komponen penting dalam sistem kejuruteraan yang baru muncul di industri 4.0. Ia terutamanya melibatkan tugas penyifatan data dan kemahiran pemodelan sistem diskret yang berkesan. Kursus ini memperkenalkan alat matematik umum yang digunakan untuk menganalisa data kejuruteraan seperti analisa berangka dan pemprosesan isyarat, untuk menyari sift data yang sesuai untuk ramalan hasil yang diinginkan. Pelajar perlu membangun model matematik atau model 'kotak hitam' dengan pembelajaran mesin dan mengaplikasikannya bersama sifat data yang dipilih untuk menganggar penyelesaian. Dengan itu, penyelesaian ini dapat memberikan celik akal untuk membuat keputusan yang lebih baik dalam aplikasi kejuruteraan.	*Data-driven decision making process is an essential component of emerging engineering systems in industry 4.0. It mainly involves effective data featuring task and discrete system modelling skill. This course introduces general mathematical tools used to analyse engineering data such as numerical analysis and signal processing, in order to extract its suitable feature for prediction of the desired outcome. Students need to develop a mathematical model or a 'black-box' model with machine learning, and apply it with the selected data feature to estimate the solution. Hence, this solution will give a new insight for better decision making in engineering application.*
Pemberatan Penilaian* *Assessment Weightage**	Penilaian Berterusan: 50% Peperiksaan Akhir: 50%	*Continuous Assessment:50%* *Final Examination:50%*
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	Ditampal di papan notis atau dimaklumkan melalui talian.	*Results will be notified through notice board and online*
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-kaedah Universiti Malaya (Ijazah Sarjana) 2019. Peraturan-peraturan Universiti Malaya (Ijazah Sarjana) 2019.	*University of Malaya Rules (Master's Degree) 2019* *University of Malaya Regulations (Master's Degree) 2019*

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Jabatan *Department*	Jabatan Kejuruteraan Mekanik	*Department of Mechanical Engineering*
Nama Program Akademik Name of Academic *Programme*	Sarjana Kejuruteraan Mekanikal	*Master of Mechanical Engineering*
Kod Kursus* *Course Code**	KQK7003	*KQK7003*
Tajuk Kursus* *Course Title**	Kejuruteraan Sistem Haba	*Thermal Systems Engineering*
Kredit* *Credit**	3	*3*
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	120	*120*
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*	Tiada	*None*
Hasil Pembelajaran Kursus* *Course Learning Outcomes**	Di akhir kursus ini, pelajar dapat: 1. Model sistem haba yang kompleks kepada komponen-komponen asas pemindahan haba dan aliran bendalir. 2. Menilai sistem haba berdasarkan prinsip pemindahan haba dan aliran bendalir. 3. Mengukur potensi penambahbaikan reka bentuk	*At the end of the course, students are able to:* *1. Model a complex thermal system into basic components of heat transfer and fluid flow.* *2. Evaluate a thermal system based on principles of heat transfer and fluid flow.* *3. Measure the potential of thermal design improvement and optimization by means of*

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	dan pengoptimuman sistem haba dengan mengunakan alatan atau kaedah moden.	*modern tools or methods.*
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Rangkaian rintangan termal untuk pemindahan haba yang stabil, Pemindahan haba yang stabil dari permukaan bersirip atau penukar haba, Pengaliran haba konduksi tak stabil dalam geometri-geometri asas, Pengaliran haba tak stabil pada kedudukan yang berlainan, Aliran bendalir dan pemindahan haba pada plat rata, silinder dan sfera, dan di atas tiub-tiub yang tersusun, Kaedah berangka dan perisian komputer aliran bendalir dan haba (kes-kes 2D dan 3D), Aliran laminar dan aliran bergelora dan pemindahan haba dalam tiub, Sistem penukar haba, Pemindahan Haba Radiasi.	*Thermal resistance network for steady heat transfer, Steady heat transfer from finned surfaces or heat exchanger, Transient heat conduction in uniform and standard geometries and with spatial effects, Fluid flow and heat transfer over flat plate, cylinders and sphere and ove tube banks, Laminar and turbulent flow and heat transfer in tubes, Numerical Method and Computational Fluid Dynamics (2D & 3D cases), Heat exchangers, Radiation Heat Transfer*
Pemberatan Penilaian* *Assessment Weightage**	Penilaian Berterusan: 50% Peperiksaan Akhir: 50%	*Continuous Assessment:50%* *Final Examination:50%*
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	Ditampal di papan notis atau dimaklumkan melalui talian.	*Results will be notified through notice board and online*
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-kaedah Universiti Malaya (Ijazah Sarjana) 2019. Peraturan-peraturan Universiti Malaya (Ijazah Sarjana) 2019.	*University of Malaya Rules (Master's Degree) 2019* *University of Malaya Regulations (Master's Degree) 2019*

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Jabatan *Department*	Jabatan Kejuruteraan Mekanik	*Department of Mechanical Engineering*
Nama Program Akademik Name of Academic *Programme*	Sarjana Kejuruteraan Mekanikal	*Master of Mechanical Engineering*
Kod Kursus* *Course Code**	KQK7004	*KQK7004*
Tajuk Kursus* *Course Title**	Penukaran Tenaga dan Penyimpanan	*Energy Conversion and Storage*
Kredit* *Credit**	3	*3*
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	120	*120*
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*	Tiada	*None*
Hasil Pembelajaran Kursus* *Course Learning Outcomes**	Di akhir kursus ini, pelajar dapat: 1. Menganalisis penukaran tenaga dalam proses thermo-mekanikal, thermo-kimia, elektrokimia dan fotoelektrik. 2. Menunjukkan pengaruh parameter utama yang mempengaruhi kecekapan loji janakuasa 3. Membanding pelbagai sistem penukaran tenaga	*At the end of the course, students are able to:* *1. Analyse energy conversion in thermo-mechanical, thermo-chemical, electrochemical, and photoelectric processes.* *2. Demonstrate the influence major parameters that influence the efficiency of*

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	termasuk kos, penerimaan sosial dan juga akibat alam sekitar	*the power plants* *3. Compare various energy conversion systems including cost, social acceptability as well as environmental consequences*
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Pengenalan kepada tenaga, Senario tenaga, Ekonomi tenaga, Enjin haba dan termodinamik: kuasa bendalir dan enjin haba, Enjin haba dan termodinamik: proses termodinamik dan ciri-ciri, Penukaran termal kepada tenaga mekanikal: Kitaran Rankine, Penukaran kimia kepada tenaga termal - Bahan Api & Pembakaran, Penukaran termal kepada tenaga mekanikal: Kitaran Brayton, Penukaran nuklear kepada tenaga terma, Penukaran elektromagnetik kepada tenaga termal – Solar, Penukaran elektromagnetik kepada tenaga termal – PV, Penukaran kimia kepada tenaga elektrik- Fuel Cells, Peningkatan kecekapan tenaga, Penyimpanan Tenaga	*Introduction to energy, Energy scenario, Energy economics, Heat Engines & thermodynamics: fluid power and heat engine, Heat Engines & thermodynamics ;thermodynamic processes and properties, Thermal to mechanical energy conversion: Rankine Cycle, Chemical to thermal energy conversion - Fuels & Combustion, Thermal to mechanical energy conversion- Brayton cycle, Nuclear to Thermal Energy Conversion, Electromagnetic to Thermal Energy Conversion- Solar, Electromagnetic to Electrical Energy Conversion- PV, Chemical to Electrical Energy Conversion- Fuel Cells, Energy efficiency improvement, Energy Storage*
Pemberatan Penilaian* *Assessment Weightage**	Penilaian Berterusan: 50% Peperiksaan Akhir: 50%	*Continuous Assessment:50%* *Final Examination:50%*
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	Ditampal di papan notis atau dimaklumkan melalui talian.	*Results will be notified through notice board and online*
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-kaedah Universiti Malaya (Ijazah Sarjana) 2019. Peraturan-peraturan Universiti Malaya (Ijazah Sarjana) 2019.	*University of Malaya Rules (Master's Degree) 2019* *University of Malaya Regulations (Master's Degree) 2019*

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Jabatan *Department*	Jabatan Kejuruteraan Mekanik	*Department of Mechanical Engineering*
Nama Program Akademik Name of Academic *Programme*	Sarjana Kejuruteraan Mekanikal	*Master of Mechanical Engineering*
Kod Kursus* *Course Code**	KQK7005	*KQK7005*
Tajuk Kursus* *Course Title**	Mekanik Gunaan	*Applied Mechanics*
Kredit* *Credit**	3	*3*
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	120	*120*
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*	Tiada	*None*
Hasil Pembelajaran Kursus* *Course Learning Outcomes**	Di akhir kursus ini, pelajar dapat: 1. Menganalisa masalah mekanik gunaan secara logik. 2. Mengaplikasi teori mekanik gunaan dalam masalah kehidupan sebenar 3. Merumuskan penyelesaian kepada masalah mekanik gunaan tiga dimensi	*At the end of the course, students are able to:* *1. Analyse applied mechanics problem in a logical manner.* *2. Apply theory of applied mechanics in the real life problem.* *3. Formulate solution to a three-dimensional applied mechanics problem.*

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Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Pengenalan kepada Mekanik, Mekanik Jasad Tegar dan Mekanisme Planar, Struktur Kerangka, Pengurangan Beban Tergaih, Kekuatan Ricih dan Momen Lentur, Geseran dan Pelinciran, Hubungan, Analisis Kinematik Grafik dan Analisa Mekanisme Planar, Kerja, Tenaga dan Kuasa, Gerakan Berkala , Dinamik Putaran, Pengimbangan Mesin – Putaran dan Salingan, Pemacu talisawat dan Brek, Gear Trains	*Introduction to Mechanics, Mechanics of Rigid Bodies and Planar Mechanisms, Framework Structure, Reduction of a Simple Distributed Loading, Shear Force and Bending Moment, Friction and Lubrication, Linkages, Graphical and Analytical Kinematic Analysis of Planar Mechanisms , Work, Energy and Power, Periodic Motion, Dynamics of Rotation, Balancing of Machines – Rotating and Reciprocating, Belt Drives and Brakes, Gear Trains*
Pemberatan Penilaian* *Assessment Weightage**	Penilaian Berterusan: 50% Peperiksaan Akhir: 50%	*Continuous Assessment:50%* *Final Examination:50%*
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	Ditampal di papan notis atau dimaklumkan melalui talian.	*Results will be notified through notice board and online*
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-kaedah Universiti Malaya (Ijazah Sarjana) 2019. Peraturan-peraturan Universiti Malaya (Ijazah Sarjana) 2019.	*University of Malaya Rules (Master's Degree) 2019* *University of Malaya Regulations (Master's Degree) 2019*

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Jabatan *Department*	Jabatan Kejuruteraan Mekanik	*Department of Mechanical Engineering*
Nama Program Akademik Name of Academic *Programme*	Sarjana Kejuruteraan Mekanikal	*Master of Mechanical Engineering*
Kod Kursus* *Course Code**	KQK7006	*KQK7006*
Tajuk Kursus* *Course Title**	Kelesuan dan Mekanik Retak	*Fatigue and Fracture Mechanics*
Kredit* *Credit**	3	*3*
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	120	*120*
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*	Tiada	*None*
Hasil Pembelajaran Kursus* *Course Learning Outcomes**	Di akhir kursus ini, pelajar dapat: 1. Menjelaskan mekanisme-mekanisme kegagalan dalam bahan 2. Merekabentuk bahan dan komponen melawan kegagalan 3. Menjalankan analisis kegagalan bahan kejuruteraan, komponen dan struktur	*At the end of the course, students are able to:* *1. Explain failure mechanisms in materials* *2. Design materials & components against failure* *3. Perform failure analysis of engineering materials, components and structures*

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Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Kursus ini dimulakan dengan memberi pengenalan pada kegagalan yang selalu dihadapi oleh bahan semasa perkhidmatannya. Kaji semula yang ringkas berkaitan dengan konsep tegasan dan terikan akan diajarkan. Selepas ini, tiga kegagalan akan dibincangkan dengan teliti: deformasi plastik, kagagalan rapuh dan keletihan. Akhirnya, beberapa contoh mengenali dengan kegagalan kejuruteraan akan dianalisasikan dan dibincangkan.	*The course starts with general introduction on failures commonly encountered in materials during the service. A brief review on the concept of stress and strain will be given. Then, three failures will be discussed in detail: yielding, brittle fracture and fatigue. Finally, some examples of engineering failure analysis will be discussed.*
Pemberatan Penilaian* *Assessment Weightage**	Penilaian Berterusan: 50% Peperiksaan Akhir: 50%	*Continuous Assessment:50%* *Final Examination:50%*
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	Ditampal di papan notis atau dimaklumkan melalui talian.	*Results will be notified through notice board and online*
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-kaedah Universiti Malaya (Ijazah Sarjana) 2019. Peraturan-peraturan Universiti Malaya (Ijazah Sarjana) 2019.	*University of Malaya Rules (Master's Degree) 2019* *University of Malaya Regulations (Master's Degree) 2019*

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Jabatan *Department*	Jabatan Kejuruteraan Mekanik	*Department of Mechanical Engineering*
Nama Program Akademik Name of Academic *Programme*	Sarjana Kejuruteraan Mekanikal	*Master of Mechanical Engineering*
Kod Kursus* *Course Code**	KQK7007	*KQK7007*
Tajuk Kursus* *Course Title**	Dinamik Bendalir Berkomputer	*Computational Fluid Dynamics*
Kredit* *Credit**	3	*3*
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	120	*120*
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*	Tiada	*None*
Hasil Pembelajaran Kursus* *Course Learning Outcomes**	Di akhir kursus ini, pelajar dapat: 1. Menentukan kesedaran yang kritikal persamaan mekanik bendalir dan sifat-sifat matematik mereka dalam formulasi yang pelbagai. 2. Menilai prinsip-prinsip dan batasan teknik alternatif bagi simulasi aliran bergelora dan peralihan. 3. Menilai sumber potensi ralat dan ketidakpastian	*At the end of the course, students are able to:* *1. Determine a critical awareness of the governing equations of fluid mechanics, and their mathematical properties, in various formulations.* *2. Appraise the principles and limitations of alternative techniques for the simulation of*

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	simulasi berangka.	*turbulent and transitional flows.* *3. Evaluate the potential sources of error and uncertainty in numerical simulations.*
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Kursus ini akan menyediakan pelajar dengan kefahaman yang jelas terhadap penggunaan simulasi pengiraan dan teknik-teknik pemodelan digunakan untuk masalah kejuruteraan. Ia juga akan menyediakan perspektif struktur data canggih, algoritma dan reka bentuk perisian. Pengenalan kepada kaedah pengkomputeran teragih dan berprestasi tinggi juga akan pelajari.	*The course will provide students with a sound understanding of the use of computational simulation and modeling techniques applied to engineering problems. It will also provide insight into advanced data structures, algorithms and software design. An introduction to distributed and high performance computing methods will also be included.*
Pemberatan Penilaian* *Assessment Weightage**	Penilaian Berterusan: 50% Peperiksaan Akhir: 50%	*Continuous Assessment:50%* *Final Examination:50%*
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	Ditampal di papan notis atau dimaklumkan melalui talian.	*Results will be notified through notice board and online*
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-kaedah Universiti Malaya (Ijazah Sarjana) 2019. Peraturan-peraturan Universiti Malaya (Ijazah Sarjana) 2019.	*University of Malaya Rules (Master's Degree) 2019* *University of Malaya Regulations (Master's Degree) 2019*

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Jabatan *Department*	Jabatan Kejuruteraan Mekanik	*Department of Mechanical Engineering*
Nama Program Akademik Name of Academic *Programme*	Sarjana Kejuruteraan Mekanikal	*Master of Mechanical Engineering*
Kod Kursus* *Course Code**	KQK7008	*KQK7008*
Tajuk Kursus* *Course Title**	HVAC dan Pengurusan Tenaga Bangunan	*HVAC and Building Energy Management*
Kredit* *Credit**	3	*3*
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	120	*120*
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*	Tiada	*None*
Hasil Pembelajaran Kursus* *Course Learning Outcomes**	Di akhir kursus ini, pelajar dapat: 1. Merekabentuk sistem HVAC & R untuk bangunan. 2. Menghitung beban pemanasan dan penyejukan bangunan. 3. Menaksir operasi sistem HVAC & R di bawah keadaan beban pemanasan dan penyejukan yang	*At the end of the course, students are able to:* *1. Design HVAC & R systems for buildings.* *2. Calculate building heating and cooling load* *3. Evaluate the operation of HVAC & R systems under different heating and cooling load conditions.*

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	berbeza.	
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Menggunakan prinsip rekabentuk untuk sistem penyamanan udara dan pendinginan. Menaksir operasi peralatan penyamanan udara di bawah keadaan beban yang berbeza. Membina kebolehan untuk menggunakan maklumat dari buku pegangan rekabentuk tertubuh seperti panduan ASHRAE. Mempunyai kebolehan untuk melakukan pengiraan beban penyamanan udara bangunan dan menilai faktor yang mempengaruhinya.	*Understand the design principles for air conditioning and refrigeration apparatus. Evaluate the operation of air conditioning equipment under varying load conditions. Develop the ability to use information from established design handbooks such as the ASHRAE guide. Be able to perform building air conditioning load calculations and appreciate factors influencing them*
Pemberatan Penilaian* *Assessment Weightage**	Penilaian Berterusan: 50% Peperiksaan Akhir: 50%	*Continuous Assessment:50%* *Final Examination:50%*
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	Ditampal di papan notis atau dimaklumkan melalui talian.	*Results will be notified through notice board and online*
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-kaedah Universiti Malaya (Ijazah Sarjana) 2019. Peraturan-peraturan Universiti Malaya (Ijazah Sarjana) 2019.	*University of Malaya Rules (Master's Degree) 2019* *University of Malaya Regulations (Master's Degree) 2019*

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Jabatan *Department*	Jabatan Kejuruteraan Mekanik	*Department of Mechanical Engineering*
Nama Program Akademik Name of Academic *Programme*	Sarjana Kejuruteraan Mekanikal	*Master of Mechanical Engineering*
Kod Kursus* *Course Code**	KQK7009	*KQK7009*
Tajuk Kursus* *Course Title**	Penderia dan Penggerak	*Sensors and Actuators*
Kredit* *Credit**	3	*3*
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	120	*120*
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*	Tiada	*None*
Hasil Pembelajaran Kursus* *Course Learning Outcomes**	Di akhir kursus ini, pelajar dapat: 1. Memilih penderia yang sesuai berdasarkan prinsip kerja untuk penggunaan dalam sistem pengukuran 2. Mengaplikasi pasca-pemprosesan isyarat yang diperolehi daripada penderia dalam sistem pengukuran	*At the end of the course, students are able to:* *1. Choose appropriate sensors based on working principles for use in measurement system* *2. Apply post-processing on signals acquired from sensors in a measurement system* *3. Decide suitability of actuators and*

	3. Menentukan kesesuaian penggerak dan mekanisme berdasarkan aplikasi yang diperlukan 4. Mereka sistem automatik lengkap yang mengandungi penderia dan penggerak	*mechanisms according to required applications* *4. Design a complete automated system containing sensors and actuation*
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Kursus ini mendedahkan pelajar kepada penderia, penggerak, dan pembangunan sistem dengan komponen berkenaan. Ini termasuk pengenalan kepada penderia, penggerak dan Internet Pelbagai Benda (IoT), pelantar-pelantar IoT dan sistem pengukuran, penderia-penderia dalam pelbagai pengukuran, termasuk sesaran, kehampiran, getaran, pecutan, suhu, tekanan, dan penderia piezorintangan dan piezoelektrik serta penggunaan, prinsip dan praktik perolehan data, pasca-pemprosesan isyarat daripada penderia, pelbagai jenis penggerak, penggerakan lelurus, berputar serta mekanisme penukaran pergerakan, kawalan sistem penggerakan, dan sistem automatik lengkap dengan integrasi penderia, penggerak dan IoT.	*This course exposes students to sensors, actuators, and the development of systems with relevant components. This includes introduction to sensors, actuators and Internet of Things (IoT), platforms of IoT and measurement systems, sensors in various measurements, including displacement, proximity, vibration, acceleration, temperature, pressure, and piezoresistive and piezoelectric sensors together with applications, data acquisition principles and practices, post-processing of acquired data from sensors, various types of actuators, linear and rotary actuation together with motion conversion mechanisms, controls for actuation systems, and integration of sensors, actuators and IoT for complete automated system.*
Pemberatan Penilaian* *Assessment Weightage**	Penilaian Berterusan: 50% Peperiksaan Akhir: 50%	*Continuous Assessment:50%* *Final Examination:50%*
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	Ditampal di papan notis atau dimaklumkan melalui talian.	*Results will be notified through notice board and online*
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-kaedah Universiti Malaya (Ijazah Sarjana) 2019. Peraturan-peraturan Universiti Malaya (Ijazah Sarjana) 2019.	*University of Malaya Rules (Master's Degree) 2019* *University of Malaya Regulations (Master's Degree) 2019*

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Jabatan *Department*	Jabatan Kejuruteraan Mekanik	*Department of Mechanical Engineering*
Nama Program Akademik Name of Academic *Programme*	Sarjana Kejuruteraan Mekanikal	*Master of Mechanical Engineering*
Kod Kursus* *Course Code**	KQK7010	*KQK7010*
Tajuk Kursus* *Course Title**	Getaran Jentera dan Pemantauan Keadaan	*Machinery Vibration and Condition Monitoring*
Kredit* *Credit**	3	*3*
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	120	*120*
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*	Tiada	*None*
Hasil Pembelajaran Kursus* *Course Learning Outcomes**	Di akhir kursus ini, pelajar dapat: 1. Menganalisa data getaran jentera melalui teknik pementauan keadaan 2. Menentukan kegagalan jentera yang umum dengan data getaran 3. Menilai masalah getaran rumit yang melibatkan isu-isu dinamik jentera	*At the end of the course, students are able to:* *1. Analyse machinery vibration through condition monitoring technique* *2. Determine common machinery fault conditions using vibration data* *3. Evaluate complex vibration problem involving machinery dynamics issues*

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Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Asas getaran, had dan piawai getaran, Pelaksanaan penyelenggaraan, Skim pemantauan keadaan dan audit kualiti, Pengumpulan isyarat getaran dengan menggunakan transduser, penukaran isyarat getaran dari isyarat analog ke digital, Domain masa- analisa gelombang, Domain frekuensi- analisa 'FFT', analisa fasa, Diagnostik kegagalan jentera, *Dinamik Jentera, analisa ragaman, analisa 'ODS', analisa bunyi*	*Fundamentals of vibration, Limits and standards of vibration Maintenance practices, Condition monitoring scheme and Quality Auditing, Collection of vibration signal using transducers. Conversion of vibration signals from analogue to digital signals, Time domain - waveform analysis, Frequency domain - Fast Fourier transform (FFT) analysis, Phase analysis, Machinery faults diagnostics, Machinery dynamics, Modal Analysis, Operating Deflection Shape Analysis, Noise Analysis*
Pemberatan Penilaian* *Assessment Weightage**	Penilaian Berterusan: 50% Peperiksaan Akhir: 50%	*Continuous Assessment:50%* *Final Examination:50%*
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	Ditampal di papan notis atau dimaklumkan melalui talian.	*Results will be notified through notice board and online*
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-kaedah Universiti Malaya (Ijazah Sarjana) 2019. Peraturan-peraturan Universiti Malaya (Ijazah Sarjana) 2019.	*University of Malaya Rules (Master's Degree) 2019* *University of Malaya Regulations (Master's Degree) 2019*

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Jabatan *Department*	Jabatan Kejuruteraan Mekanik	*Department of Mechanical Engineering*
Nama Program Akademik Name of Academic *Programme*	Sarjana Kejuruteraan Mekanikal	*Master of Mechanical Engineering*
Kod Kursus* *Course Code**	KQK7011	*KQK7011*
Tajuk Kursus* *Course Title**	Kejuruteraan Lojikuasa	*Power Plant Engineering*
Kredit* *Credit**	3	*3*
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	120	*120*
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*	Tiada	*None*
Hasil Pembelajaran Kursus* *Course Learning Outcomes**	Di akhir kursus ini, pelajar dapat: 1. Menganalisis sistem asas kuasa wap dan gas; untuk loji haba kovensional dan nuclear 2. Menyelesaikan masalah-masalah kecekapan tenaga di dalam sistem lojikuasa 3. Mengenalpasti kaedah modifikasi yang boleh diambil untuk mengoptimumkan sistem lojikuasa	*At the end of the course, students are able to:* *1. Analyse on fundamental systems of vapor and gas sytems and applying on thermal plants for conventional and nuclear plant* *2. Solve all the energy efficiencies problems in power systems* *3. Identify the modification methods that can*

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		be applied to optimize the power plant
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Pengenalan – Ekonomi Penjanaan Kuasa - Sistem wap – sistem gas – Kitaran Gabungan – Sistem Nuklear - Loji Nuklear – Fizik Reaktor - Loji Hidro – Ladang Suria – Loji Sumber Alternative – Kecekapan Loji - Ulangkaji	*Introduction – Economics of Power Generation – Vapor System – Gas System – Combine Cycle – Nuclear System – Reactor Physics – Hydro Plant – Solar Farm – Alternative Energy Plants – Plant Efficiency - Revision*
Pemberatan Penilaian* *Assessment Weightage**	Penilaian Berterusan: 50% Peperiksaan Akhir: 50%	*Continuous Assessment:50%* *Final Examination:50%*
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	Ditampal di papan notis atau dimaklumkan melalui talian.	*Results will be notified through notice board and online*
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-kaedah Universiti Malaya (Ijazah Sarjana) 2019. Peraturan-peraturan Universiti Malaya (Ijazah Sarjana) 2019.	*University of Malaya Rules (Master's Degree) 2019* *University of Malaya Regulations (Master's Degree) 2019*

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Jabatan *Department*	Jabatan Kejuruteraan Mekanik	*Department of Mechanical Engineering*
Nama Program Akademik Name of Academic *Programme*	Sarjana Kejuruteraan Mekanikal	*Master of Mechanical Engineering*
Kod Kursus* *Course Code**	KQK7012	*KQK7012*
Tajuk Kursus* *Course Title**	Teknologi Tenaga Lestari	*Sustainability Energy Technology*
Kredit* *Credit**	3	*3*
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	120	*120*
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*	Tiada	*None*
Hasil Pembelajaran Kursus* *Course Learning Outcomes**	Di akhir kursus ini, pelajar dapat: 1. Menerangkan tenaga asas, penukaran tenaga dan kegunaannya 2. Menganalisa isu teknikal di dalam sistem tenaga dan kebolehmampanan 3. Menerangkan pelbagai teknologi penghasilan tenaga boleh diperbaharui dan konvensional,	*At the end of the course, students are able to:* *1. Explain energy basics, renewable energy conversion and its applications* *2. Analyse the technical issues in renewable energy systems and sustainability* *3. Explain various renewable and conventional energy production technologies, practices*

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	amalan serta alternatif penggunaan tenaga	*and alternatives to energy use*
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Sistem-sistem tenaga memainkan satu peranan penting dalam kehidupan harian dan mustahak dalam kejuruteraan. Kajian mengenai sejarah penggunaan tenaga menunjukkan kepelbagaian teknologi-teknologi penjanaan tenaga, dan aliran ini berkemungkinan akan berterusan. Sumber-sumber tenaga lestari sedang giat bertambah dan akan wujud sebagai sumber penjanaan tenaga penting. Tenaga boleh diperbaharui bertambah dengan pesat pada kadar 30% atau lebih setiap tahun dan ia boleh memberi impak yang penting pada penjanaan dan penggunaan tenaga. Matlamat kursus ini adalah bagi membolehkan pelajar-pelajar untuk mengenalpasti di mana, bagaimana dan kenapa teknologi tenaga diperbaharui sepatutnya di gunakan secara berkesan.	*Energy systems play a critical role in everyday life and as such are an important part of engineering. Examination of historical energy patterns shows a continual diversification of energy generating technologies, and the trend is likely to continue. Sustainable energy sources are increasingly visible and are important part of the emerging energy mix. Renewable energy continues to grow rapidly at rates 30% per year or more and is now at a level that they can make a significant impact on energy generation and utilization. This course describes key renewable energy technologies. The goal of the course is for students to able to identify where, how and why renewable energy technologies should be appropriately used.*
Pemberatan Penilaian* *Assessment Weightage**	Penilaian Berterusan: 50% Peperiksaan Akhir: 50%	*Continuous Assessment:50%* *Final Examination:50%*
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	Ditampal di papan notis atau dimaklumkan melalui talian.	*Results will be notified through notice board and online*
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-kaedah Universiti Malaya (Ijazah Sarjana) 2019. Peraturan-peraturan Universiti Malaya (Ijazah Sarjana) 2019.	*University of Malaya Rules (Master's Degree) 2019* *University of Malaya Regulations (Master's Degree) 2019*

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Jabatan *Department*	Jabatan Kejuruteraan Mekanik	*Department of Mechanical Engineering*
Nama Program Akademik Name of Academic *Programme*	Sarjana Kejuruteraan Mekanikal	*Master of Mechanical Engineering*
Kod Kursus* *Course Code**	KQK7013	*KQK7013*
Tajuk Kursus* *Course Title**	Analisis Unsur Terhingga	*Finite Element Analysis*
Kredit* *Credit**	3	*3*
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	120	*120*
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*	Tiada	*None*
Hasil Pembelajaran Kursus* *Course Learning Outcomes**	Di akhir kursus ini, pelajar dapat: 1. Menunjukkan penggunaan kaedah elemen terhad untuk menyelesaikan masalah-masalah kejuruteraan asas. 2. Menilai had kaedah unsur terhingga khusus dan dapat membangunkan prosedur-prosedur paling sesuai untuk masalah kejuruteraan khusus.	*At the end of the course, students are able to:* *1. Demonstrate the use of finite element methods to solve the basic engineering problems.* *2. Assess the limitation of specific finite element method and be able to develop the*

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	3. Pengoptimuman reka bentuk menggunakan teknik-teknik kaedah unsur terhingga.	*most suitable procedures for specific engineering problems.* *3. Design optimization utilising the techniques of finite element method.*
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Pengenalan kepada Matrix algebra, Jenis elemen-elemen terhad unsur-unsur Bar dan unsur-unsur,masalah-masalah dimensi, teori asas,tekanan, syarat-syarat sempadan. Elemen terhad memperagakan dan penyelesaian teknik, penyelesaian persamaan, kaedah-kaedah langsung dan berlelar. Elemen-elemen plat, teori plat dan aplikasi, mengopek teori unsur-unsur dan permohonan pepejal, unsur-unsur getaran dan struktur dinamik.	Introduction- Review of Matrix algebra- Type of finite elements-spring elements-Bar and Beam elements-Two-dimensional problems – basic theory – stress – strain relations – boundary conditions. Finite element modeling and solution techniques- Equation solving; direct and iterative methods. Plate elements – plate theory and application- shell elements-theory and application -solid elements-Structural vibration and dynamics; Frequency Response Analysis-Transient Response Analysis.
Pemberatan Penilaian* *Assessment Weightage**	Penilaian Berterusan: 50% Peperiksaan Akhir: 50%	*Continuous Assessment:50%* *Final Examination:50%*
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	Ditampal di papan notis atau dimaklumkan melalui talian.	*Results will be notified through notice board and online*
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-kaedah Universiti Malaya (Ijazah Sarjana) 2019. Peraturan-peraturan Universiti Malaya (Ijazah Sarjana) 2019.	*University of Malaya Rules (Master's Degree) 2019* *University of Malaya Regulations (Master's Degree) 2019*

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Jabatan *Department*	Jabatan Kejuruteraan Mekanik	*Department of Mechanical Engineering*
Nama Program Akademik Name of Academic *Programme*	Sarjana Kejuruteraan Mekanikal	*Master of Mechanical Engineering*
Kod Kursus* *Course Code**	KQK7014	*KQK7014*
Tajuk Kursus* *Course Title**	Pemilihan Bahan dalam Rekabentuk Mekanikal	*Materials Selection in Mechanical Design*
Kredit* *Credit**	3	*3*
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	120	*120*
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*	Tiada	*None*
Hasil Pembelajaran Kursus* *Course Learning Outcomes**	Di akhir kursus ini, pelajar dapat: 1. Menganalisis hubungan antara syarat rekabentuk produk, struktur dan sifat bahan kejuruteraan. 2. Menjelaskan kepentingan proses pembuatan dalam pemilihan bahan dan rekabentuk. 3. Merekabentuk bahan dalam situasi yang melibatkan pelbagai halangan dan konflik dari segi	*At the end of the course, students are able to:* *1. Analyse the relationships between product design requirements, structure and properties of engineering materials.* *2. Explain the importance of manufacturing process in materials selection and design.* *3. Design materials in situations involving*

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	objektif	*multiple constraints and conflicting objectives.*
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Kursus ini bermula dengan mengkaji semula struktur dan sifat-sifat keluarga besar bahan serta kajian semula proses reka bentuk kejuruteraan. Kemudian, memperkenalkan kriteria prestasi dan carta sifat bahan. Selepas itu, asas-asas di proses pemilihan bahan dalam reka bentuk kejuruteraan dibincangkan. Pelajar akan dilatih untuk memilih bahan-bahan dalam keadaan reka bentuk kompleks yang melibatkan pelbagai halangan dan objektif yang bercanggah. Faktor ekonomi dan alam sekitar akan dibincangkan.	*This course starts with a review of the structure and properties of major families of materials as well as a review of the engineering design process. It then introduces performance criteria and materials property charts. Basics of materials selection process in engineering design are covered. Students will be trained to select materials in complex design situations involving multiple constraints and conflicting objectives. Economic and environmental factors are discussed.*
Pemberatan Penilaian* *Assessment Weightage**	Penilaian Berterusan: 50% Peperiksaan Akhir: 50%	*Continuous Assessment:50%* *Final Examination:50%*
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	Ditampal di papan notis atau dimaklumkan melalui talian.	*Results will be notified through notice board and online*
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-kaedah Universiti Malaya (Ijazah Sarjana) 2019. Peraturan-peraturan Universiti Malaya (Ijazah Sarjana) 2019.	*University of Malaya Rules (Master's Degree) 2019* *University of Malaya Regulations (Master's Degree) 2019*

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Jabatan *Department*	Jabatan Kejuruteraan Mekanik	*Department of Mechanical Engineering*
Nama Program Akademik Name of Academic *Programme*	Sarjana Kejuruteraan Mekanikal	*Master of Mechanical Engineering*
Kod Kursus* *Course Code**	KQK7015	*KQK7015*
Tajuk Kursus* *Course Title**	Teknologi Pembuatan Termaju	*Advanced Manufacturing Technology*
Kredit* *Credit**	3	*3*
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	120	*120*
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*	Tiada	*None*
Hasil Pembelajaran Kursus* *Course Learning Outcomes**	Di akhir kursus ini, pelajar dapat: 1. Mengklasifikasi teknologi pembuatan termaju sedia ada yang sesuai untuk aplikasi dan disiplin kejuruteraan yang tertentu. 2. Menganalisa had teknologi pembuatan termaju dalam proses pembuatan. 3. Mengaplikasikan konsep Kejuruteraan Balikan	*At the end of the course, students are able to:* *1. Classify the suitable established advanced manufacturing technology for particular engineering application and discipline.* *2. Analyse the advanced manufacturing technology limitation in the manufacturing processes.*

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	dan menghujah teknik prototaip pantas untuk bahagian atau produk yang tertentu.	*3. Apply the concept of Reverse Engineering and justify rapid prototyping technique for a particular part or product.*
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Konsep teknologi pemprosesan bahan bukan tradisional akan diperkenalkan dengan pelbagai jenis pemesinan termaju meliputi kaedah berasaskan haba, proses reaksi kimia dan proses hakisan. Kaedah kejuruteraan balikan termasuk proses pendigitan melalui pengimbasan optik dan pengimbasan laser juga diperkenalkan. Pelbagai teknik prototaip pantas akan diterangkan kepada pelajar.	*The concept of non-traditional material processing technology will be introduced with various type of advanced machining encompasses thermal-based methods, chemical reaction processes and erosion processes. The method of reverse engineering including digitizing processes through optical scanning and laser scanning will be introduced. Various rapid prototyping techniques will be explained to the students.*
Pemberatan Penilaian* *Assessment Weightage**	Penilaian Berterusan: 50% Peperiksaan Akhir: 50%	*Continuous Assessment:50%* *Final Examination:50%*
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	Ditampal di papan notis atau dimaklumkan melalui talian.	*Results will be notified through notice board and online*
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-kaedah Universiti Malaya (Ijazah Sarjana) 2019. Peraturan-peraturan Universiti Malaya (Ijazah Sarjana) 2019.	*University of Malaya Rules (Master's Degree) 2019* *University of Malaya Regulations (Master's Degree) 2019*

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Jabatan *Department*	Jabatan Kejuruteraan Mekanik	*Department of Mechanical Engineering*
Nama Program Akademik Name of Academic *Programme*	Sarjana Kejuruteraan Mekanikal	*Master of Mechanical Engineering*
Kod Kursus* *Course Code**	KQK7016	*KQK7016*
Tajuk Kursus* *Course Title**	Rekabentuk Terbantu Komputer Bersepadu dalam Pembangunan Produk	*Integrated Computer Aided Design in Product Development*
Kredit* *Credit**	3	*3*
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	120	*120*
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*	Tiada	*None*
Hasil Pembelajaran Kursus* *Course Learning Outcomes**	Di akhir kursus ini, pelajar dapat: 1. Ilustrisasikan prinsip komputer grafik di dalam aplikasi rekabentuk terbantu komputer. 2. Menunjukkan penggunaan sistem rekabentuk terbantu komputer dalam proses pembangunan produk. 3. Merekabentuk menggunakan sistem rekabentuk	*At the end of the course, students are able to:* *1. Illustrate the computer graphic principles in the Computer Aided Design application.* *2. Demonstrate the use of computer aided design systems in the product development process.* *3. Design using computer aided design system*

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	terbantu komputer bagi pembangunan produk secara bersepadu.	*for concurrent product development.*
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Kursus ini memberi penekanan kepada pemodelan parametrik pepejal dengan menggunakan perisian reka bentuk terbantu komputer yang komersial. Pelajar dijangka membangunkan kemahiran dan menggunakan Teknik yang bersesuaian untuk menghasilkan profil geometri yang berfungsi sebagai pangkalan data untuk menghasilkan model 3-D, lukisan kerja, bil bahan dan pandangan model yang dipasang. Di samping itu, pelajar akan didedahkan kepada pembangunan output prototaip pantas (percetakan 3-D) dan teknologi canggih realiti bertambah (AR).	*This course emphasis on parametric solid modelling using commercial computer aided design software. Student is expected to develop skills and utilize appropriate techniques to produce geometric profiles that serve as a database to produce 3-D models, working drawings, bill of materials and exploded views of assembled models. In addition, the student will be exposed into development of rapid prototype output (3-D printing) and advanced technology of augmented reality (AR).*
Pemberatan Penilaian* *Assessment Weightage**	Penilaian Berterusan: 50% Peperiksaan Akhir: 50%	*Continuous Assessment:50%* *Final Examination:50%*
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	Ditampal di papan notis atau dimaklumkan melalui talian.	*Results will be notified through notice board and online*
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-kaedah Universiti Malaya (Ijazah Sarjana) 2019. Peraturan-peraturan Universiti Malaya (Ijazah Sarjana) 2019.	*University of Malaya Rules (Master's Degree) 2019* *University of Malaya Regulations (Master's Degree) 2019*

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Jabatan *Department*	Jabatan Kejuruteraan Mekanik	*Department of Mechanical Engineering*
Nama Program Akademik Name of Academic *Programme*	Sarjana Kejuruteraan Mekanikal	*Master of Mechanical Engineering*
Kod Kursus* *Course Code**	KQK7017	*KQK7017*
Tajuk Kursus* *Course Title**	Ciri-ciri dan Aplikasi Pam	*Pump Characteristics and Applications*
Kredit* *Credit**	3	*3*
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	120	*120*
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*	Tiada	*None*
Hasil Pembelajaran Kursus* *Course Learning Outcomes**	Di akhir kursus ini, pelajar dapat: 1. Bandingkan pelbagai jenis pam berdasarkan kepada ciri-cirinya dan aplikasinya. 2. Menilai secara mendalam ciri-ciri pam. 3. Menilai prestasi pam termasuk sambungan paipnya berdasarkan aplikasi kehidupan sebenar.	*At the end of the course, students are able to:* *1. Compare different types of pumps based on its characteristics and applications.* *2. Evaluate detailed characteristics of pumps.* *3. Evaluate pump performance including its piping network based on a real life application.*

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Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Rajah prestasi pam, Penggunakan pam yang sesuai untuk sistem paip, Pam adalah susunan bersiri dan selari, Penggunakan pam yang sesuai untuk sistem paip, Udara dalam pam dan Jumlah Bersih Sedutan Positif, Pam anjakan positif, Pam emparan, Penutup mekanikal, O-Rings.	*Pump performance curve, Matching a pump to a piping system, Pump is serial and parallel arrangement, Matching a pump to a piping system, Pump cavitation and Net Positive Suction Head (NPSH), Positive displacement pumps, Centrifugal pumps, Mechanical Seals, O-Rings.*
Pemberatan Penilaian* *Assessment Weightage**	Penilaian Berterusan: 50% Peperiksaan Akhir: 50%	*Continuous Assessment:50%* *Final Examination:50%*
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	Ditampal di papan notis atau dimaklumkan melalui talian.	*Results will be notified through notice board and online*
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-kaedah Universiti Malaya (Ijazah Sarjana) 2019. Peraturan-peraturan Universiti Malaya (Ijazah Sarjana) 2019.	*University of Malaya Rules (Master's Degree) 2019* *University of Malaya Regulations (Master's Degree) 2019*

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Akademi/Fakulti/Institut/Pusat *Academy/Faculty/Institute/Centre*	Fakulti Kejuruteraan	*Faculty of Engineering*
Jabatan *Department*	Pejabat Timbalan Dekan (Ijazah Tinggi)	*Deputy Dean (Postgraduates) Office*
Nama Program Akademik Name of Academic *Programme*	Sarjana Kejuruteraan Bioperubatan Sarjana Kejuruteraan Mekanikal Sarjana Kejuruteraan Sistem Sarjana Kejuruteraan Keselamatan, Kesihatan dan Alam Sekitar	*Master of Biomedical Engineering* *Master of Mechanical Engineering* *Master of Systems Engineering* *Master of Safety, Health and Environment Engineering*
Kod Kursus* *Course Code**	KQX7001	*KQX7001*
Tajuk Kursus* *Course Title**	Metodologi Penyelidikan	*Research Methodology*
Kredit* *Credit**	3	*3*
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	120	*120*
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*	Tiada	*None*
Hasil Pembelajaran Kursus* *Course Learning Outcomes**	Di akhir kursus ini, pelajar dapat:	*At the end of the course, students are able to:* *1. Determine research problem or issues*

	Versi Bahasa Malaysia ***Malay Version***	**Versi Bahasa Inggeris** ***English Version***
	1. Menentukan masalah penyelidikan yang bersesuai dengan bidang kejuruteraan 2. Merekabentuk kaedah kajian untuk menyelesaikan masalah kajian 3. Menilai secara kritikal kebolehlaksanaan dan kepraktisan kaedah kajian untuk menyelesaikan masalah kajian. 4. Menyelaras maklumat penyelidikan yang relevan ke dalam laporan teknikal yang komprehensif	*related to the respective engineering field.* *2. Design appropriate research methodology to solve the research problem* *3. Evaluate critically the feasibility and practicality of relevant methods and tools to solve the research problem* *4. Coordinate relevant research information into comprehensive technical report.*
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Kursus ini mendedahkan pelajar kepada teknik – teknik bagaimana untuk menjalankan kajian. Di awal kursus pelajar di ajar dengan pelbagai teknik kajian termasuk, kaedah kajian saintifik. Kemudian, etika kajian, reka bentuk eksperimen dan teknik statistik di terangkan kepada pelajar di ikuti dengan mengenal pasti masalah kajian dan penulisan cadangan. Pelajar akan menguasai kemahiran kajian, penulisan saintifik, komunikasi lisan bagi dapatan kajian.	*This course exposes students to the techniques of how to conduct research. At the beginning of the course students are taught with various research techniques including, scientific research methods. Then, research ethics, experimental design and statistical techniques are explained to students followed by identifying research problems and writing suggestions. Students will master research skills, scientific writing, and oral communication for research findings.*
Pemberatan Penilaian* *Assessment Weightage**	Penilaian Berterusan: 100% Peperiksaan Akhir:-	*Continuous Assessment:100%* *Final Examination: -*
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	Ditampal di papan notis atau dimaklumkan melalui talian.	*Results will be notified through notice board and online*
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-Kaedah Universiti Malaya (Ijazah Sarjana) 2019. Peraturan-Peraturan Universiti Malaya (Ijazah Sarjana) 2019.	*University of Malaya Rules (Master's Degree) 2019* *University of Malaya Regulations (Master's Degree) 2019*

UNIVERSITI MALAYA	**PRO FORMA KURSUS** ***COURSE PRO FORMA***

PENTING / *IMPORTANT*:

Kandungan Pro Forma ini tidak boleh diubah tanpa kelulusan Senat bagi perkara-perkara yang telah ditandakan*. Pindaan kepada perkara lain boleh diluluskan di peringkat Akademi/Fakulti/Institut/Pusat.

*Contents of this Pro Forma shall not be changed without the Senate's approval for items indicated with *. Changes to the other items can be approved at the Academy/Faculty/Institution/Centre level.*

	Versi Bahasa Malaysia ***Malay Version***	**Versi Bahasa Inggeris** ***English Version***
Akademi/Fakulti/Institut/Pusat *Academy/Faculty/Institute/Centre*	Fakulti Kejuruteraan	*Faculty of Engineering*
Jabatan *Department*	Pejabat Timbalan Dekan (Ijazah Tinggi)	*Deputy Dean (Postgraduates) Office*
Nama Program Akademik Name of Academic *Programme*	Sarjana Kejuruteraan Bioperubatan Sarjana Kejuruteraan Mekanikal Sarjana Kejuruteraan Sistem Sarjana Kejuruteraan Keselamatan, Kesihatan dan Alam Sekitar	*Master of Biomedical Engineering* *Master of Mechanical Engineering* *Master of Systems Engineering* *Master of Safety, Health and Environment Engineering*
Kod Kursus* *Course Code**	KQX7002	*KQX7002*
Tajuk Kursus* *Course Title**	Pengurusan Projek	*Project Management*
Kredit* *Credit**	3	*3*
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	120	*120*
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*	Tiada	*None*
Hasil Pembelajaran Kursus* *Course Learning Outcomes**	Di akhir kursus ini, pelajar dapat: 1. Menganalisa prinsip komponen dan konsep	*At the end of the course, students are able to:* *1. Analyze the principle components and concepts*

	Versi Bahasa Malaysia ***Malay Version***	**Versi Bahasa Inggeris** ***English Version***
	pengurusan projek. 2. Membenarkan pelbagai pemacu perubahan yang boleh menjejaskan projek selama kitaran hidupnya. 3. Menyelesaikan segala cabaran semasa projek secara efektif. 4. Mengaplikasikan kemahiran keusahawanan dan kepimpinan dalam pengurusan sesuatu projek.	*of project management.* *2. Justify the various drivers of change which may impact a project during its life cycle.* *3. Solve every challenges faced during the project.* *4. Apply entrepreneurial and leadership skills in a project management.*
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Kursus ini memberikan pengenalan yang sistematik dan menyeluruh untuk semua aspek pengurusan projek. Projek adalah aspek yang semakin penting dalam perniagaan kejuruteraan moden. Oleh itu, kursus ini mengutarakan pentingnya memahami hubungan antara projek dan matlamat strategik organisasi. Kursus ini juga membincangkan kemahiran teknikal, budaya, dan interpersonal yang diperlukan untuk menguruskan projek dengan jayanya dari awal hingga akhir. Ia menekankan bahawa pengurusan projek adalah disiplin profesional yang merangkumi pengetahuan dan kemahirannya yang tersendiri. Konsep diperkukuhkan dengan menggunakan kajian kes yang merangkumi pelbagai jenis projek dan industri.	*This course provides a systematic and thorough introduction to all aspects of project management. Projects are an increasingly important aspect of modern engineering business. Therefore, the course underlines the importance of understanding the relation between projects and the strategic goals of the organisation. The course also discusses the technical, cultural, and interpersonal skills necessary to successfully manage projects from start to finish. It emphasises that project management is a professional discipline with its own tools, body of knowledge, and skills. Concepts are reinforced by case studies covering a wide variety of project types and industries.*
Pemberatan Penilaian* *Assessment Weightage**	Penilaian Berterusan: 50% Peperiksaan Akhir: 50%	*Continuous Assessment: 50%* *Final Examination: 50%*
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	Ditampal di papan notis atau dimaklumkan melalui talian.	*Results will be notified through notice board and online*
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-Kaedah Universiti Malaya (Ijazah Sarjana) 2019 Peraturan-Peraturan Universiti Malaya (Ijazah Sarjana) 2019	*University of Malaya Rules (Master's Degree) 2019* *University of Malaya Regulations (Master's Degree) 2019*

COURSEWORK PROGRAMME | KQB

02

Master of Biomedical Engineering

COURSE TYPE	MODE OF STUDY	INDICATIVE DURATION
Coursework	Full-time	2 semesters + 1 special semester

PROGRAMME AT A GLANCE

The Master of Biomedical Engineering is an interdisciplinary coursework programme that translates engineering, science and computing knowledge into practical healthcare solutions. Students develop advanced capabilities in bioinstrumentation, medical imaging, biomechanics, tissue engineering and healthcare technology, supported by research methodology, project management and a supervised research project. Elective study in artificial intelligence in medicine, telemedicine, physiological signal and image analysis, rehabilitation engineering, and professional standards enables students to respond to emerging healthcare and industry needs.

View the official programme page

Source: Universiti Malaya Study portal | Page last updated 16 May 2026

FACULTY OF ENGINEERING

Master of Biomedical Engineering

Academic Programme Information

MBME	42	FULL TIME
PROGRAMME	TOTAL CREDITS	TYPE OF STUDY

ACADEMIC SESSION 2026/2027
Universiti Malaya

Contents

A concise, student-facing guide to the programme profile, entry requirements, learning outcomes, curriculum, study pathway and career directions of the Master of Biomedical Engineering.

01	Programme Overview
02	Admission Requirements
03	Programme Goal and Educational Objectives
04	Programme Learning Outcomes
05	Curriculum Structure
06	Elective Course Guide
07	Indicative Study Plan
08	Programme Alignment
09	Career Prospects and Official Information

Programme Overview

The Master of Biomedical Engineering is an interdisciplinary coursework programme for graduates who want to translate engineering, science and computing knowledge into practical healthcare solutions. It develops advanced capability across medical devices, clinical and healthcare technologies, medical imaging, biomechanics, tissue engineering and digitally enabled care.

Learning connects technical depth with research, project management, professional judgement and ethical practice. Students work across disciplinary boundaries and complete a substantial supervised research project, preparing them to evaluate contemporary biomedical challenges and design evidence-informed solutions for healthcare and industry.

Programme at a Glance

Programme name	Master of Biomedical Engineering | Sarjana Kejuruteraan Bioperubatan
Abbreviation	MBE
Academic programme code	SCWKQBFTCV03
Faculty / field	Faculty of Engineering | Engineering and engineering trades (NEC 0710)
National Education Code	0713 Electronics and Automation
Medium of instruction	English
Mode of study	Coursework
Type and Delivery	Full-time | Conventional
Normal duration	2 semesters + 1 Special Semester
Intakes	Semester 1 (October) and Semester 2 (March), subject to availability
Total credits	42 credits

Curriculum Composition

Taught core	Research project	Electives	Programme total
21 credits	**12 credits**	**9 credits**	**42 credits**

Admission Requirements

Applicants must satisfy Universiti Malaya's general admission requirements and hold a recognised Bachelor's Degree in Engineering, Science, Computing or a related field.

Academic Qualification

Applicants with a CGPA of at least 3.00 may be considered on the basis of the recognised qualification above.

Applicants with a CGPA from 2.50 to 2.99 must meet at least one of the following criteria:

- Graduate of Universiti Malaya.
- At least one year of work experience in a related field.
- Publication in a related field.
- Recipient of a scholarship.
- Staff member of a government agency.
- Pass an interview conducted by the Faculty.
- Pass a special evaluation conducted by the Faculty.

English Language Requirement for International Applicants

Applicants who are required to demonstrate English-language competency must obtain at least one of the following results:

Qualification	Minimum result
Malaysia University English Test (MUET)	Band 4.0
IELTS Academic	Band 6.0
TOEFL iBT Centre Based	Score 60
TOEFL Essentials Online	Score 8.5
Pearson Test of English Academic	Score 59
Cambridge B1 Preliminary, B2 First, C1 Advanced or C2 Proficiency	Score 169

Programme Goal and Educational Objectives

Programme Goal

The programme aims to produce graduates with broad and advanced knowledge in biomedical engineering, strong professional and ethical values, and the critical-thinking skills required to make sound decisions on contemporary biomedical engineering issues through a coherent, specialist curriculum.

Programme Educational Objectives

Objective	Graduate achievement
PEO1	Graduates hold senior or decision-making positions in government or biomedical engineering sectors.
PEO2	Graduates engage in biomedical engineering research and development activities that support their career development.
PEO3	Graduates contribute actively to the sustainable development of biomedical engineering and the well-being of society.

What These Objectives Emphasise

Professional influence advanced technical judgement and readiness for senior or decision-making responsibilities.

Research and innovation a substantial project, research methodology and emerging technologies that strengthen R&D capability.

Responsible impact ethical practice, sustainability and biomedical solutions that improve healthcare and societal well-being.

Programme Learning Outcomes

On successful completion of the programme, graduates should be able to demonstrate the following outcomes.

Code	Learning outcome	Competency cluster and taxonomy
PLO1	Demonstrate continuing advanced knowledge in solving complex biomedical engineering problem.	CLS1 Knowledge and Understanding Cognitive / Psychomotor
PLO2	Analyze complex biomedical engineering problems critically and provide solutions through research, using advanced techniques, tools, skills or by a range of integrated approaches.	CLS2 Cognitive Skills Cognitive / Psychomotor
PLO3	Conduct standard and specialized research approaches and apply practical skills, tools or investigative techniques in formulating solutions for contemporary complex biomedical engineering problems.	CLS3A Practical Skills Cognitive / Psychomotor
PLO4	Communicate effectively as individual or in a group to peers, experts, or non-experts ethically and professionally using appropriate methods.	CLS3B Interpersonal and communication skills Cognitive / Psychomotor
PLO5	Demonstrate competency in using and adapt relevant digital technologies, statistical and numerical knowledge in designing solutions for complex biomedical engineering problems.	CLS3C Digital and numeracy skills Cognitive / Psychomotor
PLO6	Demonstrate significant independence, leadership, and interpersonal skills as a member or leader in project planning in complex biomedical engineering application.	CLS3D Leadership autonomy and responsibility Affective / Cognitive
PLO7	Identify the needs of self advancement through continuous professional development and adapt entrepreneurial element in the context of biomedical engineering.	CLS4 Personal and entrepreneurial skills Affective / Cognitive
PLO8	Demonstrate adherence to ethical and professional codes of practice in planning and execution of the technical or research project relevant to biomedical engineering.	CLS5 Ethics and professionalism Affective / Cognitive

Curriculum Structure

Students complete **33 credits of core courses**, including a **12-credit Research Project**, and **9 credits of approved electives.** The total graduation requirement is 42 credits.

Core Courses

Course code	Course title	Credits
KQB7012	Research Project	12
KQB7002	Bioinstrumentation	3
KQB7003	Engineering Biomechanics and Motion Analysis	3
KQB7004	Healthcare Technology	3
KQB7005	Medical Imaging	3
KQB7006	Tissue Engineering	3
KQX7001	Research Methodology	3
KQX7002	Project Management	3
Total core credits		**33**

Research Sequence

Foundation	Development	Completion
KQX7001 Research Methodology	KQB7012 Research Project 1 (P1)	KQB7012 Research Project 2 (P2)

Integrated Learning Path

Understand	Evaluate	Apply
Physiology and instrumentation Biomaterials and tissue Healthcare systems	Signals and images Human motion Evidence and risk	Research design Biomedical solutions Project delivery

Elective Course Guide

Students complete **9 elective credits** by **selecting three approved three-credit courses**. Elective availability may vary by semester and remains subject to programme advice.

Course code	Course title	Credits
KQB7007	Physiological Signal and Image Analysis	3
KQB7008	Artificial Intelligence in Medicine	3
KQB7009	Rehabilitation Engineering	3
KQB7010	Telemedicine	3
KQB7011	Safety, Standards and Ethics in Biomedical Engineering	3
Elective credits required		**9**

Choosing Electives

Biomedical data and intelligence physiological signal and image analysis, and artificial intelligence in medicine.

Human function and rehabilitation assistive, rehabilitation and human-centred engineering applications.

Connected and responsible healthcare telemedicine, safety, standards and ethics for technology-enabled care.

Indicative Study Plan

The supplied academic specification presents a full-time pathway across Semester 1, Semester 2 and the Special Semester. The Research Project extends across the periods shown but carries 12 credits once in the programme total. The sequence below is a planning guide; registration must follow the current timetable and programme advice.

Study period	Core focus	Credit position	Elective planning
Semester 1	KQB7002 Bioinstrumentation KQB7003 Engineering Biomechanics and Motion Analysis KQB7004 Healthcare Technology KQX7001 Research Methodology KQX7002 Project Management	15 taught core credits	Begin approved elective requirement, subject to the timetable.
Semester 2	KQB7005 Medical Imaging KQB7006 Tissue Engineering KQB7012 Research Project 1	6 taught core credits plus project activity	Continue or complete the approved 9-credit elective requirement.
Special Semester	KQB7012 Research Project 2	12 project credits counted once	Complete outstanding requirements, if any, with programme approval.

Core	Electives	Total
33 credits	**9 credits**	**42 credits**

Planning Notes

- Confirm course availability and registration deadlines before every semester.
- Plan the research topic, supervision and ethics or safety approvals early with the programme team.
- The official timetable and Faculty advice take precedence over this indicative pathway.

Programme Alignment

The approved PLO-to-PEO mapping connects immediate learning achievement with the programme's longer-term graduate objectives.

Learning outcome	PEO1	PEO2	PEO3
PLO1	YES		
PLO2	YES		
PLO3		YES	
PLO4		YES	
PLO5		YES	
PLO6	YES		
PLO7			YES
PLO8			YES

Alignment Summary

Objective	Primary emphasis	Supporting outcomes
PEO1	Advanced knowledge, critical analysis and independent leadership	PLO1, PLO2, PLO6
PEO2	Research, practical inquiry, communication and digital capability	PLO3, PLO4, PLO5
PEO3	Continuous development, entrepreneurship, ethics and responsible impact	PLO7, PLO8

Important Academic Information

Course registration, elective offerings and candidature requirements are governed by current Universiti Malaya regulations and Faculty decisions. Students should use this handbook section together with their offer letter, registration notices and official programme advice.

Career Prospects and Official Information

Biomedical engineering careers sit at the intersection of engineering, healthcare, research and technology management. The programme supports progression into technical, clinical, innovation and leadership-oriented roles.

Career area	Examples
Medical devices and clinical engineering	Biomedical Engineer; Clinical Engineer; Medical Device Design Engineer; Hospital Equipment Maintenance Engineer
Imaging, biomechanics and rehabilitation	Medical Imaging Specialist; Biomechanics Specialist; Rehabilitation Engineer
Digital health and intelligent systems	Telemedicine Solutions Developer; AI in Healthcare Specialist; Healthcare Technology Consultant
Research and advanced development	Research Scientist; Tissue Engineering Researcher; Academic Lecturer or Researcher
Quality, regulation and delivery	Regulatory Affairs Officer; Biomedical or Healthcare Project Manager

Official References

Programme page: Study@UM – Master of Biomedical Engineering (Coursework)

Faculty information: Faculty of Engineering – Postgraduate Programmes

Department information: https://engine.um.edu.my/about-biomedical-engineering

FACULTY OF ENGINEERING

Master of Biomedical Engineering Study Planners

Academic Session 2026/2027

42	33	9	12
TOTAL CREDITS	CORE CREDITS	ELECTIVE CREDITS	RESEARCH CREDITS

How to Read the Planner

1 Follow your intake sequence	2 Complete 9 elective credits	3 Complete the research project
Use the three stages shown for Semester 1 or Semester 2 entry.	Select one elective in Semester 1 and two electives in Semester 2, subject to offering.	KQB7001 carries 12 credits in total and is planned as two 6-credit project stages.

Programme code SCWKQBFTCV03 **Mode** Full-time coursework **Delivery** Conventional **Medium** English

Planner for Master of Biomedical Engineering

Semester 1 Intake

A 42-credit full-time coursework pathway comprising 33 core credits and 9 elective credits.

STAGE 1 SEMESTER 1	STAGE 2 SEMESTER 2	STAGE 3 SPECIAL SEMESTER
Entry semester	**Second study period**	**Final study period**
CORE COURSES **KQX7001** Research Methodology [3] **KQX7002** Project Management [3] **KQB7002** Bioinstrumentation [3] **KQB7003** Engineering Biomechanics and Motion Analysis [3] **KQB7004** Healthcare Technology [3] **ELECTIVE OPTIONS** **KQB7008** Artificial Intelligence in Medicine [3] **KQB7011** Safety Standard and Ethics in Biomedical Engineering [3] **Select 3 elective credits** **PLANNED LOAD 15 core + 3 elective = 18 credits**	**CORE COURSES** **KQB7001** Research Project 1 [6] **KQB7005** Medical Imaging [3] **KQB7006** Tissue Engineering [3] **ELECTIVE OPTIONS** **KQB7007** Physiological Signal and Image Analysis [3] **KQB7009** Rehabilitation Engineering [3] **KQB7010** Telemedicine [3] **Select 6 elective credits** **PLANNED LOAD 12 core + 6 elective = 18 credits**	**CORE COURSES** **KQB7001** Research Project 2 [6] **ELECTIVE OPTIONS** *No elective allocation in the standard sequence.* **PLANNED LOAD 6 core + 0 elective = 6 credits**

Core courses	Electives	Research project	Programme total
33 credits	**9 credits**	**12 credits**	**42 credits**

Planner for Master of Biomedical Engineering

Semester 2 Intake

A 42-credit full-time coursework pathway comprising 33 core credits and 9 elective credits.

STAGE 1 SEMESTER 2	STAGE 2 SPECIAL SEMESTER	STAGE 3 SEMESTER 1
Entry semester	**Second study period**	**Final study period in the following academic session**
CORE COURSES **KQB7001** Research Project **[6]** **KQB7005** Medical Imaging **[3]** **KQB7006** Tissue Engineering **[3]** **ELECTIVE OPTIONS** **KQB7007** Physiological Signal and Image Analysis **[3]** **KQB7009** Rehabilitation Engineering **[3]** **KQB7010** Telemedicine **[3]** **Select 6 elective credits** **PLANNED LOAD 12 core + 6 elective = 18 credits**	**CORE COURSES** **KQB7001** Research Project **[6]** **ELECTIVE OPTIONS** *No elective allocation in the standard sequence.* **PLANNED LOAD 6 core + 0 elective = 6 credits**	**CORE COURSES** **KQX7001** Research Methodology **[3]** **KQX7002** Project Management **[3]** **KQB7002** Bioinstrumentation **[3]** **KQB7003** Engineering Biomechanics and Motion Analysis **[3]** **KQB7004** Healthcare Technology **[3]** **ELECTIVE OPTIONS** **KQB7008** Artificial Intelligence in Medicine **[3]** **KQB7011** Safety Standard and Ethics in Biomedical Engineering **[3]** **Select 3 elective credits** **PLANNED LOAD 15 core + 3 elective = 18 credits**

Core courses	Electives	Research project	Programme total
33 credits	**9 credits**	**12 credits**	**42 credits**

UNIVERSITI MALAYA

SPESIFIKASI KURSUS
COURSE SPECIFICATIONS

Akademi/Fakulti/Institut/Pusat *Academy/Faculty/Institute/Centre*	: FAKULTI KEJURUTERAAN *FACULTY OF ENGINEERING*		
Kod Kursus *Course Code*	: KQX7001 *KQX7001*	Sesi Penawaran *Offering Session*	:
Nama Kursus *Course Name*	: METODOLOGI PENYELIDIKAN *RESEARCH METHODOLOGY*	Tarikh Kelulusan *Approval Date*	:
Versi Pindaan *Ammendment Version*	:		

#	PERKARA *ITEM*	KETERANGAN *DESCRIPTION*	
1	Sesi Akademik dan Semester *Academic Session and Semester*		
2	Nama Staf Akademik *Name of Academic Staff*	Koordinator / Coordinator : IR. DR. KHAIRUNNISA BINTI HASIKIN Pembantu Koordinator / Assistant Coordinator : PROFESOR MADYA IR. TS. DR. LAI KHIN WEE,	
3	Jabatan/Fakulti *Department/Faculty*	Jabatan *Department*	ELECTRICAL ENGINEERING
		Fakulti *Faculty*	FAKULTI KEJURUTERAAN
4	Pemberatan Penilaian *Assessment Weightage*	Penilaian Berterusan *Continuous Assessment (%)*	50
		Peperiksaan Akhir *Final Examination (%)*	50

#	PERKARA *ITEM*	KETERANGAN *DESCRIPTION*	
5	Sinopsis Kursus *Course Synopsis*	Kursus ini mendedahkan pelajar kepada teknik – teknik bagaimana untuk menjalankan kajian. Di awal kursus pelajar di ajar dengan pelbagai teknik kajian termasuk, kaedah kajian saintifik. Kemudian, etika kajian, reka bentuk eksperimen dan teknik statistik di terangkan kepada pelajar di ikuti dengan mengenal pasti masalah kajian dan penulisan cadangan. Pelajar akan menguasai kemahiran kajian, penulisan saintifik, komunikasi lisan bagi dapatan kajian. *This course exposes students to the techniques of how to conduct research. At the beginning of the course students are taught with various research techniques including, scientific research methods. Then, research ethics, experimental design and statistical techniques are explained to students followed by identifying research problems and writing suggestions. Students will master research skills, scientific writing, oral communication for research findings.*	
6	Jumlah Kredit/SLT *Total Credit/SLT*	Kredit *Credit*	3
		SLT *SLT*	120
7	Prasyarat (jika ada) *Pre-requisite (if any)*		
8	Bahasa Pengantar *Medium of Instruction*	ENGLISH LANGUAGE,	
9	Pemetaan Hasil Pembelajaran Kursus kepada Hasil Pembelajaran Program, Kaedah Pengajaran dan Kaedah Penilaian *Mapping of the Course Learning Outcomes to the Programme Learning Outcomes, Teaching Methods and Assessment Methods*	Rujuk Lampiran 1 / *Refer Attachment 1*	
10	Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	Ditampal di papan notis atau dimaklumkan melalui talian. *Results will be notified through notice board and online*	
11	Pecahan Masa Pembelajaran Pelajar *Distribution of Student Learning Time (SLT)*	Rujuk Lampiran 2 / *Refer Attachment 2*	
12	Rujukan Utama/Lain-Lain Rujukan *Main/Others References (include required and further readings, and should be the most current [last five years])*	Graziano, A.M. (2012) Research Methods: A Process of Inquiry, Pearson Allyn and Bacon (8th Ed.) Creswell, J.W. (2011) Research Design: Qualitative and Quantitative Approaches, London, Sage Publications (4th Ed.) Jarrad, D.R., Scientific Methods, Online book (2014), http://www.emotionalcompetency.com/sci/booktoc.html Institute of Postgraduate Studies (IPS) (2014), Guide to the Preparation of Research Reports, Dissertations & Theses at the University of Malaya, Kuala Lumpur.	
13	Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-Kaedah Peraturan-Peraturan Universiti Malaya (Ijazah Sarjana) (Versi Terkini) *Universiti Malaya (Master Degree) Rules and Regulations (Latest Version)*	
14	Keperluan Sumber Khas (E.g. perisian, makmal etc.) *Special Resources Requirement (E.g. software, laboratory etc.)*	Lecture Notes Reference Books	
15	Lain-Lain Maklumat Tambahan (jika berkaitan) *Other Additional Information (if applicable)*		

Lampiran 1 /*Attachment 1*

Pemetaan Hasil Pembelajaran Kursus kepada Hasil Pembelajaran Program, Kaedah Pengajaran dan Kaedah Penilaian
Mapping of the Course Learning Outcomes to the Programme Learning Outcomes, Teaching Methods and Assessment Methods

Hasil Pembelajaran Kursus / *Course Learning Outcome(s) (CLO)*	Hasil Pembelajaran Program / *Programme Learning Outcome(s) (PLO)*			Kaedah Pengajaran & Pembelajaran / *Teaching & Learning*	Peratus Kaedah Penilaian/ *Assessment Methods and Percentage (%)*	Pencapaian CLO / *Criteria for Achievement of CLO*
	PLO1	PLO2	PLO4			
1.MENGANALISA ISU-ISU SEMASA BERKAITAN DENGAN MASALAH KAJIAN. *ANALYZE THE CURRENT ISSUES RELATED TO THE RESEARCH PROBLEM* CLO1 **Tahap taksonomi :** (C4 - Analyzing) ***Taxonomy level***	✔			Discussion Lecture		Achieve (>=75% of students obtained 65% marks)
2.MEREKABENTUK KAEDAH KAJIAN UNTUK MENYELESAIKAN MASALAH KAJIAN. *DESIGN RESEARCH METHODOLOGY TO SOLVE THE RESEARCH PROBLEM.* CLO2 **Tahap taksonomi :** (C6 - Creating) ***Taxonomy level***		✔				Achieve (>=75% of students obtained 65% marks)
3.MENILAI KEBOLEHLAKSANAAN DAN KEPRAKTISAN KAEDAH KAJIAN UNTUK MENYELESAIKAN MASALAH KAJIAN. *EVALUATE THE FEASIBILITY AND PRACTICALITY OF RESEARCH METHODOLOGY TO SOLVE THE RESEARCH PROBLEM.* CLO3 **Tahap taksonomi :** (C5 - Evaluating) ***Taxonomy level***			✔		Assignment 1 (5%)	Achieve (>=75% of students obtained 65% marks)

;

Lampiran 2 /*Attachment 2*

Pecahan Masa Pembelajaran Pelajar
Distribution of Student Learning Time (SLT)

(a) Pengajaran dan Pembelajaran (P&P) / *Teaching and Learning (T&L)*

Minggu *Week*	Aktiviti P&P *T&L Activities*	Topik *Topics*	Masa Pembelajaran Pelajar *Student Learning Time*			Jumlah SLT *Total SLT*
			F2F *Synchronous*	NF2F *Asynchronous*	Masa Persiapan Pelajar *Student Preparation Time*	
12	Lecture	Penulisan kertas saintifik 2	2	0	2	4
12	Discussion	Penulisan kertas saintifik 2	1	0	1	2
			3	0	3	
					Sub-total SLT	6

(b) Penilaian / *Assessments*

Bil *No*	Minggu *Week*	Pemberatan *Weightage (%)*	Aktiviti Penilaian *Assessment Activities*	CLO	Masa Pembelajaran Pelajar *Student Learning Time*			Jumlah SLT *Total SLT*
					F2F *Synchronous*	NF2F *Asynchronous*	Masa Persediaan Pelajar *Student Preparation Time*	
1	12	5	Assignment 1	CLO3	0	2	2	4
		5			0	2	2	
							Sub-total SLT	4

Grand Total SLT	10
Total F2F SLT for T&L	3
Total NF2F SLT for T&L	0
Total Student Preparation Time for T&L	3
Total F2F SLT for Assessment	0
Total NF2F SLT for Assessment	2
Total Student Preparation Time for Assessment	2

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UNIVERSITI MALAYA

SPESIFIKASI KURSUS
COURSE SPECIFICATIONS

Akademi/Fakulti/Institut/Pusat *Academy/Faculty/Institute/Centre*	: FAKULTI KEJURUTERAAN *FACULTY OF ENGINEERING*		
Kod Kursus *Course Code*	: KQX7002 *KQX7002*	Sesi Penawaran *Offering Session*	:
Nama Kursus *Course Name*	: PENGURUSAN PROJEK *PROJECT MANAGEMENT*	Tarikh Kelulusan *Approval Date*	:
Versi Pindaan *Ammendment Version*	:		

#	PERKARA *ITEM*	KETERANGAN *DESCRIPTION*	
1	Sesi Akademik dan Semester *Academic Session and Semester*		
2	Nama Staf Akademik *Name of Academic Staff*	Koordinator / Coordinator : PROFESOR IR. DR. WONG YEW HOONG Pembantu Koordinator / Assistant Coordinator :	
3	Jabatan/Fakulti *Department/Faculty*	Jabatan *Department*	MECHANICAL ENGINEERING
		Fakulti *Faculty*	FAKULTI KEJURUTERAAN
4	Pemberatan Penilaian *Assessment Weightage*	Penilaian Berterusan *Continuous Assessment (%)*	50
		Peperiksaan Akhir *Final Examination (%)*	50

#	PERKARA *ITEM*	KETERANGAN *DESCRIPTION*	
5	Sinopsis Kursus *Course Synopsis*	Kursus ini memberikan pengenalan yang sistematik dan menyeluruh untuk semua aspek pengurusan projek. Projek adalah aspek yang semakin penting dalam perniagaan kejuruteraan moden. Oleh itu, kursus ini mengutarakan pentingnya memahami hubungan antara projek dan matlamat strategik organisasi. Kursus ini juga membincangkan kemahiran teknikal, budaya, dan interpersonal yang diperlukan untuk menguruskan projek dengan jayanya dari awal hingga akhir. Ia menekankan bahawa pengurusan projek adalah disiplin profesional yang merangkumi pengetahuan dan kemahirannya yang tersendiri. Konsep diperkukuhkan dengan menggunakan kajian kes yang merangkumi pelbagai jenis projek dan industri. *This course provides a systematic and thorough introduction to all aspects of project management. Projects are an increasingly important aspect of modern engineering business. Therefore, the course underlines the importance of understanding the relation between projects and the strategic goals of the organisation. The course also discusses the technical, cultural, and interpersonal skills necessary to successfully manage projects from start to finish. It emphasises that project management is a professional discipline with its own tools, body of knowledge, and skills. Concepts are reinforced by case studies covering a wide variety of project types and industries.*	
6	Jumlah Kredit/SLT *Total Credit/SLT*	Kredit *Credit*	3
		SLT *SLT*	120
7	Prasyarat (jika ada) *Pre-requisite (if any)*		
8	Bahasa Pengantar *Medium of Instruction*	ENGLISH LANGUAGE,	
9	Pemetaan Hasil Pembelajaran Kursus kepada Hasil Pembelajaran Program, Kaedah Pengajaran dan Kaedah Penilaian *Mapping of the Course Learning Outcomes to the Programme Learning Outcomes, Teaching Methods and Assessment Methods*	Rujuk Lampiran 1 / *Refer Attachment 1*	
10	Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	Ditampal di papan notis atau dimaklumkan melalui talian. *Results will be notified through notice board and online*	
11	Pecahan Masa Pembelajaran Pelajar *Distribution of Student Learning Time (SLT)*	Rujuk Lampiran 2 / *Refer Attachment 2*	
12	Rujukan Utama/Lain-Lain Rujukan *Main/Others References (include required and further readings, and should be the most current [last five years])*	Project Management: Planning & Control Techniques, Fifth Edition, Rory Burke, John Wiley & Sons Ltd., UK (2013) A Guide to the Project Management Body of Knowledge (PMBOK® Guide), Project Management Institute (2017) Project Management, Tenth Edition, Dennis Lock, Gower Publ. Ltd., UK. (2013) Accounting and Finance for Non-Specialists, Ninth Edition, Eddie McLaney and Peter Atrill, Pearson (2014) Management and Organisational Behaviour, Tenth Edition, Laurie J. Mullins, Pearson (2013) Purchasing and Supply Chain Management, Eighth Edition, Kenneth Lysons and Brian Farrington, Pearson (2012)	
13	Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-Kaedah Peraturan-Peraturan Universiti Malaya (Ijazah Sarjana) (Versi Terkini) *Universiti Malaya (Master Degree) Rules and Regulations (Latest Version)*	
14	Keperluan Sumber Khas (E.g. perisian, makmal etc.) *Special Resources Requirement (E.g. software, laboratory etc.)*	Lecture Notes Reference Books	
15	Lain-Lain Maklumat Tambahan (jika berkaitan) *Other Additional Information (if applicable)*		

Lampiran 1 /*Attachment 1*

Pemetaan Hasil Pembelajaran Kursus kepada Hasil Pembelajaran Program, Kaedah Pengajaran dan Kaedah Penilaian
Mapping of the Course Learning Outcomes to the Programme Learning Outcomes, Teaching Methods and Assessment Methods

Hasil Pembelajaran Kursus / *Course Learning Outcome(s) (CLO)*	Hasil Pembelajaran Program / *Programme Learning Outcome(s) (PLO)*			Kaedah Pengajaran & Pembelajaran / *Teaching & Learning*	Peratus Kaedah Penilaian/ *Assessment Methods and Percentage (%)*	Pencapaian CLO / *Criteria for Achievement of CLO*
	PLO2	PLO4	PLO6			
1.MENGANALISA PRINSIP KOMPONEN DAN KONSEP PENGURUSAN PROJEK. *ANALYZE THE PRINCIPLE COMPONENTS AND CONCEPTS OF PROJECT MANAGEMENT.* CLO1 **Tahap taksonomi :** (C4 - Analyzing) ***Taxonomy level***	✔			Lecture		Achieve (>=75% of students obtained 65% marks)
2.MEMBENARKAN PELBAGAI PEMACU PERUBAHAN YANG BOLEH MENJEJASKAN PROJEK SELAMA KITARAN HIDUPNYA. *JUSTIFY THE VARIOUS DRIVERS OF CHANGE WHICH MAY IMPACT A PROJECT DURING ITS LIFE CYCLE.* CLO2 **Tahap taksonomi :** (C5 - Evaluating) ***Taxonomy level***		✔				Achieve (>=75% of students obtained 65% marks)
3.MENYELESAIKAN SEGALA CABARAN SEMASA PROJEK SECARA EFEKTIF. *SOLVE EVERY CHALLENGES FACED DURING THE PROJECT.* CLO3 **Tahap taksonomi :** (A5 - Internalizing) ***Taxonomy level***			✔	Case Studies		Achieve (>=75% of students obtained 65% marks)

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Lampiran 2 /*Attachment 2*

Pecahan Masa Pembelajaran Pelajar
Distribution of Student Learning Time (SLT)

(a) Pengajaran dan Pembelajaran (P&P) / *Teaching and Learning (T&L)*

Minggu *Week*	Aktiviti P&P *T&L Activities*	Topik *Topics*	Masa Pembelajaran Pelajar *Student Learning Time*			Jumlah SLT *Total SLT*
			F2F *Synchronous*	NF2F *Asynchronous*	Masa Persiapan Pelajar *Student Preparation Time*	
8	Lecture	Anggaran dan Perancangan Sumber	2	0	2	4
8	Case Studies	Anggaran dan Perancangan Sumber	2	0	3	5
9	Lecture	Anggaran dan Perancangan Sumber	2	0	2	4
10	Lecture	Pengurusan Perolehan Projek	2	0	2	4
10	Case Studies	Pengurusan Perolehan Projek	2	0	3	5
11	Lecture	Perakauan Projek dan Pengurusan Nilai Dapatan	1	0	1	2
12	Lecture	Pengurusan Kualiti Projek	1	0	1	2
13	Lecture	Kawalan dan Pengurusan Risiko Projek	1	0	1	2
14	Lecture	Organisasi dan Pengurusan Komunikasi Projek	1	0	1	2
			14	0	16	
					Sub-total SLT	30

(b) Penilaian / *Assessments*

Bil *No*	Minggu *Week*	Pemberatan *Weightage (%)*	Aktiviti Penilaian *Assessment Activities*	CLO	Masa Pembelajaran Pelajar *Student Learning Time*			Jumlah SLT *Total SLT*
					F2F *Synchronous*	NF2F *Asynchronous*	Masa Persediaan Pelajar *Student Preparation Time*	
1	9	20	Quiz/Test: Multiple Choice 1		1	0	3	4
2	12	30	Assignment 1		0	5	10	15
3	15	50	Final Exam Question 1		2	0	6	8
		100			3	5	19	
							Sub-total SLT	27

Grand Total SLT	57
Total F2F SLT for T&L	14
Total NF2F SLT for T&L	0
Total Student Preparation Time for T&L	16
Total F2F SLT for Assessment	3
Total NF2F SLT for Assessment	5
Total Student Preparation Time for Assessment	19

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UNIVERSITI MALAYA

SPESIFIKASI KURSUS
COURSE SPECIFICATIONS

Akademi/Fakulti/Institut/Pusat *Academy/Faculty/Institute/Centre*	: FAKULTI KEJURUTERAAN *FACULTY OF ENGINEERING*		
Kod Kursus *Course Code*	: KQB7001 *KQB7001*	Sesi Penawaran *Offering Session*	:
Nama Kursus *Course Name*	: PROJEK PENYELIDIKAN *RESEARCH PROJECT*	Tarikh Kelulusan *Approval Date*	:
Versi Pindaan *Ammendment Version*	:		

#	PERKARA *ITEM*	KETERANGAN *DESCRIPTION*	
1	Sesi Akademik dan Semester *Academic Session and Semester*		
2	Nama Staf Akademik *Name of Academic Staff*	Koordinator / Coordinator : PROFESOR MADYA IR. DR. TING HUA NONG DR. SALMAH BINTI KARMAN Pembantu Koordinator / Assistant Coordinator : DR. THAM LAI KUAN, DR. JULIANA BINTI USMAN,	
3	Jabatan/Fakulti *Department/Faculty*	Jabatan *Department*	BIOMEDICAL ENGINEERING
		Fakulti *Faculty*	FAKULTI KEJURUTERAAN
4	Pemberatan Penilaian *Assessment Weightage*	Penilaian Berterusan *Continuous Assessment (%)*	100
		Peperiksaan Akhir *Final Examination (%)*	0

#	PERKARA *ITEM*	KETERANGAN *DESCRIPTION*	
5	Sinopsis Kursus *Course Synopsis*	Kursus ini memberi peluang kepada pelajar untuk menjalankan penyelidikan di pelbagai skop dalam bidang kejuruteraan bioperubatan. Pelajar akan menjalankan ulasan kritikal terhadap literatur dan teori asas, membangunkan metodologi penyelidikan sistematik, serta menerapkan alat dan teknik yang sesuai untuk menyelesaikan masalah kejuruteraan yang kompleks. Kursus ini menekankan analisis data menggunakan alat digital, serta penyampaian hasil penyelidikan secara berkesan kepada audiens daripada pelbagai latar belakang. Selain itu, pelajar akan memperoleh pengalaman dalam pengurusan projek, menilai implikasi kewangan dan ekonomi penyelidikan mereka, dan mengkaji secara kritikal kesan penyelidikan terhadap masyarakat. Kursus ini melengkapkan pelajar dengan kemahiran penyelidikan yang penting, membolehkan mereka membuat sumbangan bermakna dalam bidang akademik dan industri. *This course provides students with the opportunity to conduct independent research in various scopes within the field of biomedical engineering. Students will review relevant literature and theoretical foundations, develop a structured research methodology, and apply appropriate tools and techniques to solve complex engineering problems. The course emphasizes data analysis using digital tools and the effective presentation of research findings to diverse audiences. Additionally, students will gain experience in project management, assess the financial and economic implications of their research, and critically evaluate its impact on society. This course equips students with essential research skills, preparing them for academic and professional careers.*	
6	Jumlah Kredit/SLT *Total Credit/SLT*	Kredit *Credit*	12
		SLT *SLT*	480
7	Prasyarat (jika ada) *Pre-requisite (if any)*	KQX7001 - METODOLOGI PENYELIDIKAN (Pass)	
8	Bahasa Pengantar *Medium of Instruction*	ENGLISH LANGUAGE,	
9	Pemetaan Hasil Pembelajaran Kursus kepada Hasil Pembelajaran Program, Kaedah Pengajaran dan Kaedah Penilaian *Mapping of the Course Learning Outcomes to the Programme Learning Outcomes, Teaching Methods and Assessment Methods*	Rujuk Lampiran 1 / *Refer Attachment 1*	
10	Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	Maklumbalas secara dalam talian *Online feedback*	
11	Pecahan Masa Pembelajaran Pelajar *Distribution of Student Learning Time (SLT)*	Rujuk Lampiran 2 / *Refer Attachment 2*	
12	Rujukan Utama/Lain-Lain Rujukan *Main/Others References (include required and further readings, and should be the most current [last five years])*	Journals and conference papers of related scopes Textbooks Articles and manuals	
13	Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-Kaedah Peraturan-Peraturan Universiti Malaya (Ijazah Sarjana) (Versi Terkini) *Universiti Malaya (Master Degree) Rules and Regulations (Latest Version)*	
14	Keperluan Sumber Khas (E.g. perisian, makmal etc.) *Special Resources Requirement (E.g. software, laboratory etc.)*	Scientific journals and conference papers Textbooks	
15	Lain-Lain Maklumat Tambahan (jika berkaitan) *Other Additional Information (if applicable)*		

Lampiran 1 /*Attachment 1*

Pemetaan Hasil Pembelajaran Kursus kepada Hasil Pembelajaran Program, Kaedah Pengajaran dan Kaedah Penilaian
Mapping of the Course Learning Outcomes to the Programme Learning Outcomes, Teaching Methods and Assessment Methods

Hasil Pembelajaran Kursus / *Course Learning Outcome(s) (CLO)*	Hasil Pembelajaran Program / *Programme Learning Outcome(s) (PLO)*								Kaedah Pengajaran & Pembelajaran / *Teaching & Learning*	Peratus Kaedah Penilaian/ *Assessment Methods and Percentage (%)*	Pencapaian CLO / *Criteria for Achievement of CLO*
	PLO1	PLO2	PLO5	PLO6	PLO7	PLO8	PLO10	PLO11			
1.MELAKSANAKAN ULASAN KRITIKAL DAN KAJIAN TEORI YANG BERKAITAN DENGAN TOPIK PENYELIDIKAN. *CONDUCT A CRITICAL REVIEW AND THEORETICAL STUDY RELEVANT TO THE RESEARCH TOPIC.* CLO1 **Tahap taksonomi :** (C3 - Applying) ***Taxonomy level***	✔								Discussion Literature Study		Achieve (>=75% of students obtained 65% marks)
2.MEMBANGUNKAN METODOLOGI PENYELIDIKAN YANG TERSUSUN UNTUK MENANGANI MASALAH KEJURUTERAAN YANG KOMPLEKS. *DEVELOP A STRUCTURED RESEARCH METHODOLOGY TO ADDRESS COMPLEX ENGINEERING PROBLEMS.* CLO2 **Tahap taksonomi :** (C6 - Creating) ***Taxonomy level***		✔							Discussion Literature Study	Methodology (10%)	Achieve (>=75% of students obtained 65% marks)
3.MENGGUNAKAN METODOLOGI DAN ALAT YANG SESUAI UNTUK MENYELESAIKAN MASALAH PENYELIDIKAN DENGAN BERKESAN. *APPLY APPROPRIATE METHODOLOGIES AND TOOLS TO SOLVE RESEARCH PROBLEMS EFFECTIVELY.* CLO3 **Tahap taksonomi :** (C5 - Evaluating) ***Taxonomy level***				✔					Discussion Laboratory Session		Achieve (>=75% of students obtained 65% marks)
4.MENGANALISIS DATA DAN PENEMUAN PENYELIDIKAN MENGGUNAKAN ALAT DIGITAL YANG SESUAI. *ANALYZE RESEARCH DATA AND FINDINGS USING APPROPRIATE DIGITAL TOOLS.* CLO4 **Tahap taksonomi :** (P3 - Precision) ***Taxonomy level***					✔				Discussion Laboratory Session	Results and Discussion 1 (10%) Results and Discussion 2 (10%)	Achieve (>=75% of students obtained 65% marks)
5.MENYAMPAIKAN HASIL PENYELIDIKAN SECARA BERKESAN KEPADA AUDIENS PELBAGAI LATAR BELAKANG MELALUI PEMBENTANGAN. *COMMUNICATE RESEARCH OUTCOMES EFFECTIVELY TO DIVERSE AUDIENCES THROUGH PRESENTATIONS.* CLO5 **Tahap taksonomi :** (C6 - Creating) ***Taxonomy level***			✔						Discussion	Presentation (20%)	Achieve (>=75% of students obtained 65% marks)
6.MENUNJUKKAN KEMAHIRAN PENGURUSAN PROJEK DALAM MERANCANG DAN MELAKSANAKAN PROJEK PENYELIDIKAN. *DEMONSTRATE PROJECT MANAGEMENT SKILLS IN PLANNING AND EXECUTING THE RESEARCH PROJECT.* CLO6 **Tahap taksonomi :** (A3 - Valuing) ***Taxonomy level***						✔			Discussion		Achieve (>=75% of students obtained 65% marks)

7.MENILAI IMPLIKASI KEWANGAN DAN EKONOMI HASIL PENYELIDIKAN. *ASSESS THE FINANCIAL AND ECONOMIC IMPLICATIONS OF THE RESEARCH FINDINGS.* CLO7 **Tahap taksonomi :** (C4 - Analyzing) ***Taxonomy level***							✔		Discussion Laboratory Session	Results and Discussion 3 (10%)	Achieve (>=75% of students obtained 65% marks)
8.MENILAI KESAN PENYELIDIKAN TERHADAP MASYARAKAT. *EVALUATE THE SOCIETAL IMPACT OF RESEARCH OUTCOMES.* CLO8 **Tahap taksonomi :** (A4 - Organizing) ***Taxonomy level***								✔	Discussion Laboratory Session	Results and Discussion 4 (10%)	Achieve (>=75% of students obtained 65% marks)

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Lampiran 2 /*Attachment 2*

Pecahan Masa Pembelajaran Pelajar
Distribution of Student Learning Time (SLT)

(a) Pengajaran dan Pembelajaran (P&P) / *Teaching and Learning (T&L)*

Minggu *Week*	Aktiviti P&P *T&L Activities*	Topik *Topics*	Masa Pembelajaran Pelajar *Student Learning Time*			Jumlah SLT *Total SLT*
			F2F *Synchronous*	NF2F *Asynchronous*	Masa Persiapan Pelajar *Student Preparation Time*	
1	Discussion	Kajian Literasi dan Perbincangan: Perumusan Masalah	1	0	2	3
1	Literature Study	Kajian Literasi dan Perbincangan: Perumusan Masalah	0	3	4	7
2	Discussion	Kajian Literasi dan Perbincangan: Perumusan Masalah	1	0	2	3
2	Literature Study	Kajian Literasi dan Perbincangan: Perumusan Masalah	0	3	4	7
3	Discussion	Kajian Literasi dan Perbincangan: Kerja Penyelidikan Berkaitan	1	0	2	3
3	Literature Study	Kajian Literasi dan Perbincangan: Kerja Penyelidikan Berkaitan	0	3	4	7
5	Discussion	Kajian Literasi dan Perbincangan: Kaedah Penyelidikan	1	0	2	3
5	Literature Study	Kajian Literasi dan Perbincangan: Kaedah Penyelidikan	0	3	4	7
6	Discussion	Kajian Literasi dan Perbincangan: Kaedah Penyelidikan	1	0	2	3
6	Literature Study	Kajian Literasi dan Perbincangan: Kaedah Penyelidikan	0	3	4	7
7	Discussion	Kajian Literasi dan Perbincangan: Kaedah Penyelidikan	1	0	2	3
7	Literature Study	Kajian Literasi dan Perbincangan: Kaedah Penyelidikan	0	3	4	7
8	Discussion	Kerja Makmal dan Perbincangan: Eksperimen	1	0	2	3
8	Laboratory Session	Kerja Makmal dan Perbincangan: Eksperimen	0	9	9	18
9	Discussion	Kerja Makmal dan Perbincangan: Eksperimen	1	0	2	3
9	Laboratory Session	Kerja Makmal dan Perbincangan: Eksperimen	0	9	9	18
10	Discussion	Kerja Makmal dan Perbincangan: Eksperimen	1	0	2	3
10	Laboratory Session	Kerja Makmal dan Perbincangan: Eksperimen	0	9	9	18
11	Discussion	Kerja Makmal dan Perbincangan: Eksperimen	1	0	2	3
11	Laboratory Session	Kerja Makmal dan Perbincangan: Eksperimen	0	9	9	18
13	Discussion	Kerja Makmal dan Perbincangan: Eksperimen	1	0	2	3
13	Laboratory Session	Kerja Makmal dan Perbincangan: Eksperimen	0	9	9	18
15	Discussion	Kerja Makmal dan Perbincangan: Analisa Data	1	0	2	3
15	Laboratory Session	Kerja Makmal dan Perbincangan: Analisa Data	0	9	9	18
17	Discussion	Kerja Makmal dan Perbincangan: Analisa Data	1	0	2	3
17	Laboratory Session	Kerja Makmal dan Perbincangan: Analisa Data	0	9	9	18
18	Discussion	Kerja Makmal dan Perbincangan: Analisa Data	1	0	2	3
18	Laboratory Session	Kerja Makmal dan Perbincangan: Analisa Data	0	9	9	18
19	Discussion	Kerja Makmal dan Perbincangan: Analisa Data	1	0	2	3
19	Laboratory Session	Kerja Makmal dan Perbincangan: Analisa Data	0	9	9	18
20	Discussion	Kerja Makmal dan Perbincangan: Analisa Data	1	0	2	3
20	Laboratory Session	Kerja Makmal dan Perbincangan: Analisa Data	0	9	9	18
21	Discussion	Kerja Makmal dan Perbincangan: Analisa Data	1	0	2	3
21	Laboratory Session	Kerja Makmal dan Perbincangan: Analisa Data	0	9	9	18
22	Discussion	Kerja Makmal dan Perbincangan: Analisa Data	1	0	2	3

22	Laboratory Session	Kerja Makmal dan Perbincangan: Analisa Data	0	9	9	18
23	Discussion	Kerja Makmal dan Perbincangan: Analisa Data	1	0	2	3
23	Laboratory Session	Kerja Makmal dan Perbincangan: Analisa Data	0	9	9	18
24	Discussion	Kerja Makmal dan Perbincangan: Analisa Data	1	0	2	3
24	Laboratory Session	Kerja Makmal dan Perbincangan: Analisa Data	0	9	9	18
25	Discussion	Penulisan Laporan dan Perbincangan	1	0	2	3
26	Discussion	Pembentangan Projek dan Perbincangan	1	0	2	3
			22	144	194	
					Sub-total SLT	360

(b) Penilaian / *Assessments*

Bil *No*	Minggu *Week*	Pemberatan *Weightage (%)*	Aktiviti Penilaian *Assessment Activities*	CLO	Masa Pembelajaran Pelajar *Student Learning Time*			Jumlah SLT *Total SLT*
					F2F *Synchronous*	NF2F *Asynchronous*	Masa Persediaan Pelajar *Student Preparation Time*	
1	7	10	Methodology	CLO2	0	0	6	6
2	17	10	Results and Discussion 1	CLO4	0	0	6	6
3	19	10	Results and Discussion 2	CLO4	0	0	6	6
4	21	10	Results and Discussion 3	CLO7	0	0	6	6
5	24	10	Results and Discussion 4	CLO8	0	0	6	6
6	26	20	Presentation	CLO5	1	0	3	4
		70			1	0	33	
							Sub-total SLT	34

Grand Total SLT	394
Total F2F SLT for T&L	22
Total NF2F SLT for T&L	144
Total Student Preparation Time for T&L	194
Total F2F SLT for Assessment	1
Total NF2F SLT for Assessment	0
Total Student Preparation Time for Assessment	33

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UNIVERSITI MALAYA

SPESIFIKASI KURSUS
COURSE SPECIFICATIONS

Akademi/Fakulti/Institut/Pusat
Academy/Faculty/Institute/Centre : FAKULTI KEJURUTERAAN
FACULTY OF ENGINEERING

Kod Kursus
Course Code : KQB7002
KQB7002

Nama Kursus
Course Name : BIOINSTRUMENTASI
BIOINSTRUMENTATION

Versi Pindaan
Ammendment Version :

Sesi Penawaran
Offering Session :

Tarikh Kelulusan
Approval Date :

#	PERKARA *ITEM*	KETERANGAN *DESCRIPTION*	
1	Sesi Akademik dan Semester *Academic Session and Semester*		
2	Nama Staf Akademik *Name of Academic Staff*		
3	Jabatan/Fakulti *Department/Faculty*	Jabatan *Department*	BIOMEDICAL ENGINEERING
		Fakulti *Faculty*	FAKULTI KEJURUTERAAN
4	Pemberatan Penilaian *Assessment Weightage*	Penilaian Berterusan *Continuous Assessment (%)*	50
		Peperiksaan Akhir *Final Examination (%)*	50

#	PERKARA *ITEM*	KETERANGAN *DESCRIPTION*	
5	Sinopsis Kursus *Course Synopsis*	Kursus ini merangkumi prinsip-prinsip, teknologi, kaedah dan aplikasi biosensor dan bioinstrumentation. Objektifnya adalah untuk menghubungkan prinsip-prinsip kejuruteraan untuk memahami biosistem pada deria dan bioelectronics. Penguat instrumentasi dan litar jambatan akan diajar secara terperinci. Sistem biosensor berasaskan prinsip transduksi juga akan diberi perhatian yang meluas. Para pelajar akan dapat merekabentuk dan memilih komponen-komponen yang sesuai terhadap masalah pengukuran. *This course covers the principles, technologies, methods and applications of biosensor and bioinstrumentation. The objective is to link engineering principles to understanding of biosystems in sensors and bioelectronics. Instrumentation amplifier and the bridge circuit will be covered in detail. The transduction principle based biosensor systems will also be discussed extensively. The students will be able to design and select the appropriate components in response to measurement problems.*	
6	Jumlah Kredit/SLT *Total Credit/SLT*	Kredit *Credit*	3
		SLT *SLT*	120
7	Prasyarat (jika ada) *Pre-requisite (if any)*		
8	Bahasa Pengantar *Medium of Instruction*	ENGLISH LANGUAGE,	
9	Pemetaan Hasil Pembelajaran Kursus kepada Hasil Pembelajaran Program, Kaedah Pengajaran dan Kaedah Penilaian *Mapping of the Course Learning Outcomes to the Programme Learning Outcomes, Teaching Methods and Assessment Methods*	Rujuk Lampiran 1 / *Refer Attachment 1*	
10	Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	Maklumbalas secara dalam talian *Online feedback*	
11	Pecahan Masa Pembelajaran Pelajar *Distribution of Student Learning Time (SLT)*	Rujuk Lampiran 2 / *Refer Attachment 2*	
12	Rujukan Utama/Lain-Lain Rujukan *Main/Others References (include required and further readings, and should be the most current [last five years])*	John G. Webster, Medical Instrumentation: Application and Design, Wiley International (2011) Chemical Sensors and Biosensors, Eggins, B. R., John Wiley & Sons, 2012. Chemical Sensors and Biosensors for Medical and Biological Applications, SpichigerKeller, U. E., Wiley-VCH, 2012. The Art of Electronics (2nd ed), Horowitz, P. and W. Hill, Cambridge University Press, 1989. A.Mulchandani, K.R. Rogers (1998). “Enzyme and Microbial BiosensorsTechniques and Protocols”, Humana Press, Totowa, New Jersey	
13	Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-Kaedah Peraturan-Peraturan Universiti Malaya (Ijazah Sarjana) (Versi Terkini) *Universiti Malaya (Master Degree) Rules and Regulations (Latest Version)*	
14	Keperluan Sumber Khas (E.g. perisian, makmal etc.) *Special Resources Requirement (E.g. software, laboratory etc.)*	Buku Rujukan, Nota Kuliah	
15	Lain-Lain Maklumat Tambahan (jika berkaitan) *Other Additional Information (if applicable)*		

Lampiran 1 /*Attachment 1*

Pemetaan Hasil Pembelajaran Kursus kepada Hasil Pembelajaran Program, Kaedah Pengajaran dan Kaedah Penilaian
Mapping of the Course Learning Outcomes to the Programme Learning Outcomes, Teaching Methods and Assessment Methods

Hasil Pembelajaran Kursus / *Course Learning Outcome(s) (CLO)*	Hasil Pembelajaran Program / *Programme Learning Outcome(s) (PLO)*						Kaedah Pengajaran & Pembelajaran / *Teaching & Learning*	Peratus Kaedah Penilaian/ *Assessment Methods and Percentage (%)*	Pencapaian CLO / *Criteria for Achievement of CLO*
	CLS1	CLS1	CLS2	CLS2	CLS3(F)	CLS3(F)			
1.MENGGUNAKAN PRINSIP-PRINSIP KEJURUTERAAN UNTUK MEMILIH ALAT YANG OPTIMUM UNTUK MENGUKUR PEMBOLEHUBAH PERUBATAN. *USE THE PRINCIPLES OF ENGINEERING TO CHOOSE THE OPTIMAL INSTRUMENT FOR MEASURING MEDICAL VARIABLES.* CLO1 **Tahap taksonomi :** (6, - - none -) ***Taxonomy level***	✔								-
2.MENGGUNAKAN PRINSIP-PRINSIP KEJURUTERAAN UNTUK MEMILIH ALAT YANG OPTIMUM UNTUK MENGUKUR PEMBOLEHUBAH PERUBATAN *USE THE PRINCIPLES OF ENGINEERING TO CHOOSE THE OPTIMAL INSTRUMENT FOR MEASURING MEDICAL VARIABLES.* CLO1 **Tahap taksonomi :** (C3 - Applying) ***Taxonomy level***		✔							Achieve (>=75% of students obtained 65% marks)
3.MENGANALISA MASALAH UTAMA ANALOG DAN DIGITAL INSTRUMENTASI. *ANALYZE THE PROBLEM OF ANALOG AND DIGITAL INSTRUMENTATION SYSTEMS.* CLO2 **Tahap taksonomi :** (7, - - none -) ***Taxonomy level***			✔						-
4.MENGANALISA MASALAH UTAMA SISTEM ANALOG DAN DIGITAL INSTRUMENTASI. *ANALYZE THE PROBLEM OF ANALOG AND DIGITAL INSTRUMENTATION SYSTEMS* CLO2 **Tahap taksonomi :** (C4 - Analyzing) ***Taxonomy level***				✔					Achieve (>=75% of students obtained 65% marks)
5.MEREKABENTUK SEBUAH PERALATAN CANGGIH UNTUK MENGUKUR PEMBOLEHUBAH PERUBATAN DAN DALAM PENYELIDIKAN BIOLOGI DENGAN MENGAMBILKIRA ASPEK INOVASI BARU BAGI PERSIAPAN IR4.0. *DESIGN AN ADVANCED INSTRUMENTATION FOR MEASUREMENT OF MEDICAL VARIABLES AND IN BIOLOGICAL RESEARCH BY CONSIDERING THE NEW INNOVATION ASPECT FOR IR4.0 PREPARATION.* CLO3 **Tahap taksonomi :** (14, - - none -) ***Taxonomy level***					✔				-

6.MEREKABENTUK SEBUAH PERALATAN CANGGIH UNTUK MENGUKUR PEMBOLEHUBAH PERUBATAN DAN DALAM PENYELIDIKAN BIOLOGI DENGAN MENGAMBILKIRA ASPEK INOVASI BARU BAGI PERSIAPAN IR4.0. *DESIGN AN ADVANCED INSTRUMENTATION FOR MEASUREMENT OF MEDICAL VARIABLES AND IN BIOLOGICAL RESEARCH BY CONSIDERING THE NEW INNOVATION ASPECT FOR IR4.0 PREPARATION* CLO3 **Tahap taksonomi :** (P5 - Naturalization) ***Taxonomy level***						✔			Achieve (>=75% of students obtained 65% marks)

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Lampiran 2 /*Attachment 2*

Pecahan Masa Pembelajaran Pelajar
Distribution of Student Learning Time (SLT)

(a) Pengajaran dan Pembelajaran (P&P) / *Teaching and Learning (T&L)*

Minggu *Week*	Aktiviti P&P *T&L Activities*	Topik *Topics*	Masa Pembelajaran Pelajar *Student Learning Time*			Jumlah SLT *Total SLT*
			F2F *Synchronous*	NF2F *Asynchronous*	Masa Persiapan Pelajar *Student Preparation Time*	
			0	0	0	
					Sub-total SLT	0

(b) Penilaian / *Assessments*

Bil *No*	Minggu *Week*	Pemberatan *Weightage (%)*	Aktiviti Penilaian *Assessment Activities*	CLO	Masa Pembelajaran Pelajar *Student Learning Time*			Jumlah SLT *Total SLT*
					F2F *Synchronous*	NF2F *Asynchronous*	Masa Persediaan Pelajar *Student Preparation Time*	
		0			0	0	0	
							Sub-total SLT	0

Grand Total SLT	0
Total F2F SLT for T&L	0
Total NF2F SLT for T&L	0
Total Student Preparation Time for T&L	0
Total F2F SLT for Assessment	0
Total NF2F SLT for Assessment	0
Total Student Preparation Time for Assessment	0

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UNIVERSITI MALAYA

SPESIFIKASI KURSUS
COURSE SPECIFICATIONS

Akademi/Fakulti/Institut/Pusat *Academy/Faculty/Institute/Centre*	: FAKULTI KEJURUTERAAN *FACULTY OF ENGINEERING*		
Kod Kursus *Course Code*	: KQB7003 *KQB7003*	Sesi Penawaran *Offering Session*	:
Nama Kursus *Course Name*	: BIOMEKANIK KEJURUTERAAN DAN ANALISIS GERAKAN *ENGINEERING BIOMECHANICS AND MOTION ANALYSIS*	Tarikh Kelulusan *Approval Date*	:
Versi Pindaan *Ammendment Version*	:		

#	PERKARA *ITEM*	KETERANGAN *DESCRIPTION*	
1	Sesi Akademik dan Semester *Academic Session and Semester*		
2	Nama Staf Akademik *Name of Academic Staff*	Koordinator / Coordinator : IR. DR. NASRUL ANUAR BIN ABD RAZAK Pembantu Koordinator / Assistant Coordinator : DR. THAM LAI KUAN,	
3	Jabatan/Fakulti *Department/Faculty*	Jabatan *Department*	BIOMEDICAL ENGINEERING
		Fakulti *Faculty*	FAKULTI KEJURUTERAAN
4	Pemberatan Penilaian *Assessment Weightage*	Penilaian Berterusan *Continuous Assessment (%)*	100
		Peperiksaan Akhir *Final Examination (%)*	0

#	PERKARA *ITEM*	KETERANGAN *DESCRIPTION*	
5	Sinopsis Kursus *Course Synopsis*	Kursus ini memperkenalkan konsep asas biomekanik dalam analisis gerakan manusia, dengan tumpuan kepada sistem jasad tegar berbilang segmen. Pelajar akan mempelajari kaedah analisis dan penyelesaian persamaan gerakan bagi sistem ini dalam aplikasi biomekanik. Selain itu, kursus ini merangkumi struktur dan fungsi sistem muskuloskeletal, mengintegrasikan prinsip anatomi dan fisiologi untuk memahami mekanisme pergerakan manusia. Teknik pemodelan pengiraan dan biomekanik muskuloskeletal turut diterapkan bagi mensimulasikan dan menilai pergerakan dinamik manusia dalam pelbagai situasi, termasuk aplikasi dalam sukan, perubatan dan kejuruteraan rehabilitasi. *This course introduces fundamental biomechanics concepts for human motion analysis, focusing on multi-segment rigid body systems. Students will learn methods for analyzing and solving equations of motion for these systems in biomechanical applications. The course also covers the structure and function of the musculoskeletal system, integrating anatomical and physiological principles to understand human movement mechanisms. Computational modeling techniques and musculoskeletal biomechanics are applied to simulate and evaluate human movement dynamics in various contexts, including sports, medicine and rehabilitation engineering.*	
6	Jumlah Kredit/SLT *Total Credit/SLT*	Kredit *Credit*	3
		SLT *SLT*	120
7	Prasyarat (jika ada) *Pre-requisite (if any)*		
8	Bahasa Pengantar *Medium of Instruction*	ENGLISH LANGUAGE,	
9	Pemetaan Hasil Pembelajaran Kursus kepada Hasil Pembelajaran Program, Kaedah Pengajaran dan Kaedah Penilaian *Mapping of the Course Learning Outcomes to the Programme Learning Outcomes, Teaching Methods and Assessment Methods*	Rujuk Lampiran 1 / *Refer Attachment 1*	
10	Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	Maklumbalas secara dalam talian *Online feedback*	
11	Pecahan Masa Pembelajaran Pelajar *Distribution of Student Learning Time (SLT)*	Rujuk Lampiran 2 / *Refer Attachment 2*	
12	Rujukan Utama/Lain-Lain Rujukan *Main/Others References (include required and further readings, and should be the most current [last five years])*	Zatsiorsky, V. M. (2013). Introduction to biomechanics for human motion analysis (3rd ed.). Champaign, IL: Human Kinetics. Crespo da Silva, M. R. M. (2015). Fundamentals of dynamics and analysis of motion. Mineola, NY: Dover Publications. Uchida, T. K., & Delp, S. L. (2021). Biomechanics of movement: The science of sports, robotics, and rehabilitation. Cambridge, MA: The MIT Press. Pallis, J. M. (Ed.). (2019). Biomechanical principles and applications in sports. Cham, Switzerland: Springer. Wittek, A., Miller, K., & Nielsen, P. M. F. (Eds.). (2020). Computational biomechanics for medicine: Soft tissues and the musculoskeletal system. Cham, Switzerland: Springer.	
13	Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-Kaedah Peraturan-Peraturan Universiti Malaya (Ijazah Sarjana) (Versi Terkini) *Universiti Malaya (Master Degree) Rules and Regulations (Latest Version)*	
14	Keperluan Sumber Khas (E.g. perisian, makmal etc.) *Special Resources Requirement (E.g. software, laboratory etc.)*	Textbooks Lecture Notes	
15	Lain-Lain Maklumat Tambahan (jika berkaitan) *Other Additional Information (if applicable)*		

Lampiran 1 /*Attachment 1*

Pemetaan Hasil Pembelajaran Kursus kepada Hasil Pembelajaran Program, Kaedah Pengajaran dan Kaedah Penilaian
Mapping of the Course Learning Outcomes to the Programme Learning Outcomes, Teaching Methods and Assessment Methods

Hasil Pembelajaran Kursus / *Course Learning Outcome(s) (CLO)*	Hasil Pembelajaran Program / *Programme Learning Outcome(s) (PLO)*			Kaedah Pengajaran & Pembelajaran / *Teaching & Learning*	Peratus Kaedah Penilaian/ *Assessment Methods and Percentage (%)*	Pencapaian CLO / *Criteria for Achievement of CLO*
	PLO1	PLO2	PLO6			
1.MENGANALISIS DAN MENYELESAIKAN PERSAMAAN GERAKAN BAGI SISTEM JASAD TEGAR BERBILANG SEGMEN DALAM APLIKASI BIOMEKANIK. *ANALYZE AND SOLVE EQUATIONS OF MOTION FOR MULTI-SEGMENT RIGID BODY SYSTEMS IN BIOMECHANICAL APPLICATIONS.* CLO1 **Tahap taksonomi :** (C4 - Analyzing) ***Taxonomy level***		✔		Lecture Self-paced Learning Tutorial Interactive Lecture Self-paced Tutorial	Written Test 1 (20%) Report (20%)	Achieve (>=75% of students obtained 65% marks)
2.MENERANGKAN STRUKTUR DAN FUNGSI SISTEM MUSKULOSKELETAL DENGAN MENGINTEGRASIKAN PRINSIP ANATOMI DAN FISIOLOGI UNTUK ANALISIS GERAKAN. *DESCRIBE THE STRUCTURE AND FUNCTION OF THE MUSCULOSKELETAL SYSTEM, INTEGRATING ANATOMICAL AND PHYSIOLOGICAL PRINCIPLES FOR MOTION ANALYSIS.* CLO2 **Tahap taksonomi :** (C5 - Evaluating) ***Taxonomy level***	✔			Lecture Self-paced Learning Tutorial Interactive Lecture	Test 2 (20%) Presentation (20%)	Achieve (>=75% of students obtained 65% marks)
3.MENGAPLIKASIKAN BIOMEKANIK MUSKULOSKELETAL DAN TEKNIK PEMODELAN PENGIRAAN UNTUK MENSIMULASIKAN DAN MENILAI PERGERAKAN DINAMIK MANUSIA. *APPLY MUSCULOSKELETAL BIOMECHANICS AND COMPUTATIONAL MODELING TECHNIQUES TO SIMULATE AND ASSESS HUMAN MOVEMENT DYNAMICS.* CLO3 **Tahap taksonomi :** (P4 - Articulation) ***Taxonomy level***			✔	Lecture Self-paced Learning Tutorial Interactive Lecture Self-paced Tutorial	Reports/Plans: Information, Research, Scientific, Technical (20%)	Achieve (>=75% of students obtained 65% marks)

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Lampiran 2 /*Attachment 2*

Pecahan Masa Pembelajaran Pelajar
Distribution of Student Learning Time (SLT)

(a) Pengajaran dan Pembelajaran (P&P) / *Teaching and Learning (T&L)*

Minggu *Week*	Aktiviti P&P *T&L Activities*	Topik *Topics*	Masa Pembelajaran Pelajar *Student Learning Time*			Jumlah SLT *Total SLT*
			F2F *Synchronous*	NF2F *Asynchronous*	Masa Persiapan Pelajar *Student Preparation Time*	
1	Lecture	Pengenalan kepada Biomekanik dan Analisis Gerakan	3	0	3	6
2	Lecture	Asas Kinematik Badan Tegar	2	0	4	6
2	Self-paced Tutorial	Asas Kinematik Badan Tegar	0	1	1	2
3	Lecture	Persamaan Pergerakan untuk Sistem Berbilang Segmen	2	0	4	6
3	Tutorial	Persamaan Pergerakan untuk Sistem Berbilang Segmen	1	0	1	2
4	Lecture	Anatomi dan Fungsi Muskuloskeletal	2	0	4	6
4	Tutorial	Anatomi dan Fungsi Muskuloskeletal	1	0	1	2
5	Lecture	Kinetik Pergerakan Manusia	2	0	4	6
5	Tutorial	Kinetik Pergerakan Manusia	1	0	1	2
6	Interactive Lecture	Analisis Gait dan Mekanik Pergerakan I	0	2	4	6
6	Self-paced Learning	Analisis Gait dan Mekanik Pergerakan I	0	1	1	2
7	Interactive Lecture	Analisis Gait dan Mekanik Pergerakan II	0	2	4	6
7	Self-paced Tutorial	Analisis Gait dan Mekanik Pergerakan II	0	1	1	2
8	Interactive Lecture	Tangkapan Gerakan dan Pengumpulan Data Biomekanikal	0	2	4	6
8	Self-paced Learning	Tangkapan Gerakan dan Pengumpulan Data Biomekanikal	0	1	1	2
9	Lecture	Pemodelan Pengiraan dalam Biomekanik	2	0	4	6
9	Tutorial	Pemodelan Pengiraan dalam Biomekanik	1	0	1	2
10	Lecture	Keseimbangan Manusia dan Kawalan Postur	2	0	4	6
10	Tutorial	Keseimbangan Manusia dan Kawalan Postur	1	0	1	2
11	Lecture	Aplikasi dalam Prestasi Sukan dan Pencegahan Kecederaan	2	0	4	6
11	Tutorial	Aplikasi dalam Prestasi Sukan dan Pencegahan Kecederaan	1	0	1	2
12	Interactive Lecture	Teknik Analisis Gerakan Termaju	0	2	4	6
12	Self-paced Learning	Teknik Analisis Gerakan Termaju	0	1	1	2
13	Lecture	Trend Penyelidikan dan Hala Tuju Masa Depan dalam Biomekanik	3	0	3	6
14	Lecture	Pembentangan Projek Akhir dan Semakan Kursus	3	0	3	6
			29	13	64	
					Sub-total SLT	106

(b) Penilaian / *Assessments*

Bil *No*	Minggu *Week*	Pemberatan *Weightage (%)*	Aktiviti Penilaian *Assessment Activities*	CLO	Masa Pembelajaran Pelajar *Student Learning Time*			Jumlah SLT *Total SLT*
					F2F *Synchronous*	NF2F *Asynchronous*	Masa Persediaan Pelajar *Student Preparation Time*	
1	6	20	Written Test 1	CLO1	0	0	1	1
2	7	20	Report	CLO1	0	1	3	4

3	12	20	Test 2	CLO2	1	0	1	2
4	13	20	Reports/Plans: Information, Research, Scientific, Technical	CLO3	0	0	3	3
5	14	20	Presentation	CLO2	0	1	3	4
		100			1	2	11	
							Sub-total SLT	14

Grand Total SLT	120
Total F2F SLT for T&L	29
Total NF2F SLT for T&L	13
Total Student Preparation Time for T&L	64
Total F2F SLT for Assessment	1
Total NF2F SLT for Assessment	2
Total Student Preparation Time for Assessment	11

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UNIVERSITI MALAYA

SPESIFIKASI KURSUS
COURSE SPECIFICATIONS

Akademi/Fakulti/Institut/Pusat *Academy/Faculty/Institute/Centre*	: FAKULTI KEJURUTERAAN *FACULTY OF ENGINEERING*		
Kod Kursus *Course Code*	: KQB7004 *KQB7004*	Sesi Penawaran *Offering Session*	:
Nama Kursus *Course Name*	: TEKNOLOGI PENJAGAAN KESIHATAN *HEALTHCARE TECHNOLOGY*	Tarikh Kelulusan *Approval Date*	:
Versi Pindaan *Ammendment Version*	:		

#	PERKARA *ITEM*	KETERANGAN *DESCRIPTION*	
1	Sesi Akademik dan Semester *Academic Session and Semester*		
2	Nama Staf Akademik *Name of Academic Staff*	Koordinator / Coordinator : DR. CHAN CHOW KHUEN Pembantu Koordinator / Assistant Coordinator : DR. THAM LAI KUAN,	
3	Jabatan/Fakulti *Department/Faculty*	Jabatan *Department*	BIOMEDICAL ENGINEERING
		Fakulti *Faculty*	FAKULTI KEJURUTERAAN
4	Pemberatan Penilaian *Assessment Weightage*	Penilaian Berterusan *Continuous Assessment (%)*	100
		Peperiksaan Akhir *Final Examination (%)*	0

#	PERKARA *ITEM*	KETERANGAN *DESCRIPTION*	
5	Sinopsis Kursus *Course Synopsis*	Dalam kursus ini, pelajar akan meneroka secara mendalam teknologi penjagaan kesihatan dengan fokus pada peranti perubatan untuk pemantauan kesihatan berterusan. Peranti perubatan yang dibincangkan dalam kursus ini merangkumi penilaian tidur, biomekanik pergerakan manusia, peranti terapeutik, dan peranti intervensi. Kursus ini merangkumi prinsip asas reka bentuk peranti perubatan, pengukuran fisiologi, dan aplikasi kecerdasan buatan (AI) dalam penjagaan kesihatan. Pelajar akan memperoleh pengalaman praktikal menggunakan sensor boleh pakai berkaitan dengan penilaian tidur dan analisis pergerakan manusia. Selain itu, aspek peraturan, pematuhan, dan bias dalam teknologi perubatan turut dibincangkan dalam kursus ini. Melalui aktiviti praktikal, projek, dan kajian kes, pelajar akan menerapkan teknik analisis data dalam aplikasi penjagaan kesihatan, menganalisis data dunia sebenar, dan membangunkan penyelesaian inovatif dalam teknologi perubatan. Kursus ini juga meneroka trend terkini dan peluang keusahawanan, menyediakan pelajar untuk kerjaya dalam teknologi penjagaan kesihatan, kejuruteraan bioperubatan, dan inovasi peranti perubatan. *In this course, students will learn an in-depth exploration of healthcare technology with a focus on medical devices for continuous health monitoring. The medical devices covered in this subject shall encompass sleep assessment, human motion biomechanics, therapeutic devices, and interventional devices. It covers the fundamental principles of medical device design, physiological measurements, and the application of artificial intelligence (AI) in healthcare. Students will gain hands-on experience with wearable sensors relating to sleep assessment and human movement analysis. Additionally, the regulatory, compliance and biasing aspects shall be covered in this course. Through hands-on activities, projects, and case studies, students will apply data analytics techniques to healthcare applications, analyze real-world data, and develop innovative solutions for healthcare medical technology. The course also explores emerging trends and entrepreneurial opportunities, preparing students for careers in healthcare technology, biomedical engineering, and medical device innovation.*	
6	Jumlah Kredit/SLT *Total Credit/SLT*	Kredit *Credit*	3
		SLT *SLT*	120
7	Prasyarat (jika ada) *Pre-requisite (if any)*		
8	Bahasa Pengantar *Medium of Instruction*	ENGLISH LANGUAGE,	
9	Pemetaan Hasil Pembelajaran Kursus kepada Hasil Pembelajaran Program, Kaedah Pengajaran dan Kaedah Penilaian *Mapping of the Course Learning Outcomes to the Programme Learning Outcomes, Teaching Methods and Assessment Methods*	Rujuk Lampiran 1 / *Refer Attachment 1*	
10	Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	Maklumbalas secara dalam talian *Online feedback*	
11	Pecahan Masa Pembelajaran Pelajar *Distribution of Student Learning Time (SLT)*	Rujuk Lampiran 2 / *Refer Attachment 2*	
12	Rujukan Utama/Lain-Lain Rujukan *Main/Others References (include required and further readings, and should be the most current [last five years])*	Yock, P.G. (2015). Biodesign: The Process of Innovating Medical Devices. Second Edition. Cambridge University Press. Garcia, A. (2011). Bioengineering: Principles, Methodologies and Applications. First Edition. Nova Science Pub Inc. Enderle, J.D. (2012). Introduction to Biomedical Engineering. Third Edition. Science Direct Elsevier. Dey, N., Ashour, A. S., & Borra, S. (Eds.). (2019). Wearable and Implantable Medical Devices: Applications and Challenges (1st ed.). Academic Press.	
13	Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-Kaedah Peraturan-Peraturan Universiti Malaya (Ijazah Sarjana) (Versi Terkini) *Universiti Malaya (Master Degree) Rules and Regulations (Latest Version)*	
14	Keperluan Sumber Khas (E.g. perisian, makmal etc.) *Special Resources Requirement (E.g. software, laboratory etc.)*	Textbooks Lecture Notes	
15	Lain-Lain Maklumat Tambahan (jika berkaitan) *Other Additional Information (if applicable)*		

Lampiran 1 /*Attachment 1*

Pemetaan Hasil Pembelajaran Kursus kepada Hasil Pembelajaran Program, Kaedah Pengajaran dan Kaedah Penilaian
Mapping of the Course Learning Outcomes to the Programme Learning Outcomes, Teaching Methods and Assessment Methods

Hasil Pembelajaran Kursus / *Course Learning Outcome(s) (CLO)*	Hasil Pembelajaran Program / *Programme Learning Outcome(s) (PLO)*			Kaedah Pengajaran & Pembelajaran / *Teaching & Learning*	Peratus Kaedah Penilaian/ *Assessment Methods and Percentage (%)*	Pencapaian CLO / *Criteria for Achievement of CLO*
	PLO2	PLO5	PLO8			
1.MENGANALISIS CABARAN DAN PELUANG DALAM TEKNOLOGI PENJAGAAN KESIHATAN BAGI MENCADANGKAN PENYELESAIAN DAN REKOMENDASI PERANTI PERUBATAN YANG SESUAI. *ANALYSE HEALTHCARE TECHNOLOGY CHALLENGES AND OPPORTUNITIES IN PROPOSING SUITABLE MEDICAL DEVICES RECOMMENDATIONS AND SOLUTIONS.* CLO1 **Tahap taksonomi :** (C5 - Evaluating) ***Taxonomy level***	✔			Lecture Tutorial Interactive Lecture Self-paced Tutorial	Test 1 (20%)	Achieve (>=75% of students obtained 65% marks)
2.MENILAI PERANTI PERUBATAN BERDASARKAN KES SEBENAR MELALUI PENILAIAN DAN ISYARAT YANG DIKUMPULKAN. *EVALUATE MEDICAL DEVICES WITH THE REAL LIFE CASES BASED ON ASSESSMENT AND COLLECTED SIGNALS.* CLO2 **Tahap taksonomi :** (P4 - Articulation) ***Taxonomy level***		✔		Lecture Tutorial Interactive Lecture Self-paced Tutorial	Report (20%) Test 2 (20%)	Achieve (>=75% of students obtained 65% marks)
3.MENCADANGKAN PERANTI PERUBATAN YANG SESUAI KEPADA PASUKAN PENGAMAL PERUBATAN BERDASARKAN PENAMBAHBAIKAN TEKNOLOGI SEMASA. *PROPOSE A SUITABLE MEDICAL DEVICE FOR A PATIENT TO A MEDICAL PRACTICIONER TEAM BASED ON THE IMPROVEMENT OF THE CURRENT TECHNOLOGIES.* CLO3 **Tahap taksonomi :** (A4 - Organizing) ***Taxonomy level***			✔	Lecture Tutorial Interactive Lecture Self-paced Tutorial	Reports/Plans: Information, Research, Scientific, Technical (20%) Presentation (20%)	Achieve (>=75% of students obtained 65% marks)

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Lampiran 2 /*Attachment 2*

Pecahan Masa Pembelajaran Pelajar
Distribution of Student Learning Time (SLT)

(a) Pengajaran dan Pembelajaran (P&P) / *Teaching and Learning (T&L)*

Minggu *Week*	Aktiviti P&P *T&L Activities*	Topik *Topics*	Masa Pembelajaran Pelajar *Student Learning Time*			Jumlah SLT *Total SLT*
			F2F *Synchronous*	NF2F *Asynchronous*	Masa Persiapan Pelajar *Student Preparation Time*	
1	Lecture	Gambaran Keseluruhan Teknologi Penjagaan Kesihatan	3	0	3	6
2	Lecture	Gambaran Keseluruhan Teknologi Penjagaan Kesihatan untuk Penilaian Tidur	2	0	4	6
2	Self-paced Tutorial	Gambaran Keseluruhan Teknologi Penjagaan Kesihatan untuk Penilaian Tidur	0	1	1	2
3	Lecture	Gambaran Keseluruhan Teknologi Penjagaan Kesihatan untuk Biomekanik Pergerakan Manusia	2	0	4	6
3	Tutorial	Gambaran Keseluruhan Teknologi Penjagaan Kesihatan untuk Biomekanik Pergerakan Manusia	1	0	1	2
4	Lecture	Gambaran Keseluruhan Teknologi Penjagaan Kesihatan untuk Peranti Boleh Dipakai	2	0	4	6
4	Tutorial	Gambaran Keseluruhan Teknologi Penjagaan Kesihatan untuk Peranti Boleh Dipakai	1	0	1	2
5	Lecture	Peranti Perubatan dan Pengumpulan Data Secara Praktikal	2	0	4	6
5	Tutorial	Peranti Perubatan dan Pengumpulan Data Secara Praktikal	1	0	1	2
6	Interactive Lecture	Analitis Data dalam Teknologi Penjagaan Kesihatan I	0	2	4	6
6	Self-paced Tutorial	Analitis Data dalam Teknologi Penjagaan Kesihatan I	0	1	1	2
7	Interactive Lecture	Analitis Data dalam Teknologi Penjagaan Kesihatan II	0	2	4	6
7	Self-paced Tutorial	Analitis Data dalam Teknologi Penjagaan Kesihatan II	0	1	1	2
8	Interactive Lecture	Analitis Data dalam Teknologi Penjagaan Kesihatan III	0	2	4	6
8	Self-paced Tutorial	Analitis Data dalam Teknologi Penjagaan Kesihatan III	0	1	1	2
9	Lecture	Analitis Data dalam Teknologi Penjagaan Kesihatan IV	2	0	4	6
9	Tutorial	Analitis Data dalam Teknologi Penjagaan Kesihatan IV	1	0	1	2
10	Lecture	Analisis Grafik dalam Teknologi Penjagaan Kesihatan I	2	0	4	6
10	Tutorial	Analisis Grafik dalam Teknologi Penjagaan Kesihatan I	1	0	1	2
11	Lecture	Analisis Grafik dalam Teknologi Penjagaan Kesihatan II	2	0	4	6
11	Self-paced Tutorial	Analisis Grafik dalam Teknologi Penjagaan Kesihatan II	1	0	1	2
12	Interactive Lecture	Analisis Grafik dalam Teknologi Penjagaan Kesihatan III	0	2	4	6
12	Self-paced Tutorial	Analisis Grafik dalam Teknologi Penjagaan Kesihatan III	0	1	1	2
13	Lecture	Pengurusan dalam Teknologi Penjagaan Kesihatan	3	0	3	6
14	Lecture	Teknologi Penjagaan Kesihatan: Dahulu, Kini dan Masa Hadapan	3	0	3	6
			29	13	64	
					Sub-total SLT	106

(b) Penilaian / *Assessments*

Bil *No*	Minggu *Week*	Pemberatan *Weightage (%)*	Aktiviti Penilaian *Assessment Activities*	CLO	Masa Pembelajaran Pelajar *Student Learning Time*			Jumlah SLT *Total SLT*
					F2F *Synchronous*	NF2F *Asynchronous*	Masa Persediaan Pelajar *Student Preparation Time*	

1	6	20	Test 1	CLO1	0	1	1	2
2	7	20	Report	CLO2	0	0	3	3
3	12	20	Test 2	CLO2	1	0	1	2
4	13	20	Reports/Plans: Information, Research, Scientific, Technical	CLO3	0	0	3	3
5	14	20	Presentation	CLO3	0	1	3	4
		100			1	2	11	
							Sub-total SLT	14

Grand Total SLT	120
Total F2F SLT for T&L	29
Total NF2F SLT for T&L	13
Total Student Preparation Time for T&L	64
Total F2F SLT for Assessment	1
Total NF2F SLT for Assessment	2
Total Student Preparation Time for Assessment	11

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UNIVERSITI MALAYA

SPESIFIKASI KURSUS
COURSE SPECIFICATIONS

Akademi/Fakulti/Institut/Pusat *Academy/Faculty/Institute/Centre*	: FAKULTI KEJURUTERAAN *FACULTY OF ENGINEERING*		
Kod Kursus *Course Code*	: KQB7005 *KQB7005*	Sesi Penawaran *Offering Session*	:
Nama Kursus *Course Name*	: PENGIMEJAN BIOPERUBATAN *MEDICAL IMAGING*	Tarikh Kelulusan *Approval Date*	:
Versi Pindaan *Ammendment Version*	:		

#	PERKARA *ITEM*	KETERANGAN *DESCRIPTION*	
1	Sesi Akademik dan Semester *Academic Session and Semester*		
2	Nama Staf Akademik *Name of Academic Staff*	Koordinator / Coordinator : DR. THAM LAI KUAN Pembantu Koordinator / Assistant Coordinator :	
3	Jabatan/Fakulti *Department/Faculty*	Jabatan *Department*	BIOMEDICAL ENGINEERING
		Fakulti *Faculty*	FAKULTI KEJURUTERAAN
4	Pemberatan Penilaian *Assessment Weightage*	Penilaian Berterusan *Continuous Assessment (%)*	100
		Peperiksaan Akhir *Final Examination (%)*	0

#	PERKARA *ITEM*	KETERANGAN *DESCRIPTION*	
5	Sinopsis Kursus *Course Synopsis*	Kursus ini memperkenalkan prinsip-prinsip asas dan rekabentuk peralatan pengimejan perubatan diagnostik. Beberapa topik pengimejan perubatan diliputi seperti asas atom dan sifat radiasi, penghasilan x-ray dan interaksi dengan bahan, sinar gamma, radiografi projeksi, mamografi, fluroskopi, tomografi berkomputer, pengimejan resonans magnetik, sistem ultrabunyi, pengimejan perubatan nuklear, laser dan optoeletronik. Kursus ini juga mendedahkan pelajar-pelajar kepada konsep kuality imej dan keselamatan radiasi dalam pengimejan perubatan. *The course introduces the basic principles and designs of medical diagnostic imaging equipment. Topics covered include basic atomics and nature of radiation, X-ray production and interaction with matter, gamma rays, projection radiography, mammography, fluoroscopy, computed tomography, magnetic resonance imaging, ultrasound system, nuclear medicine imaging, laser and optoelectronics. The course also exposes students to the concept of image quality and radiation safety in medical imaging.*	
6	Jumlah Kredit/SLT *Total Credit/SLT*	Kredit *Credit*	3
		SLT *SLT*	120
7	Prasyarat (jika ada) *Pre-requisite (if any)*		
8	Bahasa Pengantar *Medium of Instruction*	ENGLISH LANGUAGE,	
9	Pemetaan Hasil Pembelajaran Kursus kepada Hasil Pembelajaran Program, Kaedah Pengajaran dan Kaedah Penilaian *Mapping of the Course Learning Outcomes to the Programme Learning Outcomes, Teaching Methods and Assessment Methods*	Rujuk Lampiran 1 / *Refer Attachment 1*	
10	Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	Maklumbalas secara dalam talian *Online feedback*	
11	Pecahan Masa Pembelajaran Pelajar *Distribution of Student Learning Time (SLT)*	Rujuk Lampiran 2 / *Refer Attachment 2*	
12	Rujukan Utama/Lain-Lain Rujukan *Main/Others References (include required and further readings, and should be the most current [last five years])*	Paulsen, R. R., & Moeslund, T. B. (2020). Introduction to medical image analysis. Springer. https://doi.org/10.1007/978-3-030-39364-9. Runge, V. M. (2022). Neuroradiology: The essentials with MR and CT (2nd ed.). Thieme Medical Publishers. Jadvar, H., & Colletti, P. M. (2022). Nuclear medicine: The essentials. Wolters Kluwer. Wu, G., Shen, D., & Sabuncu, M. (Eds.). (2019). Machine learning and medical imaging. Academic Press. Zhou, S. K., Greenspan, H., & Shen, D. (Eds.). (2020). Deep learning for medical image analysis (2nd ed.). Elsevier.	
13	Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-Kaedah Peraturan-Peraturan Universiti Malaya (Ijazah Sarjana) (Versi Terkini) *Universiti Malaya (Master Degree) Rules and Regulations (Latest Version)*	
14	Keperluan Sumber Khas (E.g. perisian, makmal etc.) *Special Resources Requirement (E.g. software, laboratory etc.)*	Textbooks Lecture Notes	
15	Lain-Lain Maklumat Tambahan (jika berkaitan) *Other Additional Information (if applicable)*		

Lampiran 1 /*Attachment 1*

Pemetaan Hasil Pembelajaran Kursus kepada Hasil Pembelajaran Program, Kaedah Pengajaran dan Kaedah Penilaian
Mapping of the Course Learning Outcomes to the Programme Learning Outcomes, Teaching Methods and Assessment Methods

Hasil Pembelajaran Kursus / *Course Learning Outcome(s) (CLO)*	Hasil Pembelajaran Program / *Programme Learning Outcome(s) (PLO)*			Kaedah Pengajaran & Pembelajaran / *Teaching & Learning*	Peratus Kaedah Penilaian/ *Assessment Methods and Percentage (%)*	Pencapaian CLO / *Criteria for Achievement of CLO*
	PLO1	PLO3	PLO7			
1.MENTAFSIR PRINSIP ASAS, REKA BENTUK DAN APLIKASI PELBAGAI PERALATAN PENGIMEJAN DIAGNOSTIK PERUBATAN DAN TERAPEUTIK. *INTERPRET THE WORKING PRINCIPLES, DESIGNS AND APPLICATIONS OF VARIOUS MEDICAL DIAGNOSTIC IMAGING AND THERAPEUTIC EQUIPMENTS.* CLO1 **Tahap taksonomi :** (C4 - Analyzing) ***Taxonomy level***	✔			Lecture Tutorial Interactive Lecture Self-paced Tutorial	Test 1 (20%)	Achieve (>=75% of students obtained 65% marks)
2.MENILAI KUALITI IMEJ DAN KESELAMATAN DENGAN MENERAPKAN PRINSIP PERLINDUNGAN SINARAN SERTA TEKNIK PENILAIAN KUALITI. *EVALUATE IMAGE QUALITY AND SAFETY BY APPLYING RADIATION PROTECTION PRINCIPLES AND QUALITY ASSESSMENT TECHNIQUES.* CLO2 **Tahap taksonomi :** (P5 - Naturalization) ***Taxonomy level***		✔		Lecture Tutorial Interactive Lecture Self-paced Tutorial	Report (20%) Reports/Plans: Information, Research, Scientific, Technical (20%)	Achieve (>=75% of students obtained 65% marks)
3.MENGAPLIKASI KAEDAH PEMPROSESAN DAN ANALISIS IMEJ UNTUK DIAGNOSTIK PERUBATAN DAN SOKONGAN KEPUTUSAN. *APPLY IMAGE PROCESSING AND ANALYSIS METHODS FOR MEDICAL DIAGNOSTICS AND DECISION SUPPORT.* CLO3 **Tahap taksonomi :** (C3 - Applying) ***Taxonomy level***			✔	Lecture Tutorial	Test 2 (20%) Presentation (20%)	Achieve (>=75% of students obtained 65% marks)

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Lampiran 2 /*Attachment 2*

Pecahan Masa Pembelajaran Pelajar
Distribution of Student Learning Time (SLT)

(a) Pengajaran dan Pembelajaran (P&P) / *Teaching and Learning (T&L)*

Minggu *Week*	Aktiviti P&P *T&L Activities*	Topik *Topics*	Masa Pembelajaran Pelajar *Student Learning Time*			Jumlah SLT *Total SLT*
			F2F *Synchronous*	NF2F *Asynchronous*	Masa Persiapan Pelajar *Student Preparation Time*	
1	Lecture	Pengimejan Perubatan Asas	3	0	3	6
2	Lecture	Pengimejan X-ray	2	0	4	6
2	Self-paced Tutorial	Pengimejan X-ray	0	1	1	2
3	Lecture	Teknik Radiografi	2	0	4	6
3	Tutorial	Teknik Radiografi	1	0	1	2
4	Lecture	Kualiti , Pemprosesan dan Analisis Imej	2	0	4	6
4	Tutorial	Kualiti , Pemprosesan dan Analisis Imej	1	0	1	2
5	Lecture	Mamografi dan Fluoroskopi	2	0	4	6
5	Tutorial	Mamografi dan Fluoroskopi	1	0	1	2
6	Interactive Lecture	Tomografi Berkomputer (CT) dan CT Dwi-Tenaga	0	2	4	6
6	Self-paced Tutorial	Tomografi Berkomputer (CT) dan CT Dwi-Tenaga	0	1	1	2
7	Interactive Lecture	Pengimejan Resonans Magnetik (MRI) dan MRI Berfungsi	0	2	4	6
7	Self-paced Tutorial	Pengimejan Resonans Magnetik (MRI) dan MRI Berfungsi	0	1	1	2
8	Interactive Lecture	Pengimejan Ultrasound dan Elastografi	0	2	4	6
8	Self-paced Tutorial	Pengimejan Ultrasound dan Elastografi	0	1	1	2
9	Lecture	Pengkomputeran Imej Lanjutan & AI dalam Pengimejan Perubatan	2	0	4	6
9	Tutorial	Pengkomputeran Imej Lanjutan & AI dalam Pengimejan Perubatan	1	0	1	2
10	Lecture	Kawalan Kualiti dan Keselamatan dalam Pengimejan Perubatan	2	0	4	6
10	Tutorial	Kawalan Kualiti dan Keselamatan dalam Pengimejan Perubatan	1	0	1	2
11	Lecture	Pengimejan Perubatan Nuklear & PET-CT	2	0	4	6
11	Tutorial	Pengimejan Perubatan Nuklear & PET-CT	1	0	1	2
12	Interactive Lecture	Dosimetri & Perlindungan Sinaran	0	2	4	6
12	Self-paced Tutorial	Dosimetri & Perlindungan Sinaran	0	1	1	2
13	Lecture	Modaliti Pengimejan Muncul	3	0	3	6
14	Lecture	Trend Masa Depan dalam Pengimejan Perubatan	3	0	3	6
			29	13	64	
					Sub-total SLT	106

(b) Penilaian / *Assessments*

Bil *No*	Minggu *Week*	Pemberatan *Weightage (%)*	Aktiviti Penilaian *Assessment Activities*	CLO	Masa Pembelajaran Pelajar *Student Learning Time*			Jumlah SLT *Total SLT*
					F2F *Synchronous*	NF2F *Asynchronous*	Masa Persediaan Pelajar *Student Preparation Time*	
1	6	20	Test 1	CLO1	0	1	1	2
2	7	20	Report	CLO2	0	0	3	3

3	12	20	Test 2	CLO3	1	0	1	2
4	13	20	Reports/Plans: Information, Research, Scientific, Technical	CLO2	0	0	3	3
5	14	20	Presentation	CLO3	0	1	3	4
		100			1	2	11	
							Sub-total SLT	14

Grand Total SLT	120
Total F2F SLT for T&L	29
Total NF2F SLT for T&L	13
Total Student Preparation Time for T&L	64
Total F2F SLT for Assessment	1
Total NF2F SLT for Assessment	2
Total Student Preparation Time for Assessment	11

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UNIVERSITI MALAYA

SPESIFIKASI KURSUS
COURSE SPECIFICATIONS

Akademi/Fakulti/Institut/Pusat *Academy/Faculty/Institute/Centre*	: FAKULTI KEJURUTERAAN *FACULTY OF ENGINEERING*		
Kod Kursus *Course Code*	: KQB7006 *KQB7006*	Sesi Penawaran *Offering Session*	:
Nama Kursus *Course Name*	: KEJURUTERAAN TISU *TISSUE ENGINEERING*	Tarikh Kelulusan *Approval Date*	:
Versi Pindaan *Ammendment Version*	:		

#	PERKARA *ITEM*	KETERANGAN *DESCRIPTION*	
1	Sesi Akademik dan Semester *Academic Session and Semester*		
2	Nama Staf Akademik *Name of Academic Staff*		
3	Jabatan/Fakulti *Department/Faculty*	Jabatan *Department*	BIOMEDICAL ENGINEERING
		Fakulti *Faculty*	FAKULTI KEJURUTERAAN
4	Pemberatan Penilaian *Assessment Weightage*	Penilaian Berterusan *Continuous Assessment (%)*	50
		Peperiksaan Akhir *Final Examination (%)*	50
5	Sinopsis Kursus *Course Synopsis*	Projek penyelidikan akan mendedahkan pelajar dalam membuat ulangkaji risalah berkaitan dengan topik kajian spesifik, merancang kaedah kajian, mengumpul data eksperimen dan menghuraikan data, menulis laporan dan membuat pembentangan. *Research project will expose students to carry out literature review on a specific research topic, plan a research methodology, collect experimental data and Interpret data, write a dissertation and carry out a presentation.*	

#	PERKARA *ITEM*	KETERANGAN *DESCRIPTION*	
6	Jumlah Kredit/SLT *Total Credit/SLT*	Kredit *Credit*	3
		SLT *SLT*	121
7	Prasyarat (jika ada) *Pre-requisite (if any)*		
8	Bahasa Pengantar *Medium of Instruction*	ENGLISH LANGUAGE,	
9	Pemetaan Hasil Pembelajaran Kursus kepada Hasil Pembelajaran Program, Kaedah Pengajaran dan Kaedah Penilaian *Mapping of the Course Learning Outcomes to the Programme Learning Outcomes, Teaching Methods and Assessment Methods*	Rujuk Lampiran 1 / *Refer Attachment 1*	
10	Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	Ditampal di papan notis atau dimaklumkan melalui talian. *Results will be notified through notice board and online.*	
11	Pecahan Masa Pembelajaran Pelajar *Distribution of Student Learning Time (SLT)*	Rujuk Lampiran 2 / *Refer Attachment 2*	
12	Rujukan Utama/Lain-Lain Rujukan *Main/Others References (include required and further readings, and should be the most current [last five years])*	Joyce Y. Wong, Joseph D. Bronzino and Donald R. Peterson (2012). Biomaterials: Principles and Practises, CRC Press, ISBN 9781439872512 Lanza RP, Langer R, Vacanti J. Principles of Tissue Engineering, Academic Press, 2013.4th Edition, ISBN 9780123983701 Robert A. Brown (2013). Extreme Tissue Engineering: Concepts and Strategies for Tissue Fabrication. John Wiley & Sons. ISBN 9781119942665 Jennifer L. Olson, Anthony Atala and James J. Yoo (2011). Tissue Engineering: Current Strategies and Future Directions. Chonnam Med J 2011;47:1-13 Advances in Biomaterials Science and Biomedical Applications (2013). Edited by Rosario Pignatello, ISBN 978-953-51-1051-4, 568 pages, Publisher: InTech ebook	
13	Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-Kaedah Peraturan-Peraturan Universiti Malaya (Ijazah Sarjana) (Versi Terkini) *Universiti Malaya (Master Degree) Rules and Regulations (Latest Version)*	
14	Keperluan Sumber Khas (E.g. perisian, makmal etc.) *Special Resources Requirement (E.g. software, laboratory etc.)*		
15	Lain-Lain Maklumat Tambahan (jika berkaitan) *Other Additional Information (if applicable)*		

Lampiran 1 /*Attachment 1*

Pemetaan Hasil Pembelajaran Kursus kepada Hasil Pembelajaran Program, Kaedah Pengajaran dan Kaedah Penilaian
Mapping of the Course Learning Outcomes to the Programme Learning Outcomes, Teaching Methods and Assessment Methods

Hasil Pembelajaran Kursus / *Course Learning Outcome(s) (CLO)*	Hasil Pembelajaran Program / *Programme Learning Outcome(s) (PLO)*			Kaedah Pengajaran & Pembelajaran / *Teaching & Learning*	Peratus Kaedah Penilaian/ *Assessment Methods and Percentage (%)*	Pencapaian CLO / *Criteria for Achievement of CLO*
	CLS1	CLS2	CLS5			
1.MENERANGKAN PRINSIP-PRINSIP DI SEBALIK KEJURUTERAAN TISU. *EXPLAIN THE PRINCIPLES BEHIND TISSUE ENGINEERING.* CLO1 **Tahap taksonomi :** (8, - - none -) ***Taxonomy level***	✔					-
2.MENILAI CABARAN DAN PENYELESAIAN KEJURUTERAAN TISU. *EVALUATE TISSUE ENGINEERING CHALLENGES AND SOLUTIONS.* CLO2 **Tahap taksonomi :** (8, - - none -) ***Taxonomy level***		✔				-
3.MENJUSTIFIKASI ISU-ISU PENGAWALSELIAAN DAN ETIKA YANG BERKAITAN DENGAN KEJURUTERAAN TISU. *JUSTIFY THE REGULATORY AND ETHICAL ISSUES RELATED TO TISSUE ENGINEERING.* CLO3 **Tahap taksonomi :** (8, - - none -) ***Taxonomy level***			✔			-

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Lampiran 2 /*Attachment 2*

Pecahan Masa Pembelajaran Pelajar
Distribution of Student Learning Time (SLT)

(a) Pengajaran dan Pembelajaran (P&P) / *Teaching and Learning (T&L)*

Minggu *Week*	Aktiviti P&P *T&L Activities*	Topik *Topics*	Masa Pembelajaran Pelajar *Student Learning Time*			Jumlah SLT *Total SLT*
			F2F *Synchronous*	NF2F *Asynchronous*	Masa Persiapan Pelajar *Student Preparation Time*	
			0	0	0	
					Sub-total SLT	0

(b) Penilaian / *Assessments*

Bil *No*	Minggu *Week*	Pemberatan *Weightage (%)*	Aktiviti Penilaian *Assessment Activities*	CLO	Masa Pembelajaran Pelajar *Student Learning Time*			Jumlah SLT *Total SLT*
					F2F *Synchronous*	NF2F *Asynchronous*	Masa Persediaan Pelajar *Student Preparation Time*	
		0			0	0	0	
							Sub-total SLT	0

Grand Total SLT	0
Total F2F SLT for T&L	0
Total NF2F SLT for T&L	0
Total Student Preparation Time for T&L	0
Total F2F SLT for Assessment	0
Total NF2F SLT for Assessment	0
Total Student Preparation Time for Assessment	0

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UNIVERSITI MALAYA

SPESIFIKASI KURSUS
COURSE SPECIFICATIONS

Akademi/Fakulti/Institut/Pusat *Academy/Faculty/Institute/Centre*	: FAKULTI KEJURUTERAAN *FACULTY OF ENGINEERING*		
Kod Kursus *Course Code*	: KQB7007 *KQB7007*	Sesi Penawaran *Offering Session*	:
Nama Kursus *Course Name*	: ISYARAT FISIOLOGI DAN ANALISIS IMEJ *PHYSIOLOGICAL SIGNAL & IMAGE ANALYSIS*	Tarikh Kelulusan *Approval Date*	:
Versi Pindaan *Ammendment Version*	:		

#	PERKARA *ITEM*	KETERANGAN *DESCRIPTION*	
1	Sesi Akademik dan Semester *Academic Session and Semester*		
2	Nama Staf Akademik *Name of Academic Staff*	Koordinator / Coordinator : DR. NG SIEW CHEOK Pembantu Koordinator / Assistant Coordinator :	
3	Jabatan/Fakulti *Department/Faculty*	Jabatan *Department*	BIOMEDICAL ENGINEERING
		Fakulti *Faculty*	FAKULTI KEJURUTERAAN
4	Pemberatan Penilaian *Assessment Weightage*	Penilaian Berterusan *Continuous Assessment (%)*	50
		Peperiksaan Akhir *Final Examination (%)*	50

#	PERKARA *ITEM*	KETERANGAN *DESCRIPTION*	
5	Sinopsis Kursus *Course Synopsis*	Kursus ini merangkumi teknik pemprosesan isyarat fisiologi dan teknik analisis imej perubatan maju. Topik dalam pemprosesan isyarat termasuk pembuangan artifak, penguatan isyarat dan pemilihan ciri-ciri isyarat fisiologi biasa seperti ECG, EEG, EMG dan bunyi. Topik dalam pemprosesan imej termasuk transformasi skala kelabu, segmentasi dan ekstraksi ciri-ciri imej x-ray dan ultrabunyi. *This course covers advanced physiological signal processing techniques as well as medical image analysis techniques. The topics on signal processing include artefact removal, signal enhancement and feature selection of common physiological signals such as ECG, EEG, EMG and sound. The topics on image processing include grayscale transformation, segmentation and feature extraction of x-ray and ultrasound images.*	
6	Jumlah Kredit/SLT *Total Credit/SLT*	Kredit *Credit*	3
		SLT *SLT*	120
7	Prasyarat (jika ada) *Pre-requisite (if any)*		
8	Bahasa Pengantar *Medium of Instruction*	ENGLISH LANGUAGE,	
9	Pemetaan Hasil Pembelajaran Kursus kepada Hasil Pembelajaran Program, Kaedah Pengajaran dan Kaedah Penilaian *Mapping of the Course Learning Outcomes to the Programme Learning Outcomes, Teaching Methods and Assessment Methods*	Rujuk Lampiran 1 / *Refer Attachment 1*	
10	Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	Ditampal di papan notis atau dimaklumkan melalui talian. *Results will be notified through notice board and online*	
11	Pecahan Masa Pembelajaran Pelajar *Distribution of Student Learning Time (SLT)*	Rujuk Lampiran 2 / *Refer Attachment 2*	
12	Rujukan Utama/Lain-Lain Rujukan *Main/Others References (include required and further readings, and should be the most current [last five years])*	Gonzalez, R. C. & Woods, R. E., (2011) Digital Image Processing, Pearson Education. Deserno, T. M., (2011) Biomedical Image Processing, Springer. Najarian, K. & Splinter, R., (2012) Biomedical Signal and Image Processing, Second Edition, Taylor & Francis. Akay, M (2012), Biomedical Signal Processing, Academic Press. Bruce, E.N. (2001) Biomedical Signal Processing and signal modelling, John Wiley.A. (Ed.). (2012). Webb's Physics of Medical Imaging. CRC Press.	
13	Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-Kaedah Peraturan-Peraturan Universiti Malaya (Ijazah Sarjana) (Versi Terkini) *Universiti Malaya (Master Degree) Rules and Regulations (Latest Version)*	
14	Keperluan Sumber Khas (E.g. perisian, makmal etc.) *Special Resources Requirement (E.g. software, laboratory etc.)*	Buku Rujukan, Nota Kuliah	
15	Lain-Lain Maklumat Tambahan (jika berkaitan) *Other Additional Information (if applicable)*		

Lampiran 1 /*Attachment 1*

Pemetaan Hasil Pembelajaran Kursus kepada Hasil Pembelajaran Program, Kaedah Pengajaran dan Kaedah Penilaian
Mapping of the Course Learning Outcomes to the Programme Learning Outcomes, Teaching Methods and Assessment Methods

Hasil Pembelajaran Kursus / *Course Learning Outcome(s) (CLO)*	Hasil Pembelajaran Program / *Programme Learning Outcome(s) (PLO)*								Kaedah Pengajaran & Pembelajaran / *Teaching & Learning*	Peratus Kaedah Penilaian/ *Assessment Methods and Percentage (%)*	Pencapaian CLO / *Criteria for Achievement of CLO*
	PLO1	PLO1	PLO1	PLO1	PLO2	PLO2	PLO5	PLO5			
1.MENCADANGKAN KAEDAH PEMPROSESAN ISYARAT BAGI APLIKASI ISYARAT FISIOLOGI. *RECOMMEND SIGNAL PROCESSING METHODS APPLIED TO PHYSIOLOGICAL SIGNALS.* CLO1 **Tahap taksonomi :** (8, - - none -) ***Taxonomy level***	✔										Achieve (>=75% of students obtained 65% marks)
2.MENCADANGKAN KAEDAH PEMPROSESAN ISYARAT BAGI APLIKASI ISYARAT FISIOLOGI. *RECOMMEND SIGNAL PROCESSING METHODS APPLIED TO PHYSIOLOGICAL SIGNALS* CLO1 **Tahap taksonomi :** (C5 - Evaluating) ***Taxonomy level***		✔									Achieve (>=75% of students obtained 65% marks)
3.MEREKA BENTUK PEMPROSESAN ISYARAT YANG BERSESUAIAN UNTUK PELBAGAI ISYARAT FISIOLOGI. *DESIGN APPROPRIATE SIGNAL PROCESSING METHODS FOR VARIOUS PHYSIOLOGICAL SIGNALS.* CLO2 **Tahap taksonomi :** (14, - - none -) ***Taxonomy level***							✔				-
4.MEREKA BENTUK PEMPROSESAN ISYARAT YANG BERSESUAIAN UNTUK PELBAGAI ISYARAT FISIOLOGI. *DESIGN APPROPRIATE SIGNAL PROCESSING METHODS FOR VARIOUS PHYSIOLOGICAL SIGNALS* CLO2 **Tahap taksonomi :** (P5 - Naturalization) ***Taxonomy level***								✔			Achieve (>=75% of students obtained 65% marks)
5.MENILAI TEKNIK-TEKNIK PEMPROSESAN IMEJ PERUBATAN UNTUK TUJUAN DIAGNOSTIK. *EVALUATE MEDICAL IMAGE PROCESSING TECHNIQUES FOR DIAGNOSTIC PURPOSES.* CLO3 **Tahap taksonomi :** (8, - - none -) ***Taxonomy level***			✔								-
6.MENILAI TEKNIK-TEKNIK PEMPROSESAN IMEJ PERUBATAN UNTUK TUJUAN DIAGNOSTIK *EVALUATE MEDICAL IMAGE PROCESSING TECHNIQUES FOR DIAGNOSTIC PURPOSES. (C5) EXPLAIN DIFFERENT IMA* CLO3 **Tahap taksonomi :** (C5 - Evaluating) ***Taxonomy level***				✔							Achieve (>=75% of students obtained 65% marks)

7.MENJELASKAN PELBAGAI OPERASI ANALISIS IMEJ DALAM KEDUA-DUA DOMAIN RUANG DAN FREKUENSI BAGI TUJUAN PERBANDINGAN. *EXPLAIN DIFFERENT IMAGE ANALYSIS OPERATIONS IN BOTH SPATIAL AND FREQUENCY DOMAIN FOR COMPARISON.* CLO4 **Tahap taksonomi :** (8, - - none -) ***Taxonomy level***					✔						-
8.MENJELASKAN PELBAGAI OPERASI ANALISIS IMEJ DALAM KEDUA-DUA DOMAIN RUANG DAN FREKUENSI BAGI TUJUAN PERBANDINGAN *EXPLAIN DIFFERENT IMAGE ANALYSIS OPERATIONS IN BOTH SPATIAL AND FREQUENCY DOMAIN FOR COMPARISON* CLO4 **Tahap taksonomi :** (C5 - Evaluating) ***Taxonomy level***						✔					Achieve (>=75% of students obtained 65% marks)

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Lampiran 2 /*Attachment 2*

Pecahan Masa Pembelajaran Pelajar
Distribution of Student Learning Time (SLT)

(a) Pengajaran dan Pembelajaran (P&P) / *Teaching and Learning (T&L)*

Minggu *Week*	Aktiviti P&P *T&L Activities*	Topik *Topics*	Masa Pembelajaran Pelajar *Student Learning Time*			Jumlah SLT *Total SLT*
			F2F *Synchronous*	NF2F *Asynchronous*	Masa Persiapan Pelajar *Student Preparation Time*	
			0	0	0	
					Sub-total SLT	0

(b) Penilaian / *Assessments*

Bil *No*	Minggu *Week*	Pemberatan *Weightage (%)*	Aktiviti Penilaian *Assessment Activities*	CLO	Masa Pembelajaran Pelajar *Student Learning Time*			Jumlah SLT *Total SLT*
					F2F *Synchronous*	NF2F *Asynchronous*	Masa Persediaan Pelajar *Student Preparation Time*	
		0			0	0	0	
							Sub-total SLT	0

Grand Total SLT	0
Total F2F SLT for T&L	0
Total NF2F SLT for T&L	0
Total Student Preparation Time for T&L	0
Total F2F SLT for Assessment	0
Total NF2F SLT for Assessment	0
Total Student Preparation Time for Assessment	0

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UNIVERSITI MALAYA

SPESIFIKASI KURSUS
COURSE SPECIFICATIONS

Akademi/Fakulti/Institut/Pusat *Academy/Faculty/Institute/Centre*	: FAKULTI KEJURUTERAAN *FACULTY OF ENGINEERING*		
Kod Kursus *Course Code*	: KQB7008 *KQB7008*	Sesi Penawaran *Offering Session*	:
Nama Kursus *Course Name*	: KEPINTARAN BUATAN DALAM PERUBATAN *ARTIFICIAL INTELLIGENCE IN MEDICINE*	Tarikh Kelulusan *Approval Date*	:
Versi Pindaan *Ammendment Version*	:		

#	PERKARA *ITEM*	KETERANGAN *DESCRIPTION*	
1	Sesi Akademik dan Semester *Academic Session and Semester*		
2	Nama Staf Akademik *Name of Academic Staff*	Koordinator / Coordinator : PROFESOR MADYA IR. DR. AHMAD KHAIRI BIN ABDUL WAHAB Pembantu Koordinator / Assistant Coordinator :	
3	Jabatan/Fakulti *Department/Faculty*	Jabatan *Department*	BIOMEDICAL ENGINEERING
		Fakulti *Faculty*	FAKULTI KEJURUTERAAN
4	Pemberatan Penilaian *Assessment Weightage*	Penilaian Berterusan *Continuous Assessment (%)*	50
		Peperiksaan Akhir *Final Examination (%)*	50
5	Sinopsis Kursus *Course Synopsis*	Kursus ini meliputi asas-asas kefahaman tentang konsep-konsep kecerdikan buatan dan kegunaankegunaan asasnya dalam Kejuruteraan Bioperubatan. *The course covers the fundamental understanding of the artificial intelligence concepts and its basic applications in biomedical engineering.*	

#	PERKARA *ITEM*	KETERANGAN *DESCRIPTION*	
6	Jumlah Kredit/SLT *Total Credit/SLT*	Kredit *Credit*	3
		SLT *SLT*	122
7	Prasyarat (jika ada) *Pre-requisite (if any)*		
8	Bahasa Pengantar *Medium of Instruction*	ENGLISH LANGUAGE,	
9	Pemetaan Hasil Pembelajaran Kursus kepada Hasil Pembelajaran Program, Kaedah Pengajaran dan Kaedah Penilaian *Mapping of the Course Learning Outcomes to the Programme Learning Outcomes, Teaching Methods and Assessment Methods*	Rujuk Lampiran 1 / *Refer Attachment 1*	
10	Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	Ditampal di papan notis atau dimaklumkan melalui talian. *Results will be notified through notice board and online*	
11	Pecahan Masa Pembelajaran Pelajar *Distribution of Student Learning Time (SLT)*	Rujuk Lampiran 2 / *Refer Attachment 2*	
12	Rujukan Utama/Lain-Lain Rujukan *Main/Others References (include required and further readings, and should be the most current [last five years])*	Neural Network Design (2nd Edition) Paperback – September 1, 2014, Martin T Hagan, Howard B Demuth, Mark H Beale, ISBN 978-0971732117 Stephen Lucci, Danny Kopec, Artificial Intelligence in the 21stCentury, 2012, Mercury, ISBN-13: 978-1936420230 Michael Negnevitsky, Artificial Intelligence: A Guide to Intelligent Systems, 3rd Edition, May 10, 2011,ISBN-13: 978-1408225745 Luger, G.F., Artificial intelligence structure and strategies for complex problem solving, 6thEdition, Pearson, 2009, ISBN-10: 0-321-54589-3 Stuart Russell, Peter Norvig, Artificial Intelligence A Modern Approach (3rd Edition), Prentice Hall, 2009, ISBN 0-13-604259-7	
13	Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-Kaedah Peraturan-Peraturan Universiti Malaya (Ijazah Sarjana) (Versi Terkini) *Universiti Malaya (Master Degree) Rules and Regulations (Latest Version)*	
14	Keperluan Sumber Khas (E.g. perisian, makmal etc.) *Special Resources Requirement (E.g. software, laboratory etc.)*	Seperti di Rujukan Utama,Nota Kuliah As shown in Main Reference, Lecture Notes	
15	Lain-Lain Maklumat Tambahan (jika berkaitan) *Other Additional Information (if applicable)*		

Lampiran 1 /*Attachment 1*

Pemetaan Hasil Pembelajaran Kursus kepada Hasil Pembelajaran Program, Kaedah Pengajaran dan Kaedah Penilaian
Mapping of the Course Learning Outcomes to the Programme Learning Outcomes, Teaching Methods and Assessment Methods

Hasil Pembelajaran Kursus / *Course Learning Outcome(s) (CLO)*	Hasil Pembelajaran Program / *Programme Learning Outcome(s) (PLO)*			Kaedah Pengajaran & Pembelajaran / *Teaching & Learning*	Peratus Kaedah Penilaian/ *Assessment Methods and Percentage (%)*	Pencapaian CLO / *Criteria for Achievement of CLO*
	CLS1	CLS3(C)	CLS4			
1.MENGINTEGRASIKAN TEKNIK KECERDASAN BUATAN KE ARAH PEMBANGUNAN PROFESIONAL DAN KEUSAHAWANAN DALAM BIDANG PERUBATAN. *INTEGRATE THE ARTIFICIAL INTELLIGENCE TECHNIQUE TOWARDS PROFESSIONAL DEVELOPMENT AND ENTREPRENEURSHIP IN MEDICINE.* CLO1 **Tahap taksonomi :** (C5 - Evaluating) ***Taxonomy level***			✔	Lecture	Final Exam Question 1 (16%)	Achieve (>=75% of students obtained 65% marks)
2.MENENTUKAN TEORI-TEORI TEKNIK KECERDIKAN BUATAN DALAM KEJURUTERAAN BIOPERUBATAN. *DETERMINE THE THEORIES OF ARTIFICIAL INTELLIGENCE TECHNIQUES* CLO2 **Tahap taksonomi :** (C4 - Analyzing) ***Taxonomy level***	✔			Lecture Laboratory Session	Written Test 1 (15%) Final Exam Question 2 (17%)	Achieve (>=75% of students obtained 65% marks)
3.MENGAPLIKASIKAN TEKNIK-TEKNIK KECERDIKAN BUATAN KEPADA BEBERAPA KEGUNAAN DALAM KEJURUTERAAN BIOPERUBATAN *APPLY THE ARTIFICIAL INTELLIGENCE TECHNIQUES IN SOME BIOMEDICAL ENGINEERING APPLICATIONS* CLO3 **Tahap taksonomi :** (C3 - Applying) ***Taxonomy level***		✔		Lecture Laboratory Session	Project Presentation 1 (20%) Written Test 1 (15%) Final Exam Question 3 (17%)	Achieve (>=75% of students obtained 65% marks)

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Lampiran 2 /*Attachment 2*

Pecahan Masa Pembelajaran Pelajar
Distribution of Student Learning Time (SLT)

(a) Pengajaran dan Pembelajaran (P&P) / *Teaching and Learning (T&L)*

Minggu *Week*	Aktiviti P&P *T&L Activities*	Topik *Topics*	Masa Pembelajaran Pelajar *Student Learning Time*			Jumlah SLT *Total SLT*
			F2F *Synchronous*	NF2F *Asynchronous*	Masa Persiapan Pelajar *Student Preparation Time*	
1	Lecture	Pengenalan sistem pintar berasaskan pengetahuan. Sistem pakar berdasarkan peraturan.	3	0	6	9
2	Lecture	Pengurusan ketidakpastian dalam sistem pakar berdasarkan peraturan.	3	0	6	9
3	Lecture	Sistem pakar berasaskan kerangka Kejuruteraan pengetahuan Sistem pakar untuk menyelesaikan masalah kejuruteraan.	3	0	6	9
4	Lecture	Cengkerang sistem pakar komersil: Gambaran keseluruhan Exsys CORVID. Pengenalan kepada Exsys Corvid.	3	0	6	9
5	Laboratory Session	Sesi Makmal CORVID 1.	3	0	3	6
6	Laboratory Session	Sesi Makmal CORVID 2. Ujian (15%)	3	0	3	6
7	Lecture	Kotak alat rangkaian saraf, Pembelajaran yang diawasi, Rangkaian neural multilayer. Pembelajaran yang dipercepat dalam rangkaian neural multilayer, Rangkaian saraf untuk menyelesaikan masalah kejuruteraan.	3	0	6	9
8	Lecture	Kotak Alat Rangkaian Saraf Matlab. Pengenalan Ikhtisar Matlab.	3	0	6	9
9	Laboratory Session	Sesi makmal Neural Network Toolbox 1 Matlab.	3	0	3	6
10	Laboratory Session	Sesi Makmal Matlab Neural Network Toolbox 2. Projek dan Pembentangan (20%)	3	0	3	6
11	Lecture	Kotak Alat Logik Fuzzy, Tinjauan mengenai set, peraturan dan kesimpulan membangun sistem Fuzzy, Membangun dan menala sistem Fuzzy Logik untuk menyelesaikan masalah kejuruteraan.	3	0	6	9
12	Laboratory Session	Sesi makmal Logik Fuzzy Toolbox Matlab 1. Test 2 (15%).	3	0	3	6
13	Laboratory Session	Sesi makmal Logik Fuzzy Toolbox Matlab 2.	3	0	3	6
14	Lecture	Perlombongan Data dan Penemuan Pengetahuan.	3	0	6	9
			42	0	66	
					Sub-total SLT	108

(b) Penilaian / *Assessments*

Bil *No*	Minggu *Week*	Pemberatan *Weightage (%)*	Aktiviti Penilaian *Assessment Activities*	CLO	Masa Pembelajaran Pelajar *Student Learning Time*			Jumlah SLT *Total SLT*
					F2F *Synchronous*	NF2F *Asynchronous*	Masa Persediaan Pelajar *Student Preparation Time*	
1	6	15	Written Test 1	CLO2	1	0	1	2
2	10	20	Project Presentation 1	CLO3	0	0	6	6
3	12	15	Written Test 1	CLO3	1	0	1	2
4	15	16	Final Exam Question 1	CLO1	0.66	0	0.66	1.32
5	15	17	Final Exam Question 2	CLO2	0.67	0	0.67	1.34
6	15	17	Final Exam Question 3	CLO3	0.67	0	0.67	1.34
		100			4	0	10	
							Sub-total SLT	14

Grand Total SLT	122
Total F2F SLT for T&L	42
Total NF2F SLT for T&L	0
Total Student Preparation Time for T&L	66
Total F2F SLT for Assessment	4
Total NF2F SLT for Assessment	0
Total Student Preparation Time for Assessment	10

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UNIVERSITI MALAYA

SPESIFIKASI KURSUS
COURSE SPECIFICATIONS

Akademi/Fakulti/Institut/Pusat
Academy/Faculty/Institute/Centre : FAKULTI KEJURUTERAAN
FACULTY OF ENGINEERING

Kod Kursus
Course Code : KQB7009
KQB7009

Nama Kursus
Course Name : KEJURUTERAAN REHABILITASI
REHABILITATION ENGINEERING

Versi Pindaan
Ammendment Version :

Sesi Penawaran
Offering Session :

Tarikh Kelulusan
Approval Date :

#	PERKARA *ITEM*	KETERANGAN *DESCRIPTION*	
1	Sesi Akademik dan Semester *Academic Session and Semester*		
2	Nama Staf Akademik *Name of Academic Staff*		
3	Jabatan/Fakulti *Department/Faculty*	Jabatan *Department*	BIOMEDICAL ENGINEERING
		Fakulti *Faculty*	FAKULTI KEJURUTERAAN
4	Pemberatan Penilaian *Assessment Weightage*	Penilaian Berterusan *Continuous Assessment (%)*	50
		Peperiksaan Akhir *Final Examination (%)*	50
5	Sinopsis Kursus *Course Synopsis*	Kursus ini meliputi teknik untuk gerakan manusia dan analisis beban dan gait patologi dan aktiviti-aktiviti lain. Aplikasi teknik kepada rekabentuk dan penilaian untuk implan ortopedik *The course covers techniques of human movement and load analysis in normal and pathological gait and other activities. Application of the techniques to the design and evaluation of orthopaedic implants.*	

#	PERKARA *ITEM*	KETERANGAN *DESCRIPTION*	
6	Jumlah Kredit/SLT *Total Credit/SLT*	Kredit *Credit*	3
		SLT *SLT*	120
7	Prasyarat (jika ada) *Pre-requisite (if any)*		
8	Bahasa Pengantar *Medium of Instruction*	ENGLISH LANGUAGE,	
9	Pemetaan Hasil Pembelajaran Kursus kepada Hasil Pembelajaran Program, Kaedah Pengajaran dan Kaedah Penilaian *Mapping of the Course Learning Outcomes to the Programme Learning Outcomes, Teaching Methods and Assessment Methods*	Rujuk Lampiran 1 / *Refer Attachment 1*	
10	Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	Ditampal di papan notis atau dimaklumkan melalui talian *Results will be notified through notice board and online*	
11	Pecahan Masa Pembelajaran Pelajar *Distribution of Student Learning Time (SLT)*	Rujuk Lampiran 2 / *Refer Attachment 2*	
12	Rujukan Utama/Lain-Lain Rujukan *Main/Others References (include required and further readings, and should be the most current [last five years])*	Assistive Technologies: Principles and Practice, 4e (2015) by Albert M. Cook and Janice Miller Polgar Elservier Introduction to Neural Engineering for Motor Rehabilitation 1st Edition (2013) by Dario Farina, Winnie Jensen, Metin Akay Biomedical Engineering: Bridging Medicine and Technology (Cambridge Texts in Biomedical Engineering) (2015) by W. Mark Saltzman The Biomedical Engineering Handbook, Fourth Edition: Four Volume Set (2015) by Joseph D. Bronzino and Donald R. Peterson CRC Press Current Diagnosis and Treatment Physical Medicine and Rehabilitation (Current Diagnosis & Treatment). (2014) by Ian Maitin Mc Graw Hill Education	
13	Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-Kaedah Peraturan-Peraturan Universiti Malaya (Ijazah Sarjana) (Versi Terkini) *Universiti Malaya (Master Degree) Rules and Regulations (Latest Version)*	
14	Keperluan Sumber Khas (E.g. perisian, makmal etc.) *Special Resources Requirement (E.g. software, laboratory etc.)*	Seperti di Rujukan Utama,Nota Kuliah As shown in Main Reference, Lecture Notes	
15	Lain-Lain Maklumat Tambahan (jika berkaitan) *Other Additional Information (if applicable)*		

Lampiran 1 /*Attachment 1*

Pemetaan Hasil Pembelajaran Kursus kepada Hasil Pembelajaran Program, Kaedah Pengajaran dan Kaedah Penilaian
Mapping of the Course Learning Outcomes to the Programme Learning Outcomes, Teaching Methods and Assessment Methods

Hasil Pembelajaran Kursus / *Course Learning Outcome(s) (CLO)*	Hasil Pembelajaran Program / *Programme Learning Outcome(s) (PLO)*				Kaedah Pengajaran & Pembelajaran / *Teaching & Learning*	Peratus Kaedah Penilaian/ *Assessment Methods and Percentage (%)*	Pencapaian CLO / *Criteria for Achievement of CLO*
	CLS2	CLS2	CLS3(C)	CLS3(C)			
1.MENYELESAIKAN MASALAH REHABILITASI KLINIKAL DAN YANG BERKAITAN DENGAN MENGGUNAKAN INSTRUMENTASI BIOMEKANIKAL TERMAJU. *SOLVE CLINICAL REHABILITATION PROBLEMS AND RELATED ISSUES BY USING ADVANCED BIOMECHANICAL INSTRUMENTATION.* CLO1 **Tahap taksonomi :** (7, - - none -) ***Taxonomy level***	✔						-
2.MENYELESAIKAN MASALAH REHABILITASI KLINIKAL DAN YANG BERKAITAN DENGAN MENGGUNAKAN INSTRUMENTASI BIOMEKANIKAL TERMAJU *SOLVE CLINICAL REHABILITATION PROBLEMS AND RELATED ISSUES BY USING ADVANCED BIOMECHANICAL INSTRUMENTATION* CLO1 **Tahap taksonomi :** (C4 - Analyzing) ***Taxonomy level***		✔					Achieve (>=75% of students obtained 65% marks)
3.MENGGUNAKAN KONSEP DAN TEORI REHABILITASI DALAM MENILAI PERGERAKAN MANUSIA YANG KURANG UPAYA. *USE THE CONCEPTS AND THEORIES OF REHABILITATION IN ASSESSING DISORDERED HUMAN MOVEMENTS.* CLO2 **Tahap taksonomi :** (19, - - none -) ***Taxonomy level***			✔				-
4.MENGGUNAKAN KONSEP DAN TEORI REHABILITASI DALAM MENILAI PERGERAKAN MANUSIA YANG KURANG UPAYA *USE THE CONCEPTS AND THEORIES OF REHABILITATION IN ASSESSING DISORDERED HUMAN MOVEMENTS.* CLO2 **Tahap taksonomi :** (A5 - Internalizing) ***Taxonomy level***				✔			Achieve (>=75% of students obtained 65% marks)

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Lampiran 2 /*Attachment 2*

Pecahan Masa Pembelajaran Pelajar
Distribution of Student Learning Time (SLT)

(a) Pengajaran dan Pembelajaran (P&P) / *Teaching and Learning (T&L)*

Minggu *Week*	Aktiviti P&P *T&L Activities*	Topik *Topics*	Masa Pembelajaran Pelajar *Student Learning Time*			Jumlah SLT *Total SLT*
			F2F *Synchronous*	NF2F *Asynchronous*	Masa Persiapan Pelajar *Student Preparation Time*	
			0	0	0	
					Sub-total SLT	0

(b) Penilaian / *Assessments*

Bil *No*	Minggu *Week*	Pemberatan *Weightage (%)*	Aktiviti Penilaian *Assessment Activities*	CLO	Masa Pembelajaran Pelajar *Student Learning Time*			Jumlah SLT *Total SLT*
					F2F *Synchronous*	NF2F *Asynchronous*	Masa Persediaan Pelajar *Student Preparation Time*	
		0			0	0	0	
							Sub-total SLT	0

Grand Total SLT	0
Total F2F SLT for T&L	0
Total NF2F SLT for T&L	0
Total Student Preparation Time for T&L	0
Total F2F SLT for Assessment	0
Total NF2F SLT for Assessment	0
Total Student Preparation Time for Assessment	0

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UNIVERSITI MALAYA

SPESIFIKASI KURSUS
COURSE SPECIFICATIONS

Akademi/Fakulti/Institut/Pusat
Academy/Faculty/Institute/Centre : FAKULTI KEJURUTERAAN
FACULTY OF ENGINEERING

Kod Kursus
Course Code : KQB7010
KQB7010

Nama Kursus
Course Name : TELEPERUBATAN
TELEMEDICINE

Versi Pindaan
Ammendment Version :

Sesi Penawaran
Offering Session :

Tarikh Kelulusan
Approval Date :

#	PERKARA *ITEM*	KETERANGAN *DESCRIPTION*	
1	Sesi Akademik dan Semester *Academic Session and Semester*		
2	Nama Staf Akademik *Name of Academic Staff*		
3	Jabatan/Fakulti *Department/Faculty*	Jabatan *Department*	BIOMEDICAL ENGINEERING
		Fakulti *Faculty*	FAKULTI KEJURUTERAAN
4	Pemberatan Penilaian *Assessment Weightage*	Penilaian Berterusan *Continuous Assessment (%)*	50
		Peperiksaan Akhir *Final Examination (%)*	50

#	PERKARA *ITEM*	KETERANGAN *DESCRIPTION*	
5	Sinopsis Kursus *Course Synopsis*	Kursus ini meliputi teleperubatan dan pelbagai topik berkaitan perangkaian, terutamanya yang digunakan dalam bidang kejuruteraan bioperubatan. Topik termasuklah pengenalan kepada topologi perangkaian dan piawaian yang berkaitan; pengenalan kepada internet dan kegunaannya; asas-asas antaramuka komputer; dan teknologi-teknologi perangkaian komputer yang ada pada masa ini relevan kepada penyelidikan dan pembekalan perkhidmatan kejuruteraan bioperubatan. *The course covers the telemedicine and various networking-related topics, particularly those applicable to biomedical engineering applications. Topics include an introduction to network topologies and related standards, introduction to the Internet and its applications, fundamentals of computer interface, and currently available computer networking technologies relevant to biomedical engineering research and service provision.*	
6	Jumlah Kredit/SLT *Total Credit/SLT*	Kredit *Credit*	3
		SLT *SLT*	120
7	Prasyarat (jika ada) *Pre-requisite (if any)*		
8	Bahasa Pengantar *Medium of Instruction*	ENGLISH LANGUAGE,	
9	Pemetaan Hasil Pembelajaran Kursus kepada Hasil Pembelajaran Program, Kaedah Pengajaran dan Kaedah Penilaian *Mapping of the Course Learning Outcomes to the Programme Learning Outcomes, Teaching Methods and Assessment Methods*	Rujuk Lampiran 1 / *Refer Attachment 1*	
10	Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	1) Markah untuk tugasan dan penilaian berterusan diumumkan sebelum peperiksaan akhir 2) Gred untuk peperiksaan akhir akan diberikan *1) Announcement of marks for assignments and continuous assessment before the final examination. 2) Grades for final exam will be given.*	
11	Pecahan Masa Pembelajaran Pelajar *Distribution of Student Learning Time (SLT)*	Rujuk Lampiran 2 / *Refer Attachment 2*	
12	Rujukan Utama/Lain-Lain Rujukan *Main/Others References (include required and further readings, and should be the most current [last five years])*	Telemedicine Technologies: Information Technologies in Medicine and Telehealth: Bernard Fong, A. C. M. Fong and C. K. Li, Publisher: John Wiley and Sons (2011) Journal of Telemedicine And Telecare Telemedicine Techniques and Applications:Edited by Georgi Graschew and Stefan Rakowsky, ISBN 978-953-307-354-5, 514 pages, Publisher: InTech (2012) Advances in Telemedicine: Applications in Various Medical Disciplines and Geographical Regions: Edited by Georgi Graschew and Theo A. Roelofs, ISBN 978-953-307-161-9, 310 pages, Publisher: InTech (2014) Advances in Telemedicine: Technologies, Enabling Factors and Scenarios: Edited by Georgi Graschew and Theo A. Roelofs, ISBN 978-953-307-159-6, 426 pages, Publisher: InTech (2012)	
13	Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-Kaedah Peraturan-Peraturan Universiti Malaya (Ijazah Sarjana) (Versi Terkini) *Universiti Malaya (Master Degree) Rules and Regulations (Latest Version)*	
14	Keperluan Sumber Khas (E.g. perisian, makmal etc.) *Special Resources Requirement (E.g. software, laboratory etc.)*	Buku Rujukan, Nota Kuliah Reference book, Lecture note	
15	Lain-Lain Maklumat Tambahan (jika berkaitan) *Other Additional Information (if applicable)*		

Lampiran 1 /*Attachment 1*

Pemetaan Hasil Pembelajaran Kursus kepada Hasil Pembelajaran Program, Kaedah Pengajaran dan Kaedah Penilaian
Mapping of the Course Learning Outcomes to the Programme Learning Outcomes, Teaching Methods and Assessment Methods

Hasil Pembelajaran Kursus / *Course Learning Outcome(s) (CLO)*	Hasil Pembelajaran Program / *Programme Learning Outcome(s) (PLO)*						Kaedah Pengajaran & Pembelajaran / *Teaching & Learning*	Peratus Kaedah Penilaian/ *Assessment Methods and Percentage (%)*	Pencapaian CLO / *Criteria for Achievement of CLO*
				CLS2	CLS3(C)	CLS3(F)			
1.MENGENALPASTI KONSEP-KONSEP YANG DAPAT DIGUNAKAN UNTUK PERANGKAIAN KOMPUTER SERTA PROTOCOL-PROTOKOL DAM SENI BINA KOMUNIKASI. *IDENTIFY THE CONCEPTS APPLICABLE TO COMPUTER NETWORKING AND OTHER COMMUNICATIONS PROTOCOLS AND ARCHITECTURE.* CLO1 **Tahap taksonomi :** (5,18, - - none -) ***Taxonomy level***				✔					-
2.MENGGUNAKAN KONSEP PERANGKAIAN KOMPUTER DAN KOMUNIKASI SERTA PROTOKOL DALAM TELEPERUBATAN *USE THE CONCEPT OF COMPUTER NETWORKING AND COMMUNICATION AS WELL AS PROTOCOLS IN TELEMEDICINE* CLO1 **Tahap taksonomi :** (C3 - Applying) ***Taxonomy level***	✔								Achieve (>=75% of students obtained 65% marks)
3.MENGHURAI SENI BINA INTERNET DAN PENGGUNAAN BIOPERUBATAN YANG RELEVAN. *DESCRIBE THE ARCHITECTURE OF INTERNET AND RELEVANT BIOMEDICAL ENGINEERING APPLICATIONS.* CLO2 **Tahap taksonomi :** (5,17, - - none -) ***Taxonomy level***					✔				-
4.MEMBANGUN SENI BINA INTERNET DALAMAPPLIKASI KEJURUTERAAN BIOPERUBATAN YANG RELEVAN *DEVELOP THE ARCHITECTURE OF INTERNET IN RELEVANT BIOMEDICAL ENGINEERING APPLICATIONS* CLO2 **Tahap taksonomi :** (P4 - Articulation) ***Taxonomy level***		✔							Achieve (>=75% of students obtained 65% marks)
5.MENYELESAIKAN MASALAH-MASLAH KOMUNIKASI BERKAITAN DENGAN KEJURUTERAAN BIOPERUBATAN. *PROPOSE SOLUTIONS TO BIOMEDICAL ENGINEERING-RELATED COMMUNICATIONS PROBLEMS.* CLO3 **Tahap taksonomi :** (7,19, - - none -) ***Taxonomy level***						✔			-
6.MENYELESAIKAN MASALAH-MASLAH KOMUNIKASI BERKAITAN DENGAN KEJURUTERAAN BIOPERUBATAN *PROPOSE SOLUTIONS TO BIOMEDICAL ENGINEERING-RELATED COMMUNICATIONS PROBLEMS* CLO3 **Tahap taksonomi :** (C4 - Analyzing) ***Taxonomy level***			✔						Achieve (>=75% of students obtained 65% marks)

Lampiran 2 /*Attachment 2*

Pecahan Masa Pembelajaran Pelajar
Distribution of Student Learning Time (SLT)

(a) Pengajaran dan Pembelajaran (P&P) / *Teaching and Learning (T&L)*

Minggu *Week*	Aktiviti P&P *T&L Activities*	Topik *Topics*	Masa Pembelajaran Pelajar *Student Learning Time*			Jumlah SLT *Total SLT*
			F2F *Synchronous*	NF2F *Asynchronous*	Masa Persiapan Pelajar *Student Preparation Time*	
			0	0	0	
					Sub-total SLT	0

(b) Penilaian / *Assessments*

Bil *No*	Minggu *Week*	Pemberatan *Weightage (%)*	Aktiviti Penilaian *Assessment Activities*	CLO	Masa Pembelajaran Pelajar *Student Learning Time*			Jumlah SLT *Total SLT*
					F2F *Synchronous*	NF2F *Asynchronous*	Masa Persediaan Pelajar *Student Preparation Time*	
		0			0	0	0	
							Sub-total SLT	0

Grand Total SLT	0
Total F2F SLT for T&L	0
Total NF2F SLT for T&L	0
Total Student Preparation Time for T&L	0
Total F2F SLT for Assessment	0
Total NF2F SLT for Assessment	0
Total Student Preparation Time for Assessment	0

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UNIVERSITI MALAYA

SPESIFIKASI KURSUS
COURSE SPECIFICATIONS

Akademi/Fakulti/Institut/Pusat *Academy/Faculty/Institute/Centre*	: FAKULTI KEJURUTERAAN *FACULTY OF ENGINEERING*		
Kod Kursus *Course Code*	: KQB7011 *KQB7011*	Sesi Penawaran *Offering Session*	:
Nama Kursus *Course Name*	: KESELAMATAN, PIAWAIAN DAN ETIKA DALAM KEJURUTERAAN BIOPERUBATAN *SAFETY, STANDARD AND ETHICS IN BIOMEDICAL ENGINEERING*	Tarikh Kelulusan *Approval Date*	:
Versi Pindaan *Ammendment Version*	:		

#	PERKARA *ITEM*	KETERANGAN *DESCRIPTION*	
1	Sesi Akademik dan Semester *Academic Session and Semester*		
2	Nama Staf Akademik *Name of Academic Staff*		
3	Jabatan/Fakulti *Department/Faculty*	Jabatan *Department*	BIOMEDICAL ENGINEERING
		Fakulti *Faculty*	FAKULTI KEJURUTERAAN
4	Pemberatan Penilaian *Assessment Weightage*	Penilaian Berterusan *Continuous Assessment (%)*	50
		Peperiksaan Akhir *Final Examination (%)*	50

#	PERKARA *ITEM*	KETERANGAN *DESCRIPTION*	
5	Sinopsis Kursus *Course Synopsis*	Kursus ini merangkumi peraturan peranti perubatan dan badan-badan kawal selia dan menunjukkan peranti perubatan peraturan antarabangsa dan nasional ,keselamatan dan piawaan. Keselamatan elektrik dan ujian dalam peranti perubatan juga dijelaskan. Pengiraan rekabentuk untuk keselamatan elektrik alat-alat perubatan.Garis panduan bagi alat-alat perubatan yang selamat ,alatperubatan , kemalangan elektrik, contohnya mikro dan kejutan makro , kesanfisiologi elektrik kepada manusia, arus bocor , dan alat-alat untuk melindungi daripada kejutan elektrik. Industri pengeluaran menganalisis ujian keselamatan alat-alat perubatan yang digunakan di hospital-hospital seperti mesin ECG .Kursus ini juga meliputi isu-isu etika dan bioetika yang berkaitan dengan kejuruteraan bioperubatan. *The course covers the medical device regulation and regulatory bodies and demonstrates the international and national medical devices regulation, safety and standards. The electrical safety and tests in Medical devices are also explained. Design calculations for electrical safety of medical devices. Guidelines for of safe medical devices , medical instruments, electrical accidents , eg micro and macro shocks , electrical physiological effects to humans ,leakage current , and devices to protect against electric shock. Industrial in production of analyzing the safety testing of medical devices used in hospitals such as ECG machine. The course also covers ethical and bioethical issues related to biomedical engineering.*	
6	Jumlah Kredit/SLT *Total Credit/SLT*	Kredit *Credit*	3
		SLT *SLT*	120
7	Prasyarat (jika ada) *Pre-requisite (if any)*		
8	Bahasa Pengantar *Medium of Instruction*	ENGLISH LANGUAGE,	
9	Pemetaan Hasil Pembelajaran Kursus kepada Hasil Pembelajaran Program, Kaedah Pengajaran dan Kaedah Penilaian *Mapping of the Course Learning Outcomes to the Programme Learning Outcomes, Teaching Methods and Assessment Methods*	Rujuk Lampiran 1 / *Refer Attachment 1*	
10	Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	Ditampal di papan notis atau dimaklumkan melalui talian. *Results will be notified through notice board and online*	
11	Pecahan Masa Pembelajaran Pelajar *Distribution of Student Learning Time (SLT)*	Rujuk Lampiran 2 / *Refer Attachment 2*	
12	Rujukan Utama/Lain-Lain Rujukan *Main/Others References (include required and further readings, and should be the most current [last five years])*	Malaysia Medical device ACT 2012(ACT 737) Fries, R. (2012). Reliable Design of Medical Devices, Third Edition. Hoboken: Taylor and Francis. Chatterjee, S. and Miller, A. (2010). Biomedical instrumentation systems. Clifton Park, NY: Delmar Cengage Learning. Teixeira, M. (2013). Design Controls for the Medical Device Industry, Second Edition. Hoboken: Taylor and Francis. Paul H. King, Richard C. Fries, Arthur T. Johnson, Design of Biomedical Devices and Systems, Third Edition, 2014 by CRC Press	
13	Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-Kaedah Peraturan-Peraturan Universiti Malaya (Ijazah Sarjana) (Versi Terkini) *Universiti Malaya (Master Degree) Rules and Regulations (Latest Version)*	
14	Keperluan Sumber Khas (E.g. perisian, makmal etc.) *Special Resources Requirement (E.g. software, laboratory etc.)*	Tugasan, Kuliah, Pembelanjaran berdasarkan masalah Assignment, Lecture, Problem-based learning	
15	Lain-Lain Maklumat Tambahan (jika berkaitan) *Other Additional Information (if applicable)*		

Lampiran 1 /*Attachment 1*

Pemetaan Hasil Pembelajaran Kursus kepada Hasil Pembelajaran Program, Kaedah Pengajaran dan Kaedah Penilaian
Mapping of the Course Learning Outcomes to the Programme Learning Outcomes, Teaching Methods and Assessment Methods

Hasil Pembelajaran Kursus / *Course Learning Outcome(s) (CLO)*	Hasil Pembelajaran Program / *Programme Learning Outcome(s) (PLO)*			Kaedah Pengajaran & Pembelajaran / *Teaching & Learning*	Peratus Kaedah Penilaian/ *Assessment Methods and Percentage (%)*	Pencapaian CLO / *Criteria for Achievement of CLO*
	CLS1	CLS2	CLS5			
1.MENERANGKAN PRINSIP-PRINSIP DI SEBALIK KEJURUTERAAN TISU. *EXPLAIN THE PRINCIPLES BEHIND TISSUE ENGINEERING.* CLO1 **Tahap taksonomi :** (8, - - none -) ***Taxonomy level***	✔					-
2.MENILAI CABARAN DAN PENYELESAIAN KEJURUTERAAN TISU. *EVALUATE TISSUE ENGINEERING CHALLENGES AND SOLUTIONS.* CLO2 **Tahap taksonomi :** (8, - - none -) ***Taxonomy level***		✔				-
3.MENJUSTIFIKASI ISU-ISU PENGAWALSELIAAN DAN ETIKA YANG BERKAITAN DENGAN KEJURUTERAAN TISU. *JUSTIFY THE REGULATORY AND ETHICAL ISSUES RELATED TO TISSUE ENGINEERING.* CLO3 **Tahap taksonomi :** (8, - - none -) ***Taxonomy level***			✔			-

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Lampiran 2 /*Attachment 2*

Pecahan Masa Pembelajaran Pelajar
Distribution of Student Learning Time (SLT)

(a) Pengajaran dan Pembelajaran (P&P) / *Teaching and Learning (T&L)*

Minggu *Week*	Aktiviti P&P *T&L Activities*	Topik *Topics*	Masa Pembelajaran Pelajar *Student Learning Time*			Jumlah SLT *Total SLT*
			F2F *Synchronous*	NF2F *Asynchronous*	Masa Persiapan Pelajar *Student Preparation Time*	
			0	0	0	
					Sub-total SLT	0

(b) Penilaian / *Assessments*

Bil *No*	Minggu *Week*	Pemberatan *Weightage (%)*	Aktiviti Penilaian *Assessment Activities*	CLO	Masa Pembelajaran Pelajar *Student Learning Time*			Jumlah SLT *Total SLT*
					F2F *Synchronous*	NF2F *Asynchronous*	Masa Persediaan Pelajar *Student Preparation Time*	
		0			0	0	0	
							Sub-total SLT	0

Grand Total SLT	0
Total F2F SLT for T&L	0
Total NF2F SLT for T&L	0
Total Student Preparation Time for T&L	0
Total F2F SLT for Assessment	0
Total NF2F SLT for Assessment	0
Total Student Preparation Time for Assessment	0

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COURSEWORK PROGRAMME | KQD

02

Master of Safety, Health and Environment Engineering

COURSE TYPE	MODE OF STUDY	INDICATIVE DURATION
Coursework	Full-time	2 semesters + 1 special semester

PROGRAMME AT A GLANCE

Established in 2006, this multidisciplinary coursework programme is designed for graduates and practitioners from engineering, science and technology backgrounds. It develops technical and management capability across occupational safety and health, environmental protection and sustainability, process safety, and Prevention through Design. An industry-focused research project enables students to investigate and propose solutions to practical SHE challenges.

View the official programme page

Source: Universiti Malaya Study portal | Page last updated 16 May 2026

UNIVERSITI MALAYA

FACULTY OF ENGINEERING

Master of Safety, Health and Environment Engineering

Academic Programme Information

MSHEE	43	FULL TIME
PROGRAMME REFERENCE	TOTAL CREDITS	TYPE OF STUDY

ACADEMIC SESSION 2026/2027

Universiti Malaya

Contents

This section presents the current programme profile, admission requirements, outcomes, curriculum and indicative study sequence for the Master of Safety, Health and Environment Engineering.

01	Programme Overview
02	Admission Requirements
03	Programme Goal and Educational Objectives
04	Programme Learning Outcomes
05	Curriculum Structure
06	Elective Course Guide
07	Indicative Study Plan
08	Programme Alignment
09	Career Prospects

Programme Overview

The Master of Safety, Health and Environment Engineering is a 43-credit, full-time coursework programme delivered conventionally in English. It equips graduates from engineering, science and computing backgrounds to evaluate risk, protect people and the environment, and make responsible decisions in complex industrial settings.

The curriculum integrates safety and environmental legislation, quantitative risk assessment, hazard identification, occupational health, sustainable industry practices, ergonomics, hazardous-waste management, project management, machine learning and applied research. Students complete a supervised research project that connects analytical knowledge with a current safety, health or environmental challenge.

Programme at a Glance

Programme name	Master of Safety, Health and Environment Engineering
Malay name	Sarjana Kejuruteraan Keselamatan, Kesihatan dan Alam Sekitar
Abbreviation	MSHEE
Academic programme code	SCWKQDFTCV04
Faculty	Faculty of Engineering
National Education Code	1022 Occupational Health and Safety
Medium of instruction	English
Mode of study	Coursework
Type and delivery	Full time | Conventional
Total credits	43 credits

Curriculum Composition

Core courses	Elective courses	Programme total
37 credits	**6 credits**	**43 credits**

Admission Requirements

Applicants must hold a Bachelor's Degree or equivalent qualification in Engineering, Science or Computing.

Academic Qualification

Applicants with a CGPA of at least 3.00 may be considered on the basis of the recognised qualification stated above.

Applicants with a CGPA from 2.50 to 2.99 must meet at least one of the following criteria:

- Graduate of Universiti Malaya.
- At least one year of work experience in a related field.
- Publication in a related field.
- Recipient of a scholarship.
- Staff member of a government agency.
- Pass an interview conducted by the Faculty.
- Pass a special evaluation conducted by the Faculty.

English Language Requirement for International Applicants

An international applicant whose previous degree was awarded by an institution where English was not the medium of instruction must obtain at least one of the following results:

Qualification	Minimum result
Malaysian University English Test (MUET)	Band 4.0
IELTS Academic	Band 6.0
TOEFL iBT (Centre Based)	Score 60
TOEFL Essentials (Online)	Score 8.5
Pearson Test of English Academic	Score 59
Cambridge B1 Preliminary, B2 First, C1 Advanced or C2 Proficiency	Score 169

Programme Goal and Educational Objectives

Programme Goal

The programme aims to produce graduates with broad knowledge in safety, health and environment engineering, strong professional and ethical values, and the critical-thinking skills required to make informed decisions. Its structured curriculum builds specialist capability on a sound foundation of engineering knowledge.

Programme Educational Objectives

Objective	Graduate achievement
PEO1	Graduates demonstrate advanced technical knowledge, analytical competency, and innovative problem-solving skills, integrating numerical and digital proficiencies to deliver sustainable solutions in engineering design, analysis, and implementation.
PEO2	Graduates exhibit strong leadership, an entrepreneurial mindset, and effective communication and interpersonal skills, driving transformative advancements and innovation within engineering industries.
PEO3	Graduates commit to continuous self-improvement, professional growth, and lifelong learning, upholding ethical standards and professional practices while contributing responsibly to societal and industrial progress.

What These Objectives Emphasise

Technical judgement advanced analysis, digital capability and sustainable engineering solutions.

Professional influence leadership, communication, collaboration and entrepreneurial thinking.

Responsible practice lifelong learning, ethical conduct and positive contribution to society and industry.

Programme Learning Outcomes

On successful completion of the programme, graduates should be able to demonstrate the following outcomes.

Code	Learning outcome	Competency domain and taxonomy
PLO1	Demonstrate advanced theoretical and technical knowledge in new situations within safety, health and environment engineering context.	Knowledge and Understanding Cognitive
PLO2	Apply critical and analytical skills to resolve complex problems and handle unpredictable issues with innovative solutions in the field of safety, health and environment engineering.	Cognitive Skills Cognitive
PLO3	Conduct specific methods or procedures through practical skills based on the latest developments in the field of safety, health and environment engineering.	Practical Skills Psychomotor
PLO4	Collaborate with different people in learning and working communities, ethically and professionally.	Interpersonal Skills Affective
PLO5	Communicate clearly the knowledge, skills, ideas, critique and rationale using appropriate methods to peers, experts, and non-experts.	Communication Skills Cognitive and Psychomotor
PLO6	Use a wide range of suitable digital technologies and appropriate software competently to enhance learning and research practice.	Digital Skills Cognitive and Psychomotor
PLO7	Use quantitative or qualitative tools to analyze and evaluate numerical and graphical data for learning or project work.	Numeracy Skills Cognitive and Psychomotor
PLO8	Demonstrate substantial responsibility in planning, resource management, supervision and problem solving and managing work within own team and collaboratively with other teams especially in complex and unpredictable situations.	Leadership Autonomy and Responsibility Affective
PLO9	Demonstrate continuous professional development and flexibility to new changes in the field of safety, health and environment engineering.	Personal Skills Affective
PLO10	Demonstrate an entrepreneurial mindset with creativity.	Entrepreneurial Skills Cognitive
PLO11	Uphold professional and ethical practices in conducting research and delivering services related to safety, health and environment engineering field.	Ethics and Professionalism Affective and Cognitive

Curriculum Structure

Students complete **37 credits of core courses** and **6 credits of electives** for a programme total of 43 credits. The core includes a seven-credit research project, while the elective requirement is normally met by selecting two three-credit courses from the approved list.

Core Courses

Course code	Course title	Credits
KQD7002	Safety, Health and Environmental Legislation in Malaysia	3
KQD7005	Quantitative Risk Assessment	3
KQD7006	Hazard Identification and Evaluation	3
KQX7003	Research Methodology for Coursework	3
KQD7017	Occupational Health at Workplace	3
KQD7018	Green Industries: Sustainable Practices and Technologies	3
KQD7019	Innovative Ergonomics for Technology Driven Industries	3
KQD7023	Hazardous Waste Management and Minimization: Industrial Approaches	3
KQD7024	Research Project	7
KQX7004	Engineering Project Management	3
KQX7005	Machine Learning in Engineering	3
Total core credits		**37**

Research Sequence

Foundation	Development	Completion
KQX7003 Research Methodology for Coursework	KQD7024 Research Project 1 (P1)	KQD7024 Research Project 2 (P2)

Integrated Learning Path

Understand	Evaluate	Apply
Legislation Occupational Health Sustainable Practice	Hazards Risk Waste and Ergonomics	Research Project Management Machine Learning

Elective Course Guide

Students complete **6 elective credits** by selecting **two approved three-credit courses.** Availability may vary by semester and remains subject to programme advice.

Course code	Course title	Credits
KQD7007	Environmental Monitoring and Assessment	3
KQD7014	Human Factor and Management at Workplace	3
KQD7020	Life Cycle Assessment: Practices for Sustainable Industries	3
KQD7021	Management and Technology in Air Pollution Control	3
KQD7022	Crisis and Emergency Management in Emerging Industries	3
Elective credits required		**6**

Choosing Electives

Environmental performance monitoring, life-cycle assessment and air-pollution control.

People and organisations human factors, workplace management and ergonomics-informed decision-making.

Preparedness and resilience crisis and emergency management for emerging industrial settings.

Indicative Study Plan

The official specification places taught core courses across Semester 1 and Semester 2, with the Research Project shown across Semester 2 and Semester 3 or the Special Semester. Its seven credits are counted once within the 37-credit core total. Electives are registered according to programme advice and course availability.

Study period	Core courses	Core credit position	Elective planning
Semester 1	KQX7003 Research Methodology for Coursework KQD7006 Hazard Identification and Evaluation KQD7017 Occupational Health at Workplace KQD7018 Green Industries: Sustainable Practices and Technologies KQD7019 Innovative Ergonomics for Technology Driven Industries	15 taught credits	Register approved elective course or courses as advised.
Semester 2	KQD7002 SHE Legislation in Malaysia KQD7005 Quantitative Risk Assessment KQD7023 Hazardous Waste Management KQX7004 Engineering Project Management KQX7005 Machine Learning in Engineering KQD7024 Research Project	15 taught credits plus research project	Continue or complete the approved elective requirement.
Semester 3 or Special Semester	KQD7024 Research Project continued or completed	7 project credits counted once in programme total	Complete any outstanding approved elective requirement.

Core	Electives	Total
37 credits	**6 credits**	**43 credits**

Planning Notes

- The study plan is an indicative sequence based on the supplied academic programme specification.
- The Research Project extends across the periods shown in the official study plan and carries seven credits in total.
- Students should confirm elective availability, registration deadlines and project milestones with the programme coordinator each semester.

Programme Alignment

The PLO to PEO mapping shows how learning achieved during the programme supports longer-term graduate objectives.

Learning outcome	PEO1	PEO2	PEO3
PLO1	YES		
PLO2	YES		
PLO3	YES		
PLO4		YES	
PLO5		YES	
PLO6	YES		
PLO7	YES		
PLO8		YES	
PLO9			YES
PLO10		YES	
PLO11			YES

Alignment Summary

Objective	Primary emphasis	Supporting outcomes
PEO1	Technical knowledge problem solving digital and numerical capability	PLO1 PLO2 PLO3 PLO6 PLO7
PEO2	Leadership communication collaboration and entrepreneurship	PLO4 PLO5 PLO8 PLO10
PEO3	Professional growth ethics and responsible contribution	PLO9 PLO11

Important Academic Information

Course registration, elective offerings and candidature requirements are governed by current Universiti Malaya regulations and Faculty decisions. Students should use this handbook section together with their offer letter, registration notices and official programme advice.

Career Prospects

The Master of Safety, Health and Environment Engineering prepares graduates to evaluate risk, protect people and the environment, and lead responsible improvements in complex industrial settings. Its multidisciplinary curriculum supports technical, managerial, regulatory and research-oriented careers across a wide range of industries.

Career area	Examples
Occupational Safety and Health	Safety and Health Engineer, Occupational Safety Specialist, OSH Coordinator, Workplace Safety Consultant, Safety and Health Manager
Environmental Management and Compliance	Environmental Engineer, Environmental Officer, Environmental Compliance Specialist, Environmental Management Systems Coordinator
Process Safety and Risk Engineering	Process Safety Engineer, Risk Engineer, Quantitative Risk Analyst, Hazard Assessment Specialist, Loss Prevention Engineer
Hazard Identification and Control	HAZOP Facilitator, Hazard and Risk Assessment Specialist, Safety Assurance Engineer, Operational Risk Specialist
Occupational and Industrial Health	Occupational Health Specialist, Industrial Hygiene Specialist, Workplace Exposure and Health Risk Assessor
Sustainable and Green Industries	Sustainability Engineer, Green Technology Specialist, Sustainable Operations Manager, ESG or Environmental Sustainability Executive
Waste and Pollution Management	Hazardous Waste Management Specialist, Waste Minimisation Engineer, Air-Pollution Control Specialist, Pollution Prevention Consultant
Ergonomics and Human Factors	Ergonomics Specialist, Human Factors Analyst, Workplace Design Consultant, Human Performance and Safety Specialist
Emergency and Crisis Management	Emergency Preparedness Coordinator, Crisis Management Specialist, Business Continuity Executive, Industrial Emergency Response Planner
SHE Management and Project Leadership	SHE/HSE Manager, EHS Project Manager, Safety Programme Manager, Engineering Project Manager, Corporate SHE Advisor
Digital Safety and Data Analytics	SHE Data Analyst, Digital Safety Specialist, Predictive Risk Analyst, Safety Technology and Monitoring Specialist
Auditing, Governance and Regulatory Affairs	SHE Auditor, Regulatory Compliance Specialist, Management Systems Auditor, Governance and Assurance Executive
Engineering and Management Consultancy	SHE Consultant, Risk Management Consultant, Environmental Consultant, Sustainability Consultant, Technical Advisor
Research, Education and Professional Training	Research Officer, Research Engineer, Lecturer, SHE Trainer, Doctoral Research Candidate

Official References

Programme page: Study@UM – Master of Safety, Health and Environment Engineering (Coursework)

Faculty information: Faculty of Engineering – Postgraduate Programmes

Department information: https://engine.um.edu.my/about-chemical-engineering

FACULTY OF ENGINEERING

Master of Safety Health and Environment Engineering Study Planners

Academic Session 2026/2027

43	37	6	7
TOTAL CREDITS	CORE CREDITS	ELECTIVE CREDITS	RESEARCH CREDITS

How to Read the Planner

1 Follow the stages	2 Select two electives	3 Complete the project
Complete the semester sequence shown for your intake.	Complete one 3-credit elective from Semester I offerings and one from Semester II offerings.	Register KQD7024 as P1 and P2, subject to the approved research milestones.

Programme code SCWKQDFTCV04 **Programme** MSHEE **Mode** Full time coursework **Delivery** Conventional **Medium** English

Planner for Master of Safety Health and Environment Engineering

Semester I Intake

A 43-credit full-time coursework pathway comprising 37 core credits and 6 elective credits.

STAGE 1 SEMESTER I	STAGE 2 SEMESTER II	STAGE 3 SPECIAL SEMESTER
Entry semester	**Second study period**	**Final study period**
CORE COURSES **KQX7003** Research Methodology for Coursework [3] **KQD7017** Occupational Health at Workplace [3] **KQD7018** Green Industries: Sustainable Practices and Technologies [3] **KQD7006** Hazard Identification and Evaluation [3] **KQD7019** Innovative Ergonomics for Technology Driven Industries [3] **ELECTIVE OPTIONS** **KQD7020** Life Cycle Assessment: Practices for Sustainable Industries [3] **KQD7021** Management and Technology in Air Pollution Control [3] **KQD7022** Crisis and Emergency Management in Emerging Industries [3] **Select 3 elective credits** **PLANNED LOAD 15 core + 3 elective = 18 credits**	**CORE COURSES** **KQX7004** Engineering Project Management [3] **KQX7005** Machine Learning in Engineering [3] **KQD7002** Safety, Health and Environmental Legislation in Malaysia [3] **KQD7005** Quantitative Risk Assessment [3] **KQD7023** Hazardous Waste Management and Minimization: Industrial Approaches [3] **KQD7024** Research Project P1 [2] **ELECTIVE OPTIONS** **KQD7014** Human Factor and Management at Work Place [3] **KQD7007** Environmental Monitoring and Assessment [3] **Select 3 elective credits** **PLANNED LOAD 17 core + 3 elective = 20 credits**	**CORE COURSES** **KQD7024** Research Project P2 [5] **ELECTIVE OPTIONS** *No elective allocation in the standard sequence.* **PLANNED LOAD 5 core + 0 elective = 5 credits**

Core courses	Electives	Research projects	Programme total
37 credits	**6 credits**	**7 credits**	**43 credits**

Planner for Master of Safety Health and Environment Engineering

Semester II Intake

A 43-credit full-time coursework pathway comprising 37 core credits and 6 elective credits.

STAGE 1 SEMESTER II	STAGE 2 SPECIAL SEMESTER	STAGE 3 SEMESTER I
Entry semester	**Second study period**	**Final study period in the following academic session**
CORE COURSES **KQX7004** Engineering Project Management [3] **KQX7005** Machine Learning in Engineering [3] **KQD7002** Safety, Health and Environmental Legislation in Malaysia [3] **KQD7005** Quantitative Risk Assessment [3] **KQD7023** Hazardous Waste Management and Minimization: Industrial Approaches [3] **KQD7024** Research Project P1 [2] **ELECTIVE OPTIONS** **KQD7014** Human Factor and Management at Work Place [3] **KQD7007** Environmental Monitoring and Assessment [3] **Select 3 elective credits** **PLANNED LOAD 17 core + 3 elective = 20 credits**	**CORE COURSES** **KQD7024** Research Project P2 [5] **ELECTIVE OPTIONS** *No elective allocation in the standard sequence.* **PLANNED LOAD 5 core + 0 elective = 5 credits**	**CORE COURSES** **KQX7003** Research Methodology for Coursework [3] **KQD7017** Occupational Health at Workplace [3] **KQD7018** Green Industries: Sustainable Practices and Technologies [3] **KQD7006** Hazard Identification and Evaluation [3] **KQD7019** Innovative Ergonomics for Technology Driven Industries [3] **ELECTIVE OPTIONS** **KQD7020** Life Cycle Assessment: Practices for Sustainable Industries [3] **KQD7021** Management and Technology in Air Pollution Control [3] **KQD7022** Crisis and Emergency Management in Emerging Industries [3] **Select 3 elective credits** **PLANNED LOAD 15 core + 3 elective = 18 credits**

Core courses	Electives	Research projects	Programme total
37 credits	**6 credits**	**7 credits**	**43 credits**

UNIVERSITI MALAYA	**PRO FORMA KURSUS** **COURSE PRO FORMA**

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Akademi/Fakulti/Institut/Pusat *Academy/Faculty/Institute/Centre*	FAKULTI KEJURUTERAAN	FACULTY OF ENGINEERING
Jabatan *Department*	PEJABAT DEKAN	DEAN'S OFFICE
Nama Program Akademik *Name of Academic Programme*	SARJANA KEJURUTERAAN SISTEM SARJANA KEJURUTERAAN KESELAMATAN, KESIHATAN DAN ALAM SEKITAR MASTER OF BIOMEDICAL ENGINEERING	MASTER OF SYSTEMS ENGINEERING MASTER OF SAFETY, HEALTH AND ENVIRONMENT ENGINEERING SARJANA KEJURUTERAAN BIOPERUBATAN
Kod Kursus* *Course Code**	KQX7003	KQX7003
Tajuk Kursus* *Course Title**	METODOLOGI PENYELIDIKAN BAGI KERJA KURSUS	RESEARCH METHODOLOGY FOR COURSEWORK
Kredit* *Credit**	3	3
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	120	120
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*		

	Versi Bahasa Malaysia *Malay Version*	Versi Bahasa Inggeris *English Version*
Hasil Pembelajaran Kursus* *Course Learning Outcomes**	CLO 1. MENSINTESIS MASALAH PENYELIDIKAN, SOALAN PENYELIDIKAN, DAN OBJEKTIF UNTUK MEMBANGUNKAN HALA TUJU PENYELIDIKAN YANG KOHEREN DAN BERSTRUKTUR DALAM DISIPLIN KEJURUTERAAN CLO 2. MENSINTESIS LITERATUR YANG RELEVAN UNTUK MEMBINA ULASAN KRITIKAL DAN BERASASKAN BUKTI DALAM PENYELIDIKAN KEJURUTERAAN CLO 3. MEMBINA CADANGAN PENYELIDIKAN YANG KOMPREHENSIF DENGAN MENGINTEGRASIKAN ULASAN LITERATUR, METODOLOGI, DAN PERTIMBANGAN ETIKA DALAM PENYELIDIKAN KEJURUTERAAN CLO 4. MEMBENTANGKAN PENEMUAN PENYELIDIKAN DENGAN BERKESAN MELALUI PENULISAN AKADEMIK, PEMBENTANGAN LISAN, DAN LAPORAN TEKNIKAL MENGIKUT STANDARD KOMUNIKASI KEJURUTERAAN	CLO 1. SYNTHESIZE RESEARCH PROBLEMS, RESEARCH QUESTIONS, AND OBJECTIVES IN DEVELOPING COHERENT AND WELL-STRUCTURED RESEARCH DIRECTIONS IN ENGINEERING DISCIPLINES CLO 2. SYNTHESIZE RELEVANT LITERATURE TO CONSTRUCT A CRITICAL AND WELL-FOUNDED REVIEW IN ENGINEERING RESEARCH CLO 3. CONSTRUCT A COMPREHENSIVE RESEARCH PROPOSAL INTEGRATING A LITERATURE REVIEW, METHODOLOGY, AND ETHICAL CONSIDERATIONS IN ENGINEERING RESEARCH. CLO 4. PRESENT RESEARCH FINDINGS EFFECTIVELY THROUGH ACADEMIC WRITING, ORAL PRESENTATIONS, AND TECHNICAL REPORTS FOLLOWING ENGINEERING COMMUNICATION STANDARDS
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Kursus ini menawarkan gambaran menyeluruh mengenai prinsip asas dan kaedah yang digunakan dalam menjalankan penyelidikan dalam bidang kejuruteraan. Pelajar akan didedahkan kepada pelbagai metodologi penyelidikan, termasuk pendekatan kaedah campuran, kuantitatif, dan kualitatif, dengan penekanan khusus pada kaedah penyelidikan saintifik. Pada permulaan kursus, pelajar akan meneroka asas-asas reka bentuk penyelidikan, kaedah pengumpulan data, dan pertimbangan etika dalam penyelidikan. Mereka akan memperoleh pemahaman mengenai kepentingan integriti dalam kerja ilmiah, tanggungjawab dalam penyelidikan, dan etika penyelidikan. Selain itu, kursus ini akan memberi peluang kepada pelajar untuk menggunakan kaedah yang sesuai dalam tafsiran dan pengesahan data melalui pemahaman tentang reka bentuk eksperimen dan teknik analisis statistik. Di samping itu, pelajar akan mempelajari cara menilai literatur secara kritikal, mengenal pasti jurang penyelidikan, serta membangunkan masalah penyelidikan, objektif, dan hipotesis yang tersusun dengan baik. Fokus utama kursus ini adalah pada penguasaan kemahiran asas penyelidikan, termasuk penulisan cadangan penyelidikan yang berkesan, penulisan akademik, dan pengurusan sitasi. Tambahan pula, pelajar akan meningkatkan keupayaan mereka untuk menyampaikan hasil penyelidikan melalui pembentangan lisan yang terstruktur, laporan teknikal, dan penerbitan saintifik mengikut standard komunikasi kejuruteraan. Setelah tamat kursus, pelajar akan memiliki kemahiran yang diperlukan untuk menyatakan hasil penyelidikan mereka dengan yakin, menganalisis data secara sistematik, serta mereka bentuk dan melaksanakan projek penyelidikan, sekaligus mempersiapkan diri untuk penyelidikan lanjutan dalam bidang kejuruteraan masing-masing.	This course offers a thorough overview of the fundamental principles and methods of conducting research in engineering disciplines. Students will be exposed to a variety of research methodologies, such as mixed-method, quantitative, and qualitative approaches, with a particular emphasis on scientific research methods. Students will investigate the fundamentals of research design, data acquisition methodologies, and ethical considerations in research at the commencement of the course. They will acquire a comprehension of the significance of integrity in scholarly work, responsible conduct of research, and research ethics. Furthermore, the course will provide students with the opportunity to employ appropriate methods for data interpretation and validation by covering experimental design and statistical analysis techniques. In addition, students will acquire the ability to critically evaluate literature, identify research gaps, and develop well-organized research problems, objectives, and hypotheses. The primary focus will be on the acquisition of fundamental research skills, such as effective proposal writing, academic writing, and citation management. Additionally, students will improve their capacity to communicate research findings through structured oral presentations, technical reports, and scientific publications, in accordance with engineering communication standards. Upon completion of the course, students will possess the necessary skills to confidently articulate their findings, analyze data systematically, and design and execute research projects, thereby preparing them for advanced research in their respective engineering fields.
Pemberatan Penilaian* (%) *Assessment Weightage**	Continuous Assessment : 100 Examination : 0	Continuous Assessment : 100 Examination : 0
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	Keputusan akan diumumkan melalui papan notis dan dalam talian, manakala maklum balas terhadap tugasan akan diberikan melalui Sistem Pengurusan Pembelajaran (SPECTRUM)	Results will be announced via the notice board and online, while feedback on assignments will be provided through the Learning Management System (SPECTRUM).
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-Kaedah dan Peraturan-Peraturan Universiti Malaya (Ijazah Sarjana Muda) (Versi Terkini)	Universiti Malaya (Degree) Rules and Regulations (Latest Version)

UNIVERSITI MALAYA	**PRO FORMA KURSUS** **COURSE PRO FORMA**

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Jabatan *Department*	KEJURUTERAAN MEKANIK	MECHANICAL ENGINEERING
Nama Program Akademik *Name of Academic Programme*	SARJANA KEJURUTERAAN KESELAMATAN, KESIHATAN DAN ALAM SEKITAR SARJANA KEJURUTERAAN SISTEM SARJANA KEJURUTERAAN MEKANIKAL MASTER OF BIOMEDICAL ENGINEERING	MASTER OF SAFETY, HEALTH AND ENVIRONMENT ENGINEERING MASTER OF SYSTEMS ENGINEERING MASTER OF MECHANICAL ENGINEERING SARJANA KEJURUTERAAN BIOPERUBATAN
Kod Kursus* *Course Code**	KQX7004	KQX7004
Tajuk Kursus* *Course Title**	PENGURUSAN PROJEK KEJURUTERAAN	ENGINEERING PROJECT MANAGEMENT
Kredit* *Credit**	3	3
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	121	121
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*		

	Versi Bahasa Malaysia *Malay Version*	Versi Bahasa Inggeris *English Version*
Hasil Pembelajaran Kursus* *Course Learning Outcomes**	CLO 1. MENERAPKAN PRINSIP DAN METODOLOGI PENGURUSAN PROJEK UNTUK MERANCANG, MELAKSANAKAN, DAN MENGAWAL PROJEK KEJURUTERAAN SECARA BERKESAN, MEMASTIKAN KESELARASAN DENGAN KEKANGAN TEKNIKAL, KEWANGAN, DAN MASA. CLO 2. MENGANALISIS DAN MENGURUS RISIKO DALAM PROJEK KEJURUTERAAN DENGAN MENILAI KETIDAKTENTUAN, MENGOPTIMUMKAN PERUNTUKAN SUMBER, DAN MELAKSANAKAN TEKNIK MEMBUAT KEPUTUSAN STRATEGIK. CLO 3. MENUNJUKKAN KEMAHIRAN KEPIMPINAN DAN KERJA BERPASUKAN DALAM MENGURUS PROJEK KEJURUTERAAN MERENTAS DISIPLIN, DENGAN MEMANFAATKAN KOMUNIKASI YANG BERKESAN DAN PENGLIBATAN PIHAK BERKEPENTINGAN UNTUK KEJAYAAN PELAKSANAAN PROJEK.	CLO 1. APPLY PROJECT MANAGEMENT PRINCIPLES AND METHODOLOGIES TO PLAN, EXECUTE, AND CONTROL ENGINEERING PROJECTS EFFECTIVELY, ENSURING ALIGNMENT WITH TECHNICAL, FINANCIAL, AND TIME CONSTRAINTS. CLO 2. ANALYZE AND MITIGATE RISKS IN ENGINEERING PROJECTS BY EVALUATING UNCERTAINTIES, OPTIMIZING RESOURCE ALLOCATION, AND IMPLEMENTING STRATEGIC DECISION-MAKING TECHNIQUES. CLO 3. DEMONSTRATE LEADERSHIP AND TEAMWORK SKILLS IN MANAGING MULTIDISCIPLINARY ENGINEERING PROJECTS, LEVERAGING EFFECTIVE COMMUNICATION AND STAKEHOLDER ENGAGEMENT FOR SUCCESSFUL PROJECT EXECUTION.
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Kursus ini menyediakan penerokaan mendalam tentang prinsip pengurusan projek yang disesuaikan untuk aplikasi kejuruteraan. Ia merangkumi topik penting seperti perancangan projek, penjadualan, penyediaan bajet, pengurusan risiko, dan jaminan kualiti, dengan kajian kes dan amalan baik industri. Pelajar akan membangunkan pemikiran kritis dan kemahiran menyelesaikan masalah untuk mengurus projek kejuruteraan yang kompleks dengan cekap, inovatif, dan lestari. Melalui perbincangan interaktif dan aplikasi praktikal, kursus ini melengkapkan jurutera untuk mengurus projek dengan berjaya dalam persekitaran yang dinamik dan sentiasa berkembang.	This course provides an in-depth exploration of project management principles tailored for engineering applications. It covers essential topics such as project planning, scheduling, budgeting, risk management, and quality assurance, with real-world case studies and industry best practices. Students will develop critical thinking and problem-solving skills to navigate complex engineering projects, ensuring efficiency, innovation, and sustainability. Through interactive discussions and practical applications, the course equips future engineering leaders with the tools needed to manage projects successfully in dynamic and evolving environments.
Pemberatan Penilaian* (%) *Assessment Weightage**	Continuous Assessment : 100 Examination : 0	Continuous Assessment : 100 Examination : 0
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	Keputusan akan dimaklumkan melalui sistem MAYA.	Results will be notified through MAYA system.
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-Kaedah Peraturan-Peraturan Universiti Malaya (Ijazah Sarjana) (Versi Terkini)	Universiti Malaya (Master Degree) Rules and Regulations (Latest Version)

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Jabatan *Department*	PEJABAT DEKAN	DEAN'S OFFICE
Nama Program Akademik *Name of Academic Programme*	SARJANA KEJURUTERAAN SISTEM SARJANA KEJURUTERAAN KESELAMATAN, KESIHATAN DAN ALAM SEKITAR SARJANA KEJURUTERAAN MEKANIKAL	MASTER OF SYSTEMS ENGINEERING MASTER OF SAFETY, HEALTH AND ENVIRONMENT ENGINEERING MASTER OF MECHANICAL ENGINEERING
Kod Kursus* *Course Code**	KQX7005	KQX7005
Tajuk Kursus* *Course Title**	PEMBELAJARAN MESIN DALAM KEJURUTERAAN	MACHINE LEARNING IN ENGINEERING
Kredit* *Credit**	3	3
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	120	120
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*		

	Versi Bahasa Malaysia *Malay Version*	Versi Bahasa Inggeris *English Version*
Hasil Pembelajaran Kursus* *Course Learning Outcomes**	CLO 1. MENGAPLIKASIKAN ALGORITMA PEMBELAJARAN MESIN UNTUK MENYELESAIKAN MASALAH KEJURUTERAAN CLO 2. MENILAI MODEL PEMBELAJARAN MESIN UNTUK ANALISIS RAMALAN DALAM SISTEM KEJURUTERAAN CLO 3. MENYESUAIKAN RANGKA KERJA DAN ALAT PEMBELAJARAN MESIN UNTUK MENGOPTIMUMKAN PROSES KEJURUTERAAN DAN PEMBUATAN KEPUTUSAN	CLO 1. APPLY MACHINE LEARNING ALGORITHMS TO SOLVE ENGINEERING PROBLEMS CLO 2. EVALUATE MACHINE LEARNING MODELS FOR PREDICTIVE ANALYSIS IN ENGINEERING SYSTEMS CLO 3. ADAPT MACHINE LEARNING FRAMEWORKS AND TOOLS TO OPTIMIZE ENGINEERING PROCESSES AND DECISION-MAKING
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Kursus ini memperkenalkan aplikasi pembelajaran mesin dalam kejuruteraan, dengan fokus kepada analisis ramalan, pengoptimuman, dan automasi dalam sistem mekanikal, tenaga, dan industri. Topik yang dibincangkan termasuk prapemprosesan data, pembelajaran terselia dan tidak terselia, rangkaian neural, dan pembelajaran mendalam. Kursus ini juga merangkumi pemilihan ciri, penilaian model, dan penggunaan model pembelajaran mesin dalam aplikasi kejuruteraan dunia sebenar. Pelajar akan mendapat pengalaman praktikal menggunakan alat pembelajaran mesin berasaskan Python untuk menyelesaikan cabaran kejuruteraan.	This course introduces machine learning applications in engineering, focusing on predictive analytics, optimization, and automation in mechanical, energy, and industrial systems. Topics include data preprocessing, supervised and unsupervised learning, neural networks, and deep learning. The course also covers feature selection, model evaluation, and deployment of machine learning models in real-world engineering applications. Students will gain hands-on experience with Python-based machine learning tools for solving engineering challenges.
Pemberatan Penilaian* (%) *Assessment Weightage**	Continuous Assessment : 100 Examination : 0	Continuous Assessment : 100 Examination : 0
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	Maklumbalas secara dalam talian dan komen secara lisan semasa perbincangan tugasan. Markah untuk penilaian berterusan dimuat naik dalam Spectrum dan gred keputusan keseluruhan bagi setiap kursus di akses oleh pelajar melalui MyUM.	Online feedback and oral comments on assignments. Continuous Assessment marks will be uploaded through Spectrum. Final grade of examination results can be access through MyUM.
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-Kaedah Peraturan-Peraturan Universiti Malaya (Ijazah Sarjana) (Versi Terkini)	Universiti Malaya (Master Degree) Rules and Regulations (Latest Version)

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Jabatan *Department*	KEJURUTERAAN KIMIA	CHEMICAL ENGINEERING
Nama Program Akademik *Name of Academic Programme*	SARJANA KEJURUTERAAN KESELAMATAN, KESIHATAN DAN ALAM SEKITAR SARJANA KEJURUTERAAN KESELAMATAN, KESIHATAN DAN ALAM SEKITAR SARJANA KEJURUTERAAN KESELAMATAN, KESIHATAN DAN ALAM SEKITAR	MASTER OF SAFETY, HEALTH AND ENVIRONMENT ENGINEERING MASTER OF SAFETY, HEALTH AND ENVIRONMENT ENGINEERING MASTER OF SAFETY, HEALTH AND ENVIRONMENT ENGINEERING
Kod Kursus* *Course Code**	KQD7002	KQD7002
Tajuk Kursus* *Course Title**	PERUNDANGAN KESELAMATAN, KESIHATAN DAN ALAM SEKITAR DI MALAYSIA	SAFETY, HEALTH AND ENVIRONMENTAL LEGISLATION IN MALAYSIA
Kredit* *Credit**	3	3
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	120	120
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*		

	Versi Bahasa Malaysia *Malay Version*	Versi Bahasa Inggeris *English Version*
Hasil Pembelajaran Kursus* *Course Learning Outcomes**	CLO 1. MENGENALPASTI FAKTOR PENDORONG UTAMA TERHADAP PEMBANGUNAN, TUJUAN DAN BIDANG 'SELF REGULATING ACT'. CLO 2. MENGANALISA PERBEZAAN DI ANTARA PRESKRIPTIF DAN DESKRIPTIF BAGI UNDANG-UNDANG SHE DI MALAYSIA. CLO 3. MENCADANGKAN SISTEM PENGURUSAN KESELAMATAN DAN KESIHATAN DI TEMPAT KERJA YANG MERANGKUMI KEPATUHAN KEPADA AKTA DAN PERATURAN TEMPATAN	CLO 1. IDENTIFY THE MAIN DRIVER TOWARDS THE DEVELOPMENT, PURPOSE AND SCOPE OF SELF-REGULATING ACT. CLO 2. ANALYSE THE DIFFERENCE OF PRESCRIPTIVE AND DESCRIPTIVE SHE LEGISLATION IN MALAYSIA CLO 3. PROPOSE SAFETY AND HEALTH MANAGEMENT SYSTEM AT WORKPLACE THAT INCORPORATES COMPLIANCE TO LOCAL ACTS AND REGULATION
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Kursus ini akan memperkenalkan pelajar kepada undang-undang Sejarah keselamatan & kesihatan Malaysia (common law, tort, vicarious liability), Act, Regulation, Order, Code of Practice, Guidelines, Occupational Safety & Health Act 514 (1994), Factory and Machinery Act 139 (1967), Peraturan Kebijakan Keselamatan & Kesihatan (1995), Peraturan Jawatankuasa Keselamatan & Kesihatan (1996), Peraturan Pegawai Keselamatan & Kesihatan (1997), Peraturan Pengendalian Bahaya Kemalangan Besar Industri (CIMAH) (1996, Klasifikasi, Pelabelan dan Data Keselamatan Lembaran Bahan Kimia Berbahaya (2013), Penggunaan dan Pendedahan Piawai Bahan Kimia Berbahaya kepada Kesihatan (USECHH) (2000), Pemberitahuan Kemalangan, Kejadian Berbahaya, Keracunan Pekerjaan & Peraturan Penyakit Pekerjaan (NADOPOD) (2004), Pendedahan Kebisingan (2019) Kod Amalan DOSH: Kualiti Udara Dalam Ruangan / Ruang Terhad / AIDS / Dadah & Alkohol, Kilang dan Jentera Akta 139 (1967): BOWEC / Lead / Mineral Debu / Kebajikan Umum / Asbes, Akta Kualiti Alam Sekeliling (1974) & anak syarikat undang-undang, Akta Perkhidmatan Bomba 134, Sijil Kebakaran 2000, Undang-Undang Bangunan Seragam (1984), sistem Pengurusan Keselamatan & Kesihatan.	This course will introduce students to History of Malaysian safety & health legislation (common law, tort, vicarious liability), Act, Regulation, Order, Code of Practice, Guidelines, Occupational Safety & Health Act 514 (1994), Factory and Machinery Act 139 (1967), Safety & Health Policy Regulation (1995), Safety & Health Committee Regulation (1996), Safety & Health Officer Regulation (1997), Control of Industrial Major Accidents Hazard Regulation (CIMAH) (1996, Classification, Labelling and Safety Data Sheet of Hazardous Chemicals (2013),Use and Standard Exposure of Chemicals Hazardous to Health Regulation (USECHH) (2000), Notification of Accident, Dangerous Occurrence, Occupational Poisoning & Occupational Disease Regulation (NADOPOD) (2004),Noise Exposure (2019) DOSH Code of Practice: Indoor Air Quality / Confined Space / AIDS / Drug & Alcohol, Factory and Machinery Act 139 (1967): BOWEC / Lead / Mineral Dust / General Welfare/Asbestos, Environmental Quality Act (1974) & subsidiary legislation, Fire Services Act 134 , Fire Certificate 2000, Uniform Building By Law (1984), Safety & Health Management system.
Pemberatan Penilaian* (%) *Assessment Weightage**	Continuous Assessment : 100 Examination : 0	Continuous Assessment : 100 Examination : 0
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	1. Perbincangan di dalam kelas 2. Pengembalian penilaian dan ujian yang telah digredkan 3. Gred akhir akan diumumkan	1. Discussions in class 2. Returning graded assignments and tests 3. Final grades are announced
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-Kaedah Peraturan-Peraturan Universiti Malaya (Ijazah Sarjana) (Versi Terkini)	Universiti Malaya (Master Degree) Rules and Regulations (Latest Version)

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Jabatan *Department*	KEJURUTERAAN KIMIA	CHEMICAL ENGINEERING
Nama Program Akademik *Name of Academic Programme*	SARJANA KEJURUTERAAN KESELAMATAN, KESIHATAN DAN ALAM SEKITAR SARJANA KEJURUTERAAN KESELAMATAN, KESIHATAN DAN ALAM SEKITAR SARJANA KEJURUTERAAN KESELAMATAN, KESIHATAN DAN ALAM SEKITAR	MASTER OF SAFETY, HEALTH AND ENVIRONMENT ENGINEERING MASTER OF SAFETY, HEALTH AND ENVIRONMENT ENGINEERING MASTER OF SAFETY, HEALTH AND ENVIRONMENT ENGINEERING
Kod Kursus* *Course Code**	KQD7005	KQD7005
Tajuk Kursus* *Course Title**	PENILAIAN RISIKO KUANTITATIF	QUANTITATIVE RISK ASSESSMENT
Kredit* *Credit**	3	3
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	120	120
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*		

	Versi Bahasa Malaysia *Malay Version*	Versi Bahasa Inggeris *English Version*
Hasil Pembelajaran Kursus* *Course Learning Outcomes**	CLO 1. MENGAPLIKASIKAN TEKNIK MENGENALPASTI BAHAYA YANG SESUAI. CLO 2. MENENTUKAN KRITERIA RISIKO UNTUK INDUSTRI PROSES DAN KESIHATAN PERSEKITARAN. CLO 3. MENGANGGARKAN RISIKO KEPADA INDIVIDU DAN MASYARAKAT BERDASARKAN HASIL DARIPADA ANALISA AKIBAT DAN KEBARANGKALIAN.	CLO 1. APPLY SUITABLE HAZARD IDENTIFICATION TECHNIQUES. CLO 2. FORMULATE RISK CHARACTERISTICS FOR BOTH PROCESS INDUSTRY AND ENVIRONMENTAL HEALTH HAZARD. CLO 3. ESTIMATE INDIVIDUAL AND SOCIETAL RISKS BASED ON OUTCOMES FROM CONSEQUENCE AND PROBABILITY ANALYSIS.
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Kursus ini akan memperkenalkan pelajar kepada penilaian risiko industri; Mengenalpasti sumber-sumber bahaya seperti ciri-ciri bahan mudah terbakar, meletup dan toksik, analisa pohon kegagalan (‘fault tree’) dan analisa pohon kejadian (‘event tree’); Analisa akibat seperti kebakaran kolam (‘pool fire’), kebakaran jet (‘jet fire’), bebola api (‘fireball’) dan BLEVE dan letupan awan wap (‘vapour cloud’); serta Analisa kesan yang merangkumi kesan terma, kesan peletupan dan kesan toksik. Selain itu, pelajar juga akan dapat mempelajari tentang Analisa frekuensi/Kebarangkalian seperti pengkalan data kadar kegagalan dan Peraturan kebarangkalian untuk pohon kegagalan; Anggaran Risiko yang merangkumi risiko individu dan risiko sosial; dan juga Penilaian Risiko Alam Sekitar seperti risiko sistematik kesihatan dan risiko kanser.	This course will introduce student to industrial risk assessment; Identification of sources of hazard such as flammability, explosive and toxic properties of material, fault tree analysis and event tree analysis; Consequence Analysis such as pool fire, jet fire, fireball due to BLEVE and vapour cloud explosion; as well as Effect Analysis which include thermal effect, explosion effect and toxic effect. Besides, students also will be able to learn about Frequency/Probability Analysis like failure rate database and probability rules in fault tree analysis; Risk Estimation which include individual risk and societal risk; and also Environmental Risk Assessment such as systematic health risk and cancer risk.
Pemberatan Penilaian* (%) *Assessment Weightage**	Continuous Assessment : 100 Examination : 0	Continuous Assessment : 100 Examination : 0
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	1.Perbincangan di dalam kelas 2.Pengembalian penilaian dan ujian yang telah digredkan 3.Gred akhir akan diumumkan	1.Discussions in class 2.Returning graded assignments and tests 3.Final grades are announced
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-Kaedah Peraturan-Peraturan Universiti Malaya (Ijazah Sarjana) (Versi Terkini)	Universiti Malaya (Master Degree) Rules and Regulations (Latest Version)

UNIVERSITI MALAYA	**PRO FORMA KURSUS** **COURSE PRO FORMA**

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Akademi/Fakulti/Institut/Pusat *Academy/Faculty/Institute/Centre*	FAKULTI KEJURUTERAAN	FACULTY OF ENGINEERING
Jabatan *Department*	KEJURUTERAAN KIMIA	CHEMICAL ENGINEERING
Nama Program Akademik *Name of Academic Programme*	SARJANA KEJURUTERAAN KESELAMATAN, KESIHATAN DAN ALAM SEKITAR SARJANA KEJURUTERAAN KESELAMATAN, KESIHATAN DAN ALAM SEKITAR SARJANA KEJURUTERAAN KESELAMATAN, KESIHATAN DAN ALAM SEKITAR	MASTER OF SAFETY, HEALTH AND ENVIRONMENT ENGINEERING MASTER OF SAFETY, HEALTH AND ENVIRONMENT ENGINEERING MASTER OF SAFETY, HEALTH AND ENVIRONMENT ENGINEERING
Kod Kursus* *Course Code**	KQD7006	KQD7006
Tajuk Kursus* *Course Title**	MENGENALPASTI HAZARD DAN PENILAIAN	HAZARD IDENTIFICATION AND EVALUATION
Kredit* *Credit**	3	3
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	120	120
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*		

	Versi Bahasa Malaysia *Malay Version*	Versi Bahasa Inggeris *English Version*
Hasil Pembelajaran Kursus* *Course Learning Outcomes**	CLO 1. MENGANALISA HAZAD DI TEMPAT KERJA DAN UNIT PEMPROSESAN SEBAGAI LANGKAH PENCEGAHAN KEMALANGAN. CLO 2. MENCADANGKAN SISTEM PENGURUSAN KESELAMATAN YANG BAIK DI TEMPAT KERJA DAN PENUNJUK ARAS PRESTASI YANG BAIK UNTUK MEMPERTINGKATKAN KESELAMATAN PROSES. CLO 3. MENGANGGARKAN RISIKO OLEH LETUPAN DAN KEKURANGAN DALAM SISTEM PENGURUSAN KESELAMATAN PROSES.	CLO 1. ANALYZE HAZARDS AT WORKPLACE AND PROCESSING UNITS AS ACCIDENT PREVENTIVE MEASURE. CLO 2. PROPOSE A GOOD SAFETY MANAGEMENT SYSTEM AT WORKPLACE AND BETTER PERFORMANCE INDICATORS FOR A SAFETY IMPROVEMENT PROCESS. CLO 3. ESTIMATE RISKS OF EXPLOSIONS AND DEFICIENCIES USING PROCESS SAFETY MANAGEMENT SYSTEM IN AN ORGANIZATION CONTEXT.
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Kursus ini akan memperkenalkan pelajar kepada Teknik Mengenalpasti Hazad seperti bancian hazad (Senarai semak), Analisis Keselamatan Kerja, Mengenalpasti Hazad dan Kawalan Penilaian Risiko (HIRAC), HAZOP, Analisis 'Fault Tree' serta Audit Keselamatan, Bahaya dari Tindakbalas Kimia, BLEVE, VCE, Pengendalian Selamat Bahan Kimia, Limit Mudah Terbakar bagi Wap, TLVs dan Letupan, Selain itu, pelajar juga akan dapat mempelajari mengenai Rekabentuk untuk Keselamatan, Pengurusan Proses Keselamatan, Prestasi Piawai bagi Peningkatan Proses Keselamatan, Sikap Keselamatan dan Perilaku Manusia, OSHA 1994, CIMAH, Penganggaran kos kemalangan, Mengulas Kemalangan dan Menganalisis,dan melakukan Penyiasatan Kemalangan.	This course will introduce students to the Hazard Identification Techniques such as hazard survey (Checklist), Job Safety Analysis, Hazard Identification and Risk Assessment Control (HIRAC), HAZOP, Fault Tree Analysis as well as Safety Audits, Hazards from Chemical Reaction, BLEVE, VCE, Safe Handling of Industrial Chemicals, Flammability Limits for Vapor, TLVs and Explosion. Furthermore, students also will be able to learn about Designing for Safety, Process Safety Management, Performance Standards for a Safety Improvement Process, Safety Attitudes and Human Behaviour, OSHA 1994, CIMAH, Accident Cost Estimation, Accidents Review and Analysis and Accident Investigation Study.
Pemberatan Penilaian* (%) *Assessment Weightage**	Continuous Assessment : 100 Examination : 0	Continuous Assessment : 100 Examination : 0
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	1. Perbincangan di dalam kelas 2. Pengembalian penilaian dan ujian yang telah digredkan 3. Gred akhir akan diumumkan	1. Discussions in class 2. Returning graded assignments and tests 3. Final grades are announced
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-Kaedah Peraturan-Peraturan Universiti Malaya (Ijazah Sarjana) (Versi Terkini)	Universiti Malaya (Master Degree) Rules and Regulations (Latest Version)

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Jabatan *Department*	KEJURUTERAAN KIMIA	CHEMICAL ENGINEERING
Nama Program Akademik *Name of Academic Programme*	SARJANA KEJURUTERAAN KESELAMATAN, KESIHATAN DAN ALAM SEKITAR SARJANA KEJURUTERAAN KESELAMATAN, KESIHATAN DAN ALAM SEKITAR SARJANA KEJURUTERAAN KESELAMATAN, KESIHATAN DAN ALAM SEKITAR	MASTER OF SAFETY, HEALTH AND ENVIRONMENT ENGINEERING MASTER OF SAFETY, HEALTH AND ENVIRONMENT ENGINEERING MASTER OF SAFETY, HEALTH AND ENVIRONMENT ENGINEERING
Kod Kursus* *Course Code**	KQD7007	KQD7007
Tajuk Kursus* *Course Title**	PENILAIAN DAN PEMANTAUAN ALAM SEKITAR	ENVIRONMENTAL MONITORING AND ASSESSMENT
Kredit* *Credit**	3	3
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	120	120
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*		

	Versi Bahasa Malaysia *Malay Version*	Versi Bahasa Inggeris *English Version*
Hasil Pembelajaran Kursus* *Course Learning Outcomes**	CLO 1. MENGENALPASTI PROTOKOL TERBAIK PENSAMPELAN UNTUK TUGAS KHUSUS DALAM ANALISIS PERSEKITARAN. CLO 2. MELAKUKAN ANALISIS KUALITATIF DAN KUANTITATIF BAGI SAMPEL GAS, PEPEJAL DAN CECAIR DENGAN MENGGUNAKAN GC, HPLC DAN ICP-AES. CLO 3. MENGANALISA SPECTRUM GC, HPLC DAN ICP-AES UNTUK MENGANGGARKAN KOMPOSISI ELEMEN BAGI SAMPEL CECAIR, GAS DAN PEPEJAL.	CLO 1. IDENTIFY THE BEST SAMPLING PROTOCOL FOR A SPECIFIC ENVIRONMENTAL ANALYSIS TASK. CLO 2. PERFORM QUALITATIVE AND QUANTITATIVE ANALYSIS OF GASEOUS, SOLIDS AND LIQUID SAMPLES USING GC, HPLC AND ICP-AES. CLO 3. ANALYSE GC, HPLC AND ICP-AES SPECTRA FOR ELEMENTAL COMPOSITION ESTIMATION OF LIQUID, GAS AND SOLID SAMPLES.
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Kursus ini merangkumi beberapa topik penting berkaitan dengan penilaian dan pemantauan alam sekitar iaitu Pensampelan, peralatan pensampelan, protokol pensampelan dalam pensampelan udara (pensampelan cerombong dan pensampelan ambien), pensampelan air dan pensampelan pepejal, tanah dan lumpur. Selain itu, kursus ini memperkenalkan pelajar kepada teknik analitikal, penyediaan sampel, Teknik Kromatografik (GC teknik dan HPLC) secara teori dan aplikasi persekitaran, Teknik Spektroskopik (spektrofotometri); Teknik Spektroskopik (AA dan ICP-AES)- Teori dan Aplikasi Persekitaran; Teknik Elektroanalitikal- Teori dan Aplikasi Persekitaran; ICP-AES Makmal.	This course covers few important topics for environmental monitoring and assessment such as sampling, sampling equipment, sampling protocols in air sampling (stack sampling and ambient sampling), water sampling and sampling of solids, soils and sludge. Besides, this course introduce students to analytical techniques, sample preparation; Chromatographic techniques (GC techniques)- Theory and Environmental applications; Chromatographic techniques (HPLC techniques)- Theory and Environmental applications; GC and HPLC Laboratory; Spectroscopic techniques (spectrophotometry) - Theory and Environmental applications; Spectroscopic techniques (AA and ICP-AES) - Theory and Environmental applications; Electroanalytical techniques; ICP-AES Laboratory - Theory and Environmental applications.
Pemberatan Penilaian* (%) *Assessment Weightage**	Continuous Assessment : 100 Examination : 0	Continuous Assessment : 100 Examination : 0
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	1.Perbincangan di dalam kelas 2.Pengembalian penilaian dan ujian yang telah digredkan 3.Gred akhir akan diumumkan	1.Discussions in class 2.Returning graded assignments and tests 3.Final grades are announced
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-Kaedah Peraturan-Peraturan Universiti Malaya (Ijazah Sarjana) (Versi Terkini)	Universiti Malaya (Master Degree) Rules and Regulations (Latest Version)

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Akademi/Fakulti/Institut/Pusat *Academy/Faculty/Institute/Centre*	FAKULTI KEJURUTERAAN	FACULTY OF ENGINEERING
Jabatan *Department*	KEJURUTERAAN KIMIA	CHEMICAL ENGINEERING
Nama Program Akademik *Name of Academic Programme*	SARJANA KEJURUTERAAN KESELAMATAN, KESIHATAN DAN ALAM SEKITAR SARJANA KEJURUTERAAN KESELAMATAN, KESIHATAN DAN ALAM SEKITAR SARJANA KEJURUTERAAN KESELAMATAN, KESIHATAN DAN ALAM SEKITAR SARJANA KEJURUTERAAN SISTEM	MASTER OF SAFETY, HEALTH AND ENVIRONMENT ENGINEERING MASTER OF SAFETY, HEALTH AND ENVIRONMENT ENGINEERING MASTER OF SAFETY, HEALTH AND ENVIRONMENT ENGINEERING MASTER OF SYSTEMS ENGINEERING
Kod Kursus* *Course Code**	KQD7014	KQD7014
Tajuk Kursus* *Course Title**	FAKTOR KEMANUSIAN DAN PENGURUSAN TEMPAT KERJA	HUMAN FACTOR AND MANAGEMENT AT WORK PLACE
Kredit* *Credit**	3	3
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	120	120
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*		

	Versi Bahasa Malaysia *Malay Version*	Versi Bahasa Inggeris *English Version*
Hasil Pembelajaran Kursus* *Course Learning Outcomes**	CLO 1. MENGENALPASTI KEPENTINGAN FAKTOR KEMANUSIAN DALAM APLIKASI PERALATAN DAN PERSEKITARAN TEMPAT KERJA. CLO 2. MENGANALISA REKABENTUK YANG BERKAITAN DAN PENTING BAGI PERSEKITARAN TEMPAT KERJA DI INDUSTRI. CLO 3. MENGAMALKAN KESEDARAN DIRI, TANGGUNGJAWAB DAN KEPERCAYAAN DIRI DI TEMPAT KERJA.	CLO 1. IDENTIFY THE IMPORTANCE OF HUMAN FACTOR IN THE APPLICATION OF TOOLS AND WORK ENVIRONMENT. CLO 2. ANALYSE RELEVANT AND SIGNIFICANT HUMAN FACTOR DESIGN FOR WORK ENVIRONMENT IN INDUSTRIES. CLO 3. PRACTICE SELF-AWARENESS, RESPONSIBILITY AND SELF-BELIEF AT THE WORKPLACE.
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Kursus ini mengandungi beberapa bahagian penting terutama: mengenalpasti, aplikasi dan analisis rekabentuk untuk persekitaran tempat kerja. Kursus ini juga membincangkan pembangunan kesedaran, tanggungjawab dan kepercayaan diri, serta peranan pengurus, dalam mewujudkan organisasi berprestasi tinggi.	This course contains topics which include: Identification, application and analysis the importance of ergonomics in the application and design for special population. This course also discusses the awareness building, responsibility and self-belief, as well as roles of manager, in creating a high performance organization.
Pemberatan Penilaian* (%) *Assessment Weightage**	Continuous Assessment : 100 Examination : 0	Continuous Assessment : 100 Examination : 0
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	1. Perbincangan di dalam kelas 2. Pengembalian penilaian dan ujian yang telah digredkan 3. Gred akhir akan diumumkan	1. Discussions in class 2. Returning graded assignments and tests 3. Final grades are announced
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-Kaedah Peraturan-Peraturan Universiti Malaya (Ijazah Sarjana) (Versi Terkini)	Universiti Malaya (Master Degree) Rules and Regulations (Latest Version)

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Jabatan *Department*	KEJURUTERAAN KIMIA	CHEMICAL ENGINEERING
Nama Program Akademik *Name of Academic Programme*	SARJANA KEJURUTERAAN KESELAMATAN, KESIHATAN DAN ALAM SEKITAR	MASTER OF SAFETY, HEALTH AND ENVIRONMENT ENGINEERING
Kod Kursus* *Course Code**	KQD7017	KQD7017
Tajuk Kursus* *Course Title**	KESIHATAN PEKERJAAN DI TEMPAT KERJA	OCCUPATIONAL HEALTH AT WORKPLACE
Kredit* *Credit**	3	3
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	120	120
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*		

	Versi Bahasa Malaysia *Malay Version*	Versi Bahasa Inggeris *English Version*
Hasil Pembelajaran Kursus* *Course Learning Outcomes**	CLO 1. MENGENAL PASTI DAN MENILAI BAHAYA, RISIKO KESIHATAN, SERTA POTENSI KECEDERAAN DI TEMPAT KERJA DALAM PERSEKITARAN INDUSTRI. CLO 2. MERUMUSKAN STRATEGI DAN LANGKAH UNTUK MENGHAPUSKAN ATAU MENGAWAL RISIKO YANG TELAH DIKENALPASTI. CLO 3. MENYARANKAN PERSEKITARAN TEMPAT KERJA YANG SELAMAT DAN SIHAT DALAM PERSEKITARAN PEKERJAAN DAN INDUSTRI.	CLO 1. IDENTIFY AND ASSESS WORKPLACE HAZARDS, HEALTH RISKS, AND POTENTIAL INJURIES IN AN INDUSTRIAL SETTING. CLO 2. FORMULATE STRATEGIES AND MEASURES TO ELIMINATE OR CONTROL IDENTIFIED RISKS. CLO 3. PROPOSE A SAFE AND HEALTHY WORKPLACE ENVIRONMENT IN OCCUPATIONAL AND INDUSTRIAL SETTINGS.
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Dalam kursus ini, pelajar akan belajar tentang aspek penting kesihatan pekerjaan dalam industri, termasuk bahaya kesihatan, undang-undang kesihatan pekerjaan, penyakit pekerjaan, kesihatan higen, dan mencegah bahaya kesihatan ditempat kerja.	In this course, students will be able to learn about the occupational health aspects important to the industry, inclusive of health hazards, occupational health laws, occupational disease, occupational hygiene and prevention of health hazards at the workplace.
Pemberatan Penilaian* (%) *Assessment Weightage**	Continuous Assessment : 100 Examination : 0	Continuous Assessment : 100 Examination : 0
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	1. Perbincangan di dalam kelas 2. Pengembalian penilaian dan ujian yang telah digredkan 3. Gred akhir akan diumumkan	1. Discussions in class 2. Returning graded assignments and tests 3. Final grades are announced
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Jabatan *Department*	KEJURUTERAAN KIMIA	CHEMICAL ENGINEERING
Nama Program Akademik *Name of Academic Programme*	SARJANA KEJURUTERAAN KESELAMATAN, KESIHATAN DAN ALAM SEKITAR	MASTER OF SAFETY, HEALTH AND ENVIRONMENT ENGINEERING
Kod Kursus* *Course Code**	KQD7018	KQD7018
Tajuk Kursus* *Course Title**	INDUSTRI HIJAU: AMALAN DAN TEKNOLOGI LESTARI	GREEN INDUSTRIES: SUSTAINABLE PRACTICES AND TECHNOLOGIES
Kredit* *Credit**	3	3
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	120	120
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*		

	Versi Bahasa Malaysia *Malay Version*	Versi Bahasa Inggeris *English Version*
Hasil Pembelajaran Kursus* *Course Learning Outcomes**	CLO 1. DEMONSTRATE IN-DEPTH UNDERSTANDING OF SUSTAINABILITY CONCEPTS AND THEIR APPLICATION TO CHEMICAL, MANUFACTURING OR ENERGY INDUSTRIES. CLO 2. DESIGN AND OPTIMIZE SUSTAINABLE INDUSTRIAL PROCESSES OR SYSTEMS BY APPLYING GREEN ENGINEERING PRINCIPLES. CLO 3. PROPOSE GREEN SOLUTIONS THROUGH IMPACT ASSESSMENTS FOCUSING ON CARBON FOOTPRINTS, WASTE GENERATION AND RESOURCE CONSUMPTION IN INDUSTRIAL OPERATIONS.	CLO 1. MENUNJUKKAN PEMAHAMAN MENDALAM TENTANG KONSEP KELESTARIAN DAN APLIKASINYA DALAM INDUSTRI KIMIA, PEMBUATAN, ATAU TENAGA. CLO 2. MERANCANG DAN MENGOPTIMAKAN PROSES ATAU SISTEM INDUSTRI LESTARI DENGAN MENERAPKAN PRINSIP KEJURUTERAAN HIJAU. CLO 3. MENCADANGKAN PENYELESAIAN HIJAU MELALUI PENILAIAN IMPAK YANG MEMFOKUSKAN PADA JEJAK KARBON, PENJANAAN SISA, DAN PENGGUNAAN SUMBER DALAM OPERASI INDUSTRI.
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Dalam kursus ini, pelajar akan membangunkan pemahaman menyeluruh tentang konsep kelestarian dan kaitannya dalam persekitaran industri, dengan fokus pada penerapan prinsip-prinsip ini dalam sektor kimia, pembuatan, dan tenaga. Pelajar akan mempelajari cara untuk mereka bentuk dan mengoptimumkan sistem industri lestari, menggunakan prinsip kejuruteraan hijau untuk meningkatkan kecekapan proses, meminimumkan sisa, dan memperbaiki penggunaan sumber. Kursus ini juga akan melatih pelajar untuk menjalankan penilaian impak dengan fokus pada pertimbangan alam sekitar seperti jejak karbon, penghasilan sisa, dan penggunaan sumber. Pelajar akan mencadangkan penyelesaian hijau yang boleh dilaksanakan untuk mengurangkan impak-impak ini dalam operasi industri.	In this course, students will develop a comprehensive understanding of sustainability concepts and their relevance in industrial settings, with a focus on applying these principles to chemical, manufacturing, and energy sectors. Students will learn to design and optimize sustainable industrial systems, utilizing green engineering principles to enhance process efficiency, minimize waste, and improve resource utilization. The course will also train students to conduct impact assessments with a focus on environmental considerations such as carbon footprints, waste production, and resource consumption. Students will propose actionable green solutions to mitigate these impacts in industrial operations.
Pemberatan Penilaian* (%) *Assessment Weightage**	Continuous Assessment : 100 Examination : 0	Continuous Assessment : 100 Examination : 0
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	1. Perbincangan di dalam kelas 2. Pengembalian penilaian dan ujian yang telah digredkan 3. Gred akhir akan diumumkan	1. Discussions in class 2. Returning graded assignments and tests 3. Final grades are announced
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-Kaedah Peraturan-Peraturan Universiti Malaya (Ijazah Sarjana) (Versi Terkini)	Universiti Malaya (Master Degree) Rules and Regulations (Latest Version)

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Akademi/Fakulti/Institut/Pusat *Academy/Faculty/Institute/Centre*	FAKULTI KEJURUTERAAN	FACULTY OF ENGINEERING
Jabatan *Department*	KEJURUTERAAN KIMIA	CHEMICAL ENGINEERING
Nama Program Akademik *Name of Academic Programme*	SARJANA KEJURUTERAAN KESELAMATAN, KESIHATAN DAN ALAM SEKITAR	MASTER OF SAFETY, HEALTH AND ENVIRONMENT ENGINEERING
Kod Kursus* *Course Code**	KQD7019	KQD7019
Tajuk Kursus* *Course Title**	ERGONOMIK INOVATIF UNTUK INDUSTRI YANG DIPACU TEKNOLOGI	INNOVATIVE ERGONOMICS FOR TECHNOLOGY DRIVEN INDUSTRIES
Kredit* *Credit**	3	3
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	120	120
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*		

	Versi Bahasa Malaysia *Malay Version*	Versi Bahasa Inggeris *English Version*
Hasil Pembelajaran Kursus* *Course Learning Outcomes**	CLO 1. EVALUATE THE SIGNIFICANCE OF HUMAN FACTORS, ERGONOMICS, AND HEALTH & SAFETY IN THE DESIGN OF EQUIPMENT AND DIGITAL WORK ENVIRONMENTS. CLO 2. APPLY ERGONOMIC METHODS FOR DIAGNOSING JOB ROLES AND DESIGNING DIGITAL WORK ENVIRONMENTS. CLO 3. ANALYZE THE PRACTICES OF JOB ROLES AND WORK DESIGN IN DIGITAL AND TECHNOLOGY-DRIVEN INDUSTRIES.	CLO 1. MENILAI KEPENTINGAN FAKTOR MANUSIA, ERGONOMIK, DAN KESIHATAN & KESELAMATAN DALAM REKA BENTUK PERALATAN DAN PERSEKITARAN KERJA DIGITAL. CLO 2. MENERAPKAN KAEDAH ERGONOMIK UNTUK MENDIAGNOSIS PERANAN PEKERJAAN DAN MEREKABENTUK PERSEKITARAN KERJA DIGITAL. CLO 3. MENGANALISIS AMALAN PERANAN PEKERJAAN DAN REKA BENTUK KERJA DALAM INDUSTRI DIGITAL DAN YANG DIPACU TEKNOLOGI.
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Kursus ini mengandungi lapan bahagian penting terutama: keselamatan dan kesihatan industri, industri ergonomik, prinsip ergonomik dalam rekabentuk, kesan persekitaran kepada pekerja, fisiologi manusia, antropometri, rekabentuk pekerjaan dan analisis tugas.	This course contains eight essential parts mainly: industrial safety and health, ergonomics industries, ergonomics principal in design, effect of environment on workers, human physiology, anthropometry, works design and analysis of tasks.
Pemberatan Penilaian* (%) *Assessment Weightage**	Continuous Assessment : 100 Examination : 0	Continuous Assessment : 100 Examination : 0
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	1. Perbincangan di dalam kelas 2. Pengembalian penilaian dan ujian yang telah digredkan 3. Gred akhir akan diumumkan	1. Discussions in class 2. Returning graded assignments and tests 3. Final grades are announced
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*		

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Jabatan *Department*	KEJURUTERAAN KIMIA	CHEMICAL ENGINEERING
Nama Program Akademik *Name of Academic Programme*	SARJANA KEJURUTERAAN KESELAMATAN, KESIHATAN DAN ALAM SEKITAR	MASTER OF SAFETY, HEALTH AND ENVIRONMENT ENGINEERING
Kod Kursus* *Course Code**	KQD7020	KQD7020
Tajuk Kursus* *Course Title**	PENILAIAN KITAR HAYAT: AMALAN UNTUK INDUSTRI MAMPAN	LIFE CYCLE ASSESSMENT: PRACTICES FOR SUSTAINABLE INDUSTRIES
Kredit* *Credit**	3	3
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	120	120
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*		

	Versi Bahasa Malaysia *Malay Version*	Versi Bahasa Inggeris *English Version*
Hasil Pembelajaran Kursus* *Course Learning Outcomes**	CLO 1. ASSESS AND QUANTIFY THE ENVIRONMENTAL IMPACTS OF PRODUCTS AND SERVICES ACROSS THEIR ENTIRE LIFE CYCLE, FROM RAW MATERIAL EXTRACTION TO DISPOSAL, USING ESTABLISHED LCA TOOLS AND FRAMEWORKS. CLO 2. APPLY INDUSTRY-STANDARD LCA SOFTWARE TOOLS (E.G., GABI, SIMAPRO) TO CONDUCT ASSESSMENTS, ANALYZE RESULTS, AND INTERPRET THE ENVIRONMENTAL IMPACTS OF VARIOUS PROCESS SYSTEMS. CLO 3. SOLVE ENVIRONMENTAL ISSUES AND MANAGEMENT USING LIFE CYCLE MANAGEMENT STRATEGIES.	CLO 1. MENILAI DAN MENGKUANTIFIKASIKAN IMPAK ALAM SEKITAR PRODUK DAN PERKHIDMATAN SEPANJANG KESELURUHAN KITAR HAYAT MEREKA, DARI PENGEKSTRAKAN BAHAN MENTAH HINGGA PELUPUSAN, MENGGUNAKAN ALAT DAN RANGKA KERJA LCA YANG DITETAPKAN. CLO 2. MENERAPKAN PERISIAN LCA STANDARD INDUSTRI (CONTOHNYA, GABI, SIMAPRO) UNTUK MENJALANKAN PENILAIAN, MENGANALISIS KEPUTUSAN, DAN MENTAFSIR IMPAK ALAM SEKITAR BAGI PELBAGAI SISTEM PROSES. CLO 3. MENYELESAIKAN ISU DAN PENGURUSAN ALAM SEKITAR DENGAN PENGGUNAAN STRATEGI PENGURUSAN KITAR HAYAT
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Kursus ini akan memperkenalkan pelajar kepada isu alam sekitar dan Pengurusan, Kitar Hayat Berdasarkan Inisiatif Persekitaran, Pengenalan terhadap siri Matlamat Piawai Penilaian Kitar Hayat dan Definisi Skop, Inventori kitar hayat, Penilaian Kesan Kitar Hayat, Interpretasi Kitar Hayat, SIMA PRO – Perisian simulasi dan LCA, Pengurusan Kitar Hayat. Selain itu, pelajar juga akan diberi pendedahan kepada Peralatan LCM, Sistem Pengurusan Alam Sekitar, Pengurusan Rantaian Terintegrasi, Pendekatan Pengurusan Terhadap LCM, dan Persaingan bagi negara-negara yang sedang membangun.	This course will introduce students to Environmental Issues and Management, Life Cycle Based Environmental Initiatives, ISO 14040 – Introduction to Life Cycle Assessment (LCA) Series of Standards Goal and Scope Definition, Life Cycle Inventory, Life Cycle Impact Assessment, Life Cycle Interpretation, SIMA PRO – LCA simulation software and LCA course Project. Besides, students also will be exposed to the Life Cycle Management (LCM), LCM Tool Box, Environmental Management Systems, Integrated Chain Management, Management Approaches Toward LCM and Challenges for Developing Countries.
Pemberatan Penilaian* (%) *Assessment Weightage**	Continuous Assessment : 100 Examination : 0	Continuous Assessment : 100 Examination : 0
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	1. Perbincangan di dalam kelas 2. Pengembalian penilaian dan ujian yang telah digredkan 3. Gred akhir akan diumumkan	1. Discussions in class 2. Returning graded assignments and tests 3. Final grades are announced
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-Kaedah Peraturan-Peraturan Universiti Malaya (Ijazah Sarjana) (Versi Terkini)	Universiti Malaya (Master Degree) Rules and Regulations (Latest Version)

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Jabatan *Department*	KEJURUTERAAN KIMIA	CHEMICAL ENGINEERING
Nama Program Akademik *Name of Academic Programme*	SARJANA KEJURUTERAAN KESELAMATAN, KESIHATAN DAN ALAM SEKITAR	MASTER OF SAFETY, HEALTH AND ENVIRONMENT ENGINEERING
Kod Kursus* *Course Code**	KQD7021	KQD7021
Tajuk Kursus* *Course Title**	PENGURUSAN DAN TEKNOLOGI DALAM KAWALAN PENCEMARAN UDARA	MANAGEMENT AND TECHNOLOGY IN AIR POLLUTION CONTROL
Kredit* *Credit**	3	3
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	120	120
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*		

	Versi Bahasa Malaysia *Malay Version*	Versi Bahasa Inggeris *English Version*
Hasil Pembelajaran Kursus* *Course Learning Outcomes**	CLO 1. EXPLAIN THE CONCEPT OF AIR QUALITY AND ITS CHARACTERISTICS, TYPES AND SOURCES AND THEIR IMPACT ON HEALTH AND ENVIRONMENT. CLO 2. EVALUATE THE DISPERSION OF POLLUTANTS THROUGH MODELING. CLO 3. FORMULATE THE CONTROL AND MANAGEMENT STRATEGIES FOR PARTICULATES AND GASEOUS POLLUTANTS.	CLO 1. MENERANGKAN KONSEP KUALITI UDARA DAN CIRI-CIRI, JENIS SERTA SUMBER DAN KESANNYA TERHADAP KESIHATAN DAN ALAM SEKITAR. CLO 2. MENILAI SERAKAN PENCEMAR MELALUI PERMODELAN. CLO 3. MERUMUSKAN STRATEGI KAWALAN DAN PENGURUSAN UNTUK PENCEMAR ZARAHAN DAN GAS.
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Kursus ini akan memperkenalkan pelajar kepada isu umum yang berkaitan dengan pencemaran udara, kualiti udara, dan juga jenis, sumber dan kesan pencemar udara. Selain itu, pelajar juga akan diberi pendedahan kepada isu pemanasan global, meteorologi udara dan serakan pencemar, serta pengurusan dan kawalan pencemar udara gas dan zarahan udara.	This course will introduce students to general issues on air pollution, air quality and also types, sources and impacts of air pollutants. Besides, students also will be exposed to the Global warming issue, air meteorology and dispersion of pollutants, as well as management and control of gaseous and particulate air pollutants.
Pemberatan Penilaian* (%) *Assessment Weightage**	Continuous Assessment : 100 Examination : 0	Continuous Assessment : 100 Examination : 0
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	1. Perbincangan di dalam kelas 2. Pengembalian penilaian dan ujian yang telah digredkan 3. Gred akhir akan diumumkan	1. Discussions in class 2. Returning graded assignments and tests 3. Final grades are announced
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-Kaedah Peraturan-Peraturan Universiti Malaya (Ijazah Sarjana) (Versi Terkini)	Universiti Malaya (Master Degree) Rules and Regulations (Latest Version)

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Jabatan *Department*	KEJURUTERAAN KIMIA	CHEMICAL ENGINEERING
Nama Program Akademik *Name of Academic Programme*	SARJANA KEJURUTERAAN KESELAMATAN, KESIHATAN DAN ALAM SEKITAR	MASTER OF SAFETY, HEALTH AND ENVIRONMENT ENGINEERING
Kod Kursus* *Course Code**	KQD7022	KQD7022
Tajuk Kursus* *Course Title**	PENGURUSAN KRISIS DAN KECEMASAN DALAM INDUSTRI BAHARU	CRISIS AND EMERGENCY MANAGEMENT IN EMERGING INDUSTRIES
Kredit* *Credit**	3	3
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	120	120
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*		

	Versi Bahasa Malaysia *Malay Version*	Versi Bahasa Inggeris *English Version*
Hasil Pembelajaran Kursus* *Course Learning Outcomes**	CLO 1. MENILAI DAN MENGANALISIS BAHAYA INDUSTRI, RISIKO, DAN KERENTANAN, DENGAN MENGGUNAKAN RANGKA KERJA DAN METODOLOGI KHUSUS INDUSTRI UNTUK MENGENAL PASTI ANCAMAN SERTA MEMBANGUNKAN STRATEGI PROAKTIF UNTUK PENCEGAHAN KECEMASAN DAN PENGURUSAN KRISIS. CLO 2. MERANCANG DAN MENILAI PELAN PENGURUSAN KRISIS YANG KOMPREHENSIF YANG MENANGANI KESAN JANGKA PENDEK DAN JANGKA PANJANG KECEMASAN INDUSTRI, DENGAN MENGINTEGRASIKAN SUMBER ORGANISASI, KOORDINASI PIHAK BERKEPENTINGAN, DAN KEPERLUAN PERATURAN. CLO 3. MENILAI DAN MENILAI KEBERKESANAN RESPONS PENGURUSAN KRISIS DALAM KAJIAN KES DUNIA SEBENAR, DENGAN MENGENAL PASTI PENGAJARAN YANG DIPEROLEH DAN KAWASAN YANG MEMERLUKAN PENAMBAHBAIKAN DALAM SISTEM PENGURUSAN KECEMASAN INDUSTRI.	CLO 1. ASSESS AND ANALYZE INDUSTRIAL HAZARDS, RISKS, AND VULNERABILITIES, APPLYING INDUSTRY-SPECIFIC FRAMEWORKS AND METHODOLOGIES TO IDENTIFY THREATS AND DEVELOP PROACTIVE STRATEGIES FOR EMERGENCY PREVENTION AND CRISIS MANAGEMENT. CLO 2. DESIGN AND EVALUATE COMPREHENSIVE CRISIS MANAGEMENT PLANS THAT ADDRESS BOTH SHORT-TERM AND LONG-TERM CONSEQUENCES OF INDUSTRIAL EMERGENCIES, INTEGRATING ORGANIZATIONAL RESOURCES, STAKEHOLDER COORDINATION, AND REGULATORY REQUIREMENTS. CLO 3. ASSESS AND EVALUATE THE EFFECTIVENESS OF CRISIS MANAGEMENT RESPONSES IN REAL-WORLD CASE STUDIES, IDENTIFYING LESSONS LEARNED AND AREAS FOR IMPROVEMENT IN INDUSTRIAL EMERGENCY MANAGEMENT SYSTEMS.
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Kursus ini membekalkan peserta dengan kemahiran dan pengetahuan yang diperlukan untuk menguruskan krisis dan kecemasan industri dengan berkesan. Melalui penerokaan mendalam mengenai penilaian bahaya, analisis risiko, dan pengenalpastian kerentan, peserta akan mempelajari untuk menggunakan rangka kerja dan metodologi khusus industri bagi mengurangkan ancaman secara proaktif. Program ini menekankan reka bentuk dan penilaian pelan pengurusan krisis yang komprehensif, memastikan kesan jangka pendek dan jangka panjang dapat ditangani. Komponen utama termasuk integrasi sumber organisasi, penyelarasan pihak berkepentingan, dan pematuhan kepada keperluan peraturan. Di samping itu, program ini memberi fokus kepada penilaian respons pengurusan krisis melalui kajian kes dunia sebenar, membolehkan peserta mengenal pasti pengajaran yang diperoleh dan ruang untuk penambahbaikan dalam sistem pengurusan kecemasan industri. Di akhir program, peserta akan bersedia untuk memimpin inisiatif strategik yang bertujuan untuk mencegah, memberi respons, dan pulih dari kecemasan industri.	This course equips participants with the skills and knowledge necessary to effectively manage industrial crises and emergencies. Through an in-depth exploration of hazard assessment, risk analysis, and vulnerability identification, participants will learn to apply industry-specific frameworks and methodologies to proactively mitigate potential threats. The program emphasizes the design and evaluation of comprehensive crisis management plans, ensuring that both short-term and long-term impacts are addressed. Key components include the integration of organizational resources, stakeholder coordination, and adherence to regulatory requirements. Additionally, the program focuses on evaluating crisis management responses through real-world case studies, enabling participants to identify lessons learned and areas for improvement in industrial emergency management systems. By the end of the program, participants will be prepared to lead strategic initiatives aimed at preventing, responding to, and recovering from industrial emergencies.
Pemberatan Penilaian* (%) *Assessment Weightage**	Continuous Assessment : 100 Examination : 0	Continuous Assessment : 100 Examination : 0
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	Perbincangan dan maklumbalas secara dalam talian.	Discussion and online feedback.
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-Kaedah Peraturan-Peraturan Universiti Malaya (Ijazah Sarjana) (Versi Terkini)	Universiti Malaya (Master Degree) Rules and Regulations (Latest Version)

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Jabatan *Department*	KEJURUTERAAN KIMIA	CHEMICAL ENGINEERING
Nama Program Akademik *Name of Academic Programme*		
Kod Kursus* *Course Code**	KQD7023	KQD7023
Tajuk Kursus* *Course Title**	PENGURUSAN DAN PENGURANGAN SISA BERBAHAYA: PENDEKATAN INDUSTRI	HAZARDOUS WASTE MANAGEMENT AND MINIMIZATION: INDUSTRIAL APPROACHES
Kredit* *Credit**	3	3
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	120	120
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*		

	Versi Bahasa Malaysia *Malay Version*	Versi Bahasa Inggeris *English Version*
Hasil Pembelajaran Kursus* *Course Learning Outcomes**	CLO 1. KENAL PASTI JENIS-JENIS SISA BERBAHAYA DAN MENILAI POTENSI RISIKO TERHADAP ALAM SEKITAR DAN KESIHATAN MANUSIA YANG BERKAITAN DENGAN SISA BERBAHAYA, TERMASUK LALUAN PENDEDAHAN, KETOKSIKAN, DAN KESAN JANGKA PANJANG TERHADAP EKOSISTEM. CLO 2. RANCANG KAEDAH RAWATAN DAN PENGURANGAN SISA BERBAHAYA YANG SESUAI BERDASARKAN JENIS SISA, KEBIMBANGAN KESELAMATAN, DAN PERTIMBANGAN KESAN ALAM SEKITAR. CLO 3. MENYELESAIKAN KAJIAN KES BERDASARKAN KEPERLUAN PERATURAN DAN TEKNIKAL YANG MELIBATKAN ISU-ISU UMUM YANG BERKAITAN DENGAN PENGURUSAN SISA BERBAHAYA.	CLO 1. IDENTIFY TYPES OF HAZARDOUS WASTES AND ASSESS THE POTENTIAL ENVIRONMENTAL AND HUMAN HEALTH RISKS ASSOCIATED WITH HAZARDOUS WASTE, INCLUDING EXPOSURE PATHWAYS, TOXICITY, AND LONG-TERM IMPACT ON ECOSYSTEMS. CLO 2. DESIGN APPROPRIATE HAZARDOUS WASTE TREATMENT AND MINIMIZATION METHODS BASED ON THE TYPE OF WASTE, SAFETY CONCERNS, AND ENVIRONMENTAL IMPACT CONSIDERATIONS. CLO 3. SOLVE CASE STUDIES BASED ON REGULATORY AND TECHNICAL REQUIREMENTS INVOLVING COMMON ISSUES RELATED TO HAZARDOUS WASTE MANAGEMENT.
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Dalam kursus ini, pelajar akan diberi pendedahan mengenai pengenalan dan definasi sisa berbahaya, analisis toksik pada sisa berbahaya, secara amnya pengurusan sisa, audit dan teknik pemilihan pencegahan pencemaran untuk sisa berbahaya. Selain itu, pelajar akan dapat mempelajari mengenai rawatan terma, kimia, fizikal dan biologi, rekabentuk tempat pembuangan dan operasi pelupusan sisa berbahaya, teknik 'site-remediation', peraturan sisa berjadual dan komitmen antarabangsa bagi Malaysia dan juga analisis ringkas risiko yang melibatkan sisa berbahaya.	In this course, students will be exposed to the introduction and definition of hazardous waste, toxicity analysis for hazardous waste, general waste management practices, auditing and selected pollution prevention techniques for hazardous wastes. Moreover, students also will be able to learn about thermal, chemical, physical and biological treatment, landfill design and operation of hazardous waste disposal, site-remediation techniques, scheduled waste regulations and international commitments for Malaysia and also brief risk analysis involving hazardous waste.
Pemberatan Penilaian* (%) *Assessment Weightage**	Continuous Assessment : 100 Examination : 0	Continuous Assessment : 100 Examination : 0
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	1. Perbincangan di dalam kelas 2. Pengembalian penilaian dan ujian yang telah digredkan 3. Gred akhir akan diumumkan	1. Discussions in class 2. Returning graded assignments and tests 3. Final grades are announced
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-Kaedah Peraturan-Peraturan Universiti Malaya (Ijazah Sarjana) (Versi Terkini)	Universiti Malaya (Master Degree) Rules and Regulations (Latest Version)

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Jabatan *Department*	KEJURUTERAAN KIMIA	CHEMICAL ENGINEERING
Nama Program Akademik *Name of Academic Programme*	SARJANA KEJURUTERAAN KESELAMATAN, KESIHATAN DAN ALAM SEKITAR	MASTER OF SAFETY, HEALTH AND ENVIRONMENT ENGINEERING
Kod Kursus* *Course Code**	KQD7024	KQD7024
Tajuk Kursus* *Course Title**	PROJEK PENYELIDIKAN	RESEARCH PROJECT
Kredit* *Credit**	7	7
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	280	280
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*		

	Versi Bahasa Malaysia *Malay Version*	Versi Bahasa Inggeris *English Version*
Hasil Pembelajaran Kursus* *Course Learning Outcomes**	CLO 1. MENGKAJI DOKUMEN SAINTIFIK DAN MELAPORKAN TINJAUAN LITERATUR UNTUK MENGENALPASTI JURANG PENYELIDIKAN SERTA OBJEKTIF YANG BOLEH DICAPAI DALAM LAPORAN CADANGAN. CLO 2. MEMILIH METODOLOGI PENGUMPULAN DATA YANG SESUAI UNTUK DITULIS DALAM LAPORAN CADANGAN. CLO 3. MENGANALISA DAPATAN KAJIAN DAN MEMANFAATKAN ALAT DIGITAL DAN PERISIAN YANG SESUAI. CLO 4. MENYEDIAKAN SATU PERANCANGAN UNTUK MENYIAPKAN PROJEK PENYELIDIKAN MENGIKUT JADUAL YANG TELAH DIBERIKAN OLEH PENYELARAS SUBJEK. CLO 5. MENGHASILKAN PERBANDINGAN TELITI TENTANG HASIL KAJIAN DAN NILAI TAMBAH/IMPAK EKONOMINYA TERHADAP INDUSTRI KESIHATAN, KESELAMATAN DAN/ATAU ALAM SEKITAR SECARA KREATIF. CLO 6. MENJELASKAN HASIL PROJEK PENYELIDIKAN KEPADA KHALAYAK BERSASAR.	CLO 1. REVIEW SCIENTIFIC DOCUMENTS AND REPORT LITERATURE REVIEW TO IDENTIFY RESEARCH GAP AND DELIVERABLE OBJECTIVES IN THE PROPOSAL REPORT. CLO 2. SELECT A SUITABLE DATA COLLECTION METHODOLOGY TO BE WRITTEN IN THE PROPOSAL REPORT. CLO 3. ANALYSE THE RESEARCH FINDINGS AND UTILIZE RELEVANT SOFTWARE AND DIGITAL TOOLS. CLO 4. ASSEMBLE A PLAN TO COMPLETE THE RESEARCH PROJECT BASED ON A GIVEN SCHEDULE BY THE SUBJECT COORDINATOR. CLO 5. DEVELOP A COMPREHENSIVE COMPARISON OF THE RESEARCH OUTCOMES AND THEIR ADDED VALUES/ECONOMIC IMPACTS TO SAFETY, HEALTH AND/OR ENVIRONMENTAL INDUSTRIES IN A CREATIVE MANNER. CLO 6. EXPLAIN OUTCOMES OF RESEARCH PROJECT TO A TARGET AUDIENCE.
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Dalam kursus Projek Penyelidikan ini, dengan bantuan dari penyelia yang telah dipilih oleh pelajar, mereka akan belajar cara-cara untuk membuat kajian literatur untuk satu topik kajian yang spesifik, menyenaraikan objektif projek, umerancang kaedah kajian, mengumpul data serta menganalisanya, menulis laporan dan membuat satu pembentangan.	In this Research Project course, with the assistance of a selected supervisor by the students, they will learn how to conduct a literature review on a specific research topic, outline project objectives, plan research methodology, perform data collection and analysis, write a report and deliver a presentation.
Pemberatan Penilaian* (%) *Assessment Weightage**	Continuous Assessment : 100 Examination : 0	Continuous Assessment : 100 Examination : 0
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	Maklumbalas atas talian.	Online feedback.
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-Kaedah Peraturan-Peraturan Universiti Malaya (Ijazah Sarjana) (Versi Terkini)	Universiti Malaya (Master Degree) Rules and Regulations (Latest Version)

COURSEWORK PROGRAMME | KQC

05

Master of Systems Engineering

COURSE TYPE	MODE OF STUDY	INDICATIVE DURATION
Coursework	Full-time	2 semesters + 1 special semester

PROGRAMME AT A GLANCE

This intensive programme equips engineers to design, integrate and manage complex systems through data analytics, machine learning, systems analysis and systems design. Students can deepen their knowledge in sustainable energy, micro- and nanoelectronics, information and communication technologies, and cyber-physical systems before applying their learning to a research project focused on a real engineering challenge.

View the official programme page

Source: Universiti Malaya Study portal | Page last updated 15 May 2026

UNIVERSITI MALAYA

FACULTY OF ENGINEERING

Master of Systems Engineering

Academic Programme Information

MSE	42	FULL TIME
PROGRAMME REFERENCE	TOTAL CREDITS	TYPE OF STUDY

ACADEMIC SESSION 2026/2027
Universiti Malaya

Contents

This section presents the current programme profile, admission requirements, outcomes, curriculum and indicative study sequence for the Master of Systems Engineering.

01	Programme Overview
02	Admission Requirements
03	Programme Goal and Educational Objectives
04	Programme Learning Outcomes
05	Curriculum Structure
06	Elective Course Guide
07	Indicative Study Plan
08	Programme Alignment

Programme Overview

The Master of Systems Engineering is a 42-credit, full-time coursework programme delivered conventionally. It develops the ability to analyse, design and improve interconnected engineering systems through an integrated foundation in data analytics, system analysis, machine learning, research methodology and applied research.

Students complete a 12-credit research project and select six electives from a broad portfolio covering energy systems, communications, microelectronics, automation, control, numerical analysis, human-centred design, healthcare technologies and engineering management. This flexible structure supports focused study while preserving a coherent systems perspective.

Programme at a Glance

Programme name	Master of Systems Engineering
Malay name	Sarjana Kejuruteraan Sistem
Abbreviation	MEng Systems
Academic programme code	SCWKQCFTCV04
Faculty	Faculty of Engineering
National Education Code	0713 Electronics and Automation
Medium of instruction	Malay and English
Mode of study	Coursework
Type and delivery	Full time | Conventional
Mode of operation	Self governing
Total credits	42 credits

Curriculum Composition

Core courses	Elective courses	Programme total
24 credits	**18 credits**	**42 credits**

Admission Requirements

Applicants must hold a Bachelor's Degree or equivalent qualification in Engineering, Science or Computing.

Academic Qualification

Applicants with a CGPA of at least 3.00 may be considered on the basis of the recognised qualification stated above.

Applicants with a CGPA from 2.50 to 2.99 must meet at least one of the following criteria:

- Graduate of Universiti Malaya.
- At least one year of work experience in a related field.
- Publication in a related field.
- Recipient of a scholarship.
- Staff member of a government agency.
- Pass an interview conducted by the Faculty.
- Pass a special evaluation conducted by the Faculty.

English Language Requirement for International Applicants

An international applicant whose previous degree was awarded by an institution where English was not the medium of instruction must obtain at least one of the following results:

Qualification	Minimum result
Malaysian University English Test (MUET)	Band 4.0
IELTS Academic	Band 6.0
TOEFL iBT (Centre Based)	Score 60
TOEFL Essentials (Online)	Score 8.5
Pearson Test of English Academic	Score 59
Cambridge B1 Preliminary, B2 First, C1 Advanced or C2 Proficiency	Score 169

Programme Goal and Educational Objectives

Programme Goal

The programme aims to develop knowledgeable systems engineering graduates who demonstrate high ethical standards and a professional culture. Through its structured curriculum, graduates build the analytical judgement and specialist capability needed to advance the design, integration and management of complex engineering systems.

Programme Educational Objectives

Objective	Graduate achievement
PEO1	Graduates demonstrate advanced technical knowledge, analytical competency, and innovative problem-solving skills, integrating numerical and digital proficiencies to deliver sustainable solutions in engineering design, analysis, and implementation.
PEO2	Graduates exhibit strong leadership, an entrepreneurial mindset, and effective communication and interpersonal skills, driving transformative advancements and innovation within engineering industries.
PEO3	Graduates commit to continuous self-improvement, professional growth, and lifelong learning, upholding ethical standards and professional practices while contributing responsibly to societal and industrial progress.

What These Objectives Emphasise

Technical judgement advanced analysis, digital capability and sustainable engineering solutions.

Professional influence leadership, communication, collaboration and entrepreneurial thinking.

Responsible practice lifelong learning, ethical conduct and positive contribution to society and industry.

Programme Learning Outcomes

On successful completion of the programme, graduates should be able to demonstrate the following outcomes.

Code	Learning outcome	Competency domain and taxonomy
PLO1	Demonstrate advanced theoretical and technical knowledge in new situations within system engineering context.	Knowledge and Understanding Cognitive
PLO2	Apply critical and analytical skills to resolve complex problems and handle unpredictable issues with innovative solutions in the field of system engineering.	Cognitive Skills Cognitive
PLO3	Conduct specific methods or procedures through practical skills based on the latest developments in the field of system engineering.	Practical Skills Psychomotor
PLO4	Collaborate with different people in learning and working communities, ethically and professionally.	Interpersonal Skills Affective
PLO5	Communicate clearly the knowledge, skills, ideas, critique and rationale using appropriate methods to peers, experts, and non-experts.	Communication Skills Cognitive and Psychomotor
PLO6	Use a wide range of suitable digital technologies and appropriate software competently to enhance learning and research practice.	Digital Skills Cognitive and Psychomotor
PLO7	Use quantitative or qualitative tools to analyze and evaluate numerical and graphical data for learning or project work.	Numeracy Skills Cognitive and Psychomotor
PLO8	Demonstrate substantial responsibility in planning, resource management, supervision and problem solving and managing work within own team and collaboratively with other teams especially in complex and unpredictable situations.	Leadership Autonomy and Responsibility Affective
PLO9	Demonstrate continuous professional development and flexibility to new changes in the field of system engineering.	Personal Skills Affective
PLO10	Demonstrate an entrepreneurial mindset with creativity.	Entrepreneurial Skills Cognitive
PLO11	Uphold professional and ethical practices in conducting research and delivering services related to system engineering field.	Ethics and Professionalism Affective and Cognitive

Curriculum Structure

Students complete **24 credits of core courses** and **18 credits of electives** for a programme total of 42 credits. The core combines four three-credit taught courses with a 12-credit research project. The elective requirement is normally met by selecting six approved three-credit courses.

Core Courses

Course code	Course title	Credits
KQC7016	Data Analytics	3
KQC7017	System Analysis and Design	3
KQC7035	Research Project	12
KQX7003	Research Methodology for Coursework	3
KQX7005	Machine Learning in Engineering	3
Total core credits		**24**

Research Sequence

Foundation	Development	Completion
KQX7003 Research Methodology for Coursework	KQC7035 Research Project 1 (P1)	KQC7035 Research Project 2 (P2)

Integrated Learning Path

Understand	Analyse	Integrate
System Architecture Research Methods	Data Analytics Machine Learning	System Design Research Project

Elective Course Guide

Students complete **18 elective credits** by selecting **six approved three-credit courses.** The thematic guide helps readers explore the curriculum; these groupings are editorial and do not represent formal specialisations. Course availability may vary by semester and remains subject to programme advice.

Elective Themes

Theme	Focus
Energy and Power Systems	Smart distribution, green energy, power electronics, power quality and energy conversion.
Signals and Communications	Digital signal processing, communication networks, wireless systems, optical devices, electromagnetic compatibility and antennas.
Microelectronics and Embedded Systems	MEMS, embedded systems and integrated-circuit design.
Automation Control and Computation	Industrial automation, robotics, discrete-time control and advanced numerical analysis.
Human Centred and Healthcare Systems	Human factors, human-computer interaction, intelligent healthcare systems and deep learning for healthcare design.
Professional Practice	Engineering project management.

Elective Directory

Course code	Course title	Credits
KQC7018	Smart Power Distribution System	3
KQC7019	Green Energy Systems	3
KQC7020	Power Electronics	3
KQC7022	Power Quality	3
KQC7023	Digital Signal Processing	3
KQC7024	Communication Networks	3
KQC7025	Wireless Communication Systems	3
KQC7027	Optical Devices	3
KQC7028	MEMS Design	3
KQC7029	Embedded Systems	3
KQC7030	IC Design	3
KQC7031	Industrial Automation and Robotics	3
KQC7033	Discrete-Time Control Systems	3
KQC7034	Electromagnetic Compatibility and Interference	3

Course code	Course title	Credits
KQD7014	Human Factor and Management at Work Place	3
KQC7036	Human-Computer Interaction	3
KQC7037	Advanced Numerical Analysis	3
KQC7039	Deep Learning for Healthcare System Design	3
KQX7004	Engineering Project Management	3
KQC7038	Intelligent Healthcare System Design	3
KQC7040	Energy Conversion Devices	3
KQC7041	Modern Antenna Design and Propagation	3
Elective credits required		**18**

Indicative Study Plan

The official specification places taught core courses across Semester 1 and Semester 2. KQC7035 Research Project is shown across Semester 2 and Semester 3 or the Special Semester and carries 12 credits in total. Electives totalling 18 credits are planned within the candidature according to programme advice and course availability.

Study period	Core courses	Core credit position	Elective planning
Semester 1	KQC7017 System Analysis and Design KQX7003 Research Methodology for Coursework KQX7005 Machine Learning in Engineering	9 taught credits	Register an approved combination contributing to the 18-credit elective requirement.
Semester 2	KQC7016 Data Analytics KQC7035 Research Project	3 taught credits plus research project	Continue the approved elective plan.
Semester 3 or Special Semester	KQC7035 Research Project continued or completed	12 project credits counted once in the programme total	Complete any outstanding approved elective requirement.

Core	Electives	Total
24 credits	**18 credits**	**42 credits**

Planning Notes

- The study plan is an indicative sequence based on the supplied academic programme specification.
- KQC7035 is shown in more than one study period but contributes 12 credits once to the programme total.
- Students should confirm elective availability, registration requirements and research milestones with the programme coordinator each semester.

Programme Alignment

The PLO to PEO mapping shows how learning achieved during the programme supports longer-term graduate objectives.

Learning outcome	PEO1	PEO2	PEO3
PLO1	YES		
PLO2	YES		
PLO3	YES		
PLO4		YES	
PLO5		YES	
PLO6	YES		
PLO7	YES		
PLO8		YES	
PLO9			YES
PLO10		YES	
PLO11			YES

Alignment Summary

Objective	Primary emphasis	Supporting outcomes
PEO1	Technical knowledge problem solving digital and numerical capability	PLO1 PLO2 PLO3 PLO6 PLO7
PEO2	Leadership communication collaboration and entrepreneurship	PLO4 PLO5 PLO8 PLO10
PEO3	Professional growth ethics and responsible contribution	PLO9 PLO11

Important Academic Information

Course registration, elective offerings and candidature requirements are governed by current Universiti Malaya regulations and Faculty decisions. Students should use this handbook section together with their offer letter, registration notices and official programme advice.

Career Prospects

The Master of Systems Engineering prepares graduates to analyse, design, integrate and improve complex, interconnected engineering systems. Its combination of systems analysis, data analytics, machine learning, applied research and multidisciplinary electives supports careers across digital, energy, communications, automation, microelectronics and healthcare industries.

Career area	Examples
Systems Engineering and Integration	Systems Engineer, Systems Integration Engineer, Systems Architect, Requirements Engineer, Systems Design Engineer
Data Analytics and Intelligent Systems	Engineering Data Analyst, Data Analytics Engineer, Intelligent Systems Engineer, Decision-Support Analyst
Artificial Intelligence and Machine Learning	Machine Learning Engineer, AI Applications Engineer, Predictive Analytics Specialist, Intelligent Automation Engineer
Industrial Automation and Robotics	Automation Engineer, Robotics Engineer, Control Systems Engineer, Industrial Systems Engineer, Systems Integration Specialist
Energy and Power Systems	Power Systems Engineer, Smart Grid Engineer, Renewable Energy Systems Engineer, Power Quality Engineer, Energy Systems Analyst
Power Electronics and Energy Conversion	Power Electronics Engineer, Energy Conversion Engineer, Electrical Systems Engineer, Power Technology Specialist
Communications and Signal Processing	Communication Systems Engineer, Network Engineer, Digital Signal Processing Engineer, Wireless Systems Engineer
RF, Antenna and Electromagnetic Systems	RF Engineer, Antenna Design Engineer, Electromagnetic Compatibility Engineer, Wireless Technology Specialist
Microelectronics and Integrated Systems	Microelectronics Engineer, IC Design Engineer, MEMS Engineer, Semiconductor Design Engineer
Embedded and Connected Systems	Embedded Systems Engineer, Firmware Engineer, IoT Systems Engineer, Hardware–Software Integration Engineer
Human-Centred Systems and Interaction Design	Human–Computer Interaction Specialist, Human Factors Engineer, User Experience Researcher, Human-Centred Systems Designer
Healthcare Systems and Digital Health	Healthcare Systems Engineer, Medical Technology Systems Specialist, Digital Health Engineer, Healthcare AI Solutions Engineer
Engineering Project and Technology Management	Engineering Project Manager, Technical Project Lead, Technology Programme Manager, Systems Delivery Manager
Engineering Consultancy and Technical Advisory	Systems Engineering Consultant, Technology Consultant, Digital Transformation Consultant, Technical Solutions Advisor
Research, Innovation and Product Development	Research Engineer, R&D Engineer, Product Development Engineer, Technology Innovation Specialist
Academic and Professional Advancement	Lecturer, Academic Researcher, Technical Trainer, Doctoral Research Candidate

Official References

Programme page: Study@UM – Master of Systems Engineering (Coursework)

Faculty information: Faculty of Engineering – Postgraduate Programmes

Department information: https://engine.um.edu.my/about-electrical-engineering

FACULTY OF ENGINEERING

Master of Systems Engineering Study Planners

Academic Session 2026/2027

42	24	18	12
TOTAL CREDITS	CORE CREDITS	ELECTIVE CREDITS	RESEARCH CREDITS

How to Read the Planner

1 Follow the stages	2 Select six electives	3 Plan the research project
Complete the semester sequence shown for your intake.	Complete 18 elective credits: normally three courses from each semester pool.	Confirm supervision, milestones and the two-part project registration with the programme team.

Programme code SCWKQCFTCV04 **Mode** Full-time coursework **Delivery** Conventional **Medium** Malay and English

Planner for Master of Systems Engineering

Semester I Intake

A 42-credit full-time coursework pathway comprising 24 core credits and 18 elective credits.

STAGE 1 SEMESTER I	STAGE 2 SEMESTER II	STAGE 3 SPECIAL SEMESTER
Entry semester	**Second study period**	**Final study period**
CORE COURSES **KQX7003** Research Methodology for Coursework **[3]** **KQX7005** Machine Learning in Engineering **[3]** **KQC7017** System Analysis and Design **[3]** **ELECTIVE OPTIONS** **SELECT 3** Semester I elective courses from the approved directory **[9]** **Select 9 elective credits** **PLANNED LOAD 9 core + 9 elective = 18 credits**	**CORE COURSES** **KQC7016** Data Analytics **[3]** **KQC7035** Research Project — Part 1 **[6]** **ELECTIVE OPTIONS** **SELECT 3** Semester II elective courses from the approved directory **[9]** **Select 9 elective credits** **PLANNED LOAD 9 core + 9 elective = 18 credits**	**CORE COURSES** **KQC7035** Research Project — Part 2 **[6]** **ELECTIVE OPTIONS** *No elective allocation in the standard sequence.* **PLANNED LOAD 6 core + 0 elective = 6 credits**

Core courses	Electives	Research projects	Programme total
24 credits	**18 credits**	**12 credits**	**42 credits**

Planner for Master of Systems Engineering

Semester II Intake

A 42-credit full-time coursework pathway comprising 24 core credits and 18 elective credits.

STAGE 1 SEMESTER II	STAGE 2 SPECIAL SEMESTER	STAGE 3 SEMESTER I
Entry semester	**Second study period**	**Final study period in the following academic session**
CORE COURSES **KQX7003** Research Methodology for Coursework **[3]** **KQX7005** Machine Learning in Engineering **[3]** **KQC7016** Data Analytics **[3]** **ELECTIVE OPTIONS** **SELECT 3** Semester II elective courses from the approved directory **[9]** **Select 9 elective credits** **PLANNED LOAD 9 core + 9 elective = 18 credits**	**CORE COURSES** **KQC7035** Research Project — Part 1 **[6]** **ELECTIVE OPTIONS** *No elective allocation in the standard sequence.* **PLANNED LOAD 6 core + 0 elective = 6 credits**	**CORE COURSES** **KQC7017** System Analysis and Design **[3]** **KQC7035** Research Project — Part 2 **[6]** **ELECTIVE OPTIONS** **SELECT 3** Semester I elective courses from the approved directory **[9]** **Select 9 elective credits** **PLANNED LOAD 9 core + 9 elective = 18 credits**

Core courses	Electives	Research projects	Programme total
24 credits	**18 credits**	**12 credits**	**42 credits**

Elective Planning Directory

Approved elective pool • 3 credits per course • Select six courses (18 credits)

Use the semester columns as a planning guide. Course offerings may vary and registration remains subject to Faculty approval.

SEMESTER I POOL	SEMESTER II POOL
KQC7018 Smart Power Distribution System	**KQC7020** Power Electronics
KQC7019 Green Energy Systems	**KQC7022** Power Quality
KQC7040 Energy Conversion Devices	**KQC7023** Digital Signal Processing
KQC7024 Communication Networks	**KQC7027** Optical Devices
KQC7025 Wireless Communication Systems	**KQC7029** Embedded Systems
KQC7041 Modern Antenna Design and Propagation	**KQC7031** Industrial Automation and Robotics
KQC7028 MEMS Design	**KQD7014** Human Factor and Management at Work Place
KQC7030 IC Design	**KQC7034** Electromagnetic Compatibility and Interference
KQC7033 Discrete-Time Control Systems	**KQC7036** Human-Computer Interaction
KQC7037 Advanced Numerical Analysis	**KQX7004** Engineering Project Management
KQC7039 Deep Learning for Healthcare System Design	**KQC7038** Intelligent Healthcare System Design

UNIVERSITI MALAYA	**PRO FORMA KURSUS** **COURSE PRO FORMA**

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*Contents of this Pro Forma shall not be changed without the Senate's approval for items indicated with *. Changes to the other items can be approved at the Academy/Faculty/Institution/Centre level.*

	Versi Bahasa Malaysia *Malay Version*	Versi Bahasa Inggeris *English Version*
Akademi/Fakulti/Institut/Pusat *Academy/Faculty/Institute/Centre*	FAKULTI KEJURUTERAAN	FACULTY OF ENGINEERING
Jabatan *Department*	KEJURUTERAAN MEKANIK	MECHANICAL ENGINEERING
Nama Program Akademik *Name of Academic Programme*	SARJANA KEJURUTERAAN KESELAMATAN, KESIHATAN DAN ALAM SEKITAR SARJANA KEJURUTERAAN SISTEM SARJANA KEJURUTERAAN MEKANIKAL MASTER OF BIOMEDICAL ENGINEERING	MASTER OF SAFETY, HEALTH AND ENVIRONMENT ENGINEERING MASTER OF SYSTEMS ENGINEERING MASTER OF MECHANICAL ENGINEERING SARJANA KEJURUTERAAN BIOPERUBATAN
Kod Kursus* *Course Code**	KQX7004	KQX7004
Tajuk Kursus* *Course Title**	PENGURUSAN PROJEK KEJURUTERAAN	ENGINEERING PROJECT MANAGEMENT
Kredit* *Credit**	3	3
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	121	121
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*		

	Versi Bahasa Malaysia *Malay Version*	Versi Bahasa Inggeris *English Version*
Hasil Pembelajaran Kursus* *Course Learning Outcomes**	CLO 1. MENERAPKAN PRINSIP DAN METODOLOGI PENGURUSAN PROJEK UNTUK MERANCANG, MELAKSANAKAN, DAN MENGAWAL PROJEK KEJURUTERAAN SECARA BERKESAN, MEMASTIKAN KESELARASAN DENGAN KEKANGAN TEKNIKAL, KEWANGAN, DAN MASA. CLO 2. MENGANALISIS DAN MENGURUS RISIKO DALAM PROJEK KEJURUTERAAN DENGAN MENILAI KETIDAKTENTUAN, MENGOPTIMUMKAN PERUNTUKAN SUMBER, DAN MELAKSANAKAN TEKNIK MEMBUAT KEPUTUSAN STRATEGIK. CLO 3. MENUNJUKKAN KEMAHIRAN KEPIMPINAN DAN KERJA BERPASUKAN DALAM MENGURUS PROJEK KEJURUTERAAN MERENTAS DISIPLIN, DENGAN MEMANFAATKAN KOMUNIKASI YANG BERKESAN DAN PENGLIBATAN PIHAK BERKEPENTINGAN UNTUK KEJAYAAN PELAKSANAAN PROJEK.	CLO 1. APPLY PROJECT MANAGEMENT PRINCIPLES AND METHODOLOGIES TO PLAN, EXECUTE, AND CONTROL ENGINEERING PROJECTS EFFECTIVELY, ENSURING ALIGNMENT WITH TECHNICAL, FINANCIAL, AND TIME CONSTRAINTS. CLO 2. ANALYZE AND MITIGATE RISKS IN ENGINEERING PROJECTS BY EVALUATING UNCERTAINTIES, OPTIMIZING RESOURCE ALLOCATION, AND IMPLEMENTING STRATEGIC DECISION-MAKING TECHNIQUES. CLO 3. DEMONSTRATE LEADERSHIP AND TEAMWORK SKILLS IN MANAGING MULTIDISCIPLINARY ENGINEERING PROJECTS, LEVERAGING EFFECTIVE COMMUNICATION AND STAKEHOLDER ENGAGEMENT FOR SUCCESSFUL PROJECT EXECUTION.
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Kursus ini menyediakan penerokaan mendalam tentang prinsip pengurusan projek yang disesuaikan untuk aplikasi kejuruteraan. Ia merangkumi topik penting seperti perancangan projek, penjadualan, penyediaan bajet, pengurusan risiko, dan jaminan kualiti, dengan kajian kes dan amalan baik industri. Pelajar akan membangunkan pemikiran kritis dan kemahiran menyelesaikan masalah untuk mengurus projek kejuruteraan yang kompleks dengan cekap, inovatif, dan lestari. Melalui perbincangan interaktif dan aplikasi praktikal, kursus ini melengkapkan jurutera untuk mengurus projek dengan berjaya dalam persekitaran yang dinamik dan sentiasa berkembang.	This course provides an in-depth exploration of project management principles tailored for engineering applications. It covers essential topics such as project planning, scheduling, budgeting, risk management, and quality assurance, with real-world case studies and industry best practices. Students will develop critical thinking and problem-solving skills to navigate complex engineering projects, ensuring efficiency, innovation, and sustainability. Through interactive discussions and practical applications, the course equips future engineering leaders with the tools needed to manage projects successfully in dynamic and evolving environments.
Pemberatan Penilaian* (%) *Assessment Weightage**	Continuous Assessment : 100 Examination : 0	Continuous Assessment : 100 Examination : 0
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	Keputusan akan dimaklumkan melalui sistem MAYA.	Results will be notified through MAYA system.
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-Kaedah Peraturan-Peraturan Universiti Malaya (Ijazah Sarjana) (Versi Terkini)	Universiti Malaya (Master Degree) Rules and Regulations (Latest Version)

UNIVERSITI MALAYA	**PRO FORMA KURSUS** **COURSE PRO FORMA**

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Akademi/Fakulti/Institut/Pusat *Academy/Faculty/Institute/Centre*	FAKULTI KEJURUTERAAN	FACULTY OF ENGINEERING
Jabatan *Department*	PEJABAT DEKAN	DEAN'S OFFICE
Nama Program Akademik *Name of Academic Programme*	SARJANA KEJURUTERAAN SISTEM SARJANA KEJURUTERAAN KESELAMATAN, KESIHATAN DAN ALAM SEKITAR SARJANA KEJURUTERAAN MEKANIKAL	MASTER OF SYSTEMS ENGINEERING MASTER OF SAFETY, HEALTH AND ENVIRONMENT ENGINEERING MASTER OF MECHANICAL ENGINEERING
Kod Kursus* *Course Code**	KQX7005	KQX7005
Tajuk Kursus* *Course Title**	PEMBELAJARAN MESIN DALAM KEJURUTERAAN	MACHINE LEARNING IN ENGINEERING
Kredit* *Credit**	3	3
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	120	120
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*		

	Versi Bahasa Malaysia *Malay Version*	Versi Bahasa Inggeris *English Version*
Hasil Pembelajaran Kursus* *Course Learning Outcomes**	CLO 1. MENGAPLIKASIKAN ALGORITMA PEMBELAJARAN MESIN UNTUK MENYELESAIKAN MASALAH KEJURUTERAAN CLO 2. MENILAI MODEL PEMBELAJARAN MESIN UNTUK ANALISIS RAMALAN DALAM SISTEM KEJURUTERAAN CLO 3. MENYESUAIKAN RANGKA KERJA DAN ALAT PEMBELAJARAN MESIN UNTUK MENGOPTIMUMKAN PROSES KEJURUTERAAN DAN PEMBUATAN KEPUTUSAN	CLO 1. APPLY MACHINE LEARNING ALGORITHMS TO SOLVE ENGINEERING PROBLEMS CLO 2. EVALUATE MACHINE LEARNING MODELS FOR PREDICTIVE ANALYSIS IN ENGINEERING SYSTEMS CLO 3. ADAPT MACHINE LEARNING FRAMEWORKS AND TOOLS TO OPTIMIZE ENGINEERING PROCESSES AND DECISION-MAKING
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Kursus ini memperkenalkan aplikasi pembelajaran mesin dalam kejuruteraan, dengan fokus kepada analisis ramalan, pengoptimuman, dan automasi dalam sistem mekanikal, tenaga, dan industri. Topik yang dibincangkan termasuk prapemprosesan data, pembelajaran terselia dan tidak terselia, rangkaian neural, dan pembelajaran mendalam. Kursus ini juga merangkumi pemilihan ciri, penilaian model, dan penggunaan model pembelajaran mesin dalam aplikasi kejuruteraan dunia sebenar. Pelajar akan mendapat pengalaman praktikal menggunakan alat pembelajaran mesin berasaskan Python untuk menyelesaikan cabaran kejuruteraan.	This course introduces machine learning applications in engineering, focusing on predictive analytics, optimization, and automation in mechanical, energy, and industrial systems. Topics include data preprocessing, supervised and unsupervised learning, neural networks, and deep learning. The course also covers feature selection, model evaluation, and deployment of machine learning models in real-world engineering applications. Students will gain hands-on experience with Python-based machine learning tools for solving engineering challenges.
Pemberatan Penilaian* (%) *Assessment Weightage**	Continuous Assessment : 100 Examination : 0	Continuous Assessment : 100 Examination : 0
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	Maklumbalas secara dalam talian dan komen secara lisan semasa perbincangan tugasan. Markah untuk penilaian berterusan dimuat naik dalam Spectrum dan gred keputusan keseluruhan bagi setiap kursus di akses oleh pelajar melalui MyUM.	Online feedback and oral comments on assignments. Continuous Assessment marks will be uploaded through Spectrum. Final grade of examination results can be access through MyUM.
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-Kaedah Peraturan-Peraturan Universiti Malaya (Ijazah Sarjana) (Versi Terkini)	Universiti Malaya (Master Degree) Rules and Regulations (Latest Version)

UNIVERSITI MALAYA	**PRO FORMA KURSUS** **COURSE PRO FORMA**

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Jabatan *Department*	KEJURUTERAAN ELEKTRIK	ELECTRICAL ENGINEERING
Nama Program Akademik *Name of Academic Programme*	SARJANA KEJURUTERAAN SISTEM SARJANA KEJURUTERAAN SISTEM	MASTER OF SYSTEMS ENGINEERING MASTER OF SYSTEMS ENGINEERING
Kod Kursus* *Course Code**	KQC7016	KQC7016
Tajuk Kursus* *Course Title**	ANALITIK DATA	DATA ANALYTICS
Kredit* *Credit**	3	3
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	120	120
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*		

	Versi Bahasa Malaysia *Malay Version*	Versi Bahasa Inggeris *English Version*
Hasil Pembelajaran Kursus* *Course Learning Outcomes**	CLO 1. MEREKABENTUK KAEDAH YANG SESUAI UNTUK MEWAKILI PELBAGAI JENIS DATA UNTUK ANALISIS SELANJUTNYA. CLO 2. MENGESAHKAN KECEKAPAN PELBAGAI TEKNIK YANG DIGUNAKAN UNTUK KLASIFIKASI DAN PENGELOMPOKAN DATA. CLO 3. MELAKUKAN ANALISA DATA YANG MELIBATKAN MEKANISME UNTUK REGRESI DATA, PERATURAN SEKUTUAN, DAN PENGURANGAN PETA DENGAN MENGAMBIL KIRA ISU-ISU ETIKA.	CLO 1. DESIGN THE APPROPRIATE METHODS FOR REPRESENTING DIFFERENT TYPES OF DATA FOR FURTHER ANALYSIS. CLO 2. VALIDATE THE EFFICIENCY OF VARIOUS TECHNIQUES USED FOR DATA CLASSIFICATION AND CLUSTERING. CLO 3. PERFORM DATA ANALYSIS INVOLVING MECHANISMS FOR DATA REGRESSION, ASSOCIATION RULES, AND MAP-REDUCED BY CONSIDERING ETHICAL ISSUES.
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Kursus ini bertujuan untuk menyediakan pelajar dengan konsep asas analisis data, dengan tumpuan kepada aplikasi kejuruteraan elektrik. Antara topik yang dibincangkan dalam kursus ini adalah pelbagai teknik untuk penyediaan dan pemodelan data, membuat keputusan, klasifikasi data dan pengelompokan data. Selain itu, alat-alat yang digunakan untuk analisis data juga akan diperkenalkan dalam kursus ini, termasuk Pemrograman Python dan R, dan Hadoop.	This course aims to provide the students with basic concept of data analytics, focusing on the electrical engineering applications. Among the topics that are covered in this course are various techniques for data preparation and modeling, decision-making, data classification and data clustering. Besides, tools used for data analytics is also introduced in this course, including Python and R Programming, and Hadoop.
Pemberatan Penilaian* (%) *Assessment Weightage**	Continuous Assessment : 50 Examination : 50	Continuous Assessment : 50 Examination : 50
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	Maklumbalas secara dalam talian.	Online feedback.
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-Kaedah Peraturan-Peraturan Universiti Malaya (Ijazah Sarjana) (Versi Terkini)	Universiti Malaya (Master Degree) Rules and Regulations (Latest Version)

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Jabatan *Department*	KEJURUTERAAN ELEKTRIK	ELECTRICAL ENGINEERING
Nama Program Akademik *Name of Academic Programme*	SARJANA KEJURUTERAAN SISTEM SARJANA KEJURUTERAAN SISTEM	MASTER OF SYSTEMS ENGINEERING MASTER OF SYSTEMS ENGINEERING
Kod Kursus* *Course Code**	KQC7017	KQC7017
Tajuk Kursus* *Course Title**	ANALISA DAN REKABENTUK SISTEM	SYSTEM ANALYSIS AND DESIGN
Kredit* *Credit**	3	3
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	120	120
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*		

	Versi Bahasa Malaysia *Malay Version*	Versi Bahasa Inggeris *English Version*
Hasil Pembelajaran Kursus* *Course Learning Outcomes**	CLO 1. MENCADANGKAN PENYELESAIAN REKABENTUK BAGI KEADAAN AKHIR TERTAKRIF DENGAN MENGGUNAKAN METODOLOGI REKABENTUK KEJURUTERAAN BERSTRUKTUR. CLO 2. MEMBANGUNKAN SATU PENYELESAIAN KEJURUTERAAN TERPERINCI DENGAN MENGGUNAKAN ALAT-ALAT REKABENTUK YANG SESUAI BAGI PENYELESAIAN REKABENTUK TERPILIH. CLO 3. MENGHUBUNGKAIT PENYELESAIAN KEJURUTERAAN YANG DIREKABENTUK DENGAN DATA/SENARIO KAJIAN KES AWAL.	CLO 1. PROPOSE DESIGN SOLUTION FOR A DEFINED END STATE USING A STRUCTURED ENGINEERING DESIGN METHODOLOGY. CLO 2. DEVELOP A DETAILED ENGINEERING SOLUTION USING APPROPRIATE DESIGN TOOLS FOR THE SELECTED DESIGN SOLUTION. CLO 3. RELATE THE DESIGNED ENGINEERING SOLUTION WITH INITIAL CASE STUDY DATA/SCENARIO.
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Kursus ini memperkenalkan satu set kemahiran utama yang semua penganalisis perlu tahu tidak kira pendekatan atau metodologi yang digunakan untuk membangunkan sistem yang lebih berkesan dan cekap. Semua projek sistem maklumat dilaksanakan melalui empat fasa iaitu perancangan, analisis, reka bentuk, dan pelaksanaan. Semua projek memerlukan penganalisis untuk mengumpul keperluan, memodelkan keperluan perniagaan, dan membuat pelan tindakan untuk bagaimana sistem itu perlu dibina; dan semua projek memerlukan pemahaman tentang konsep tingkah laku organisasi seperti pengurusan perubahan dan pembinaan pasukan.	This course introduces a core set of skills that all analysts need to know no matter what approach or methodology is used to develop more effective and efficient systems. All information systems projects move through the four phases of planning, analysis, design, and implementation. All projects require analysts to gather requirements, model the business needs, and create blueprints for how the system should be built; and all projects require an understanding of organizational behavior concepts like change management and team building.
Pemberatan Penilaian* (%) *Assessment Weightage**	Continuous Assessment : 100 Examination : 0	Continuous Assessment : 100 Examination : 0
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	Maklumbalas secara dalam talian	Online feedback
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-Kaedah Peraturan-Peraturan Universiti Malaya (Ijazah Sarjana) (Versi Terkini)	Universiti Malaya (Master Degree) Rules and Regulations (Latest Version)

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Jabatan *Department*	KEJURUTERAAN ELEKTRIK	ELECTRICAL ENGINEERING
Nama Program Akademik *Name of Academic Programme*	SARJANA KEJURUTERAAN SISTEM SARJANA KEJURUTERAAN SISTEM	MASTER OF SYSTEMS ENGINEERING MASTER OF SYSTEMS ENGINEERING
Kod Kursus* *Course Code**	KQC7018	KQC7018
Tajuk Kursus* *Course Title**	SISTEM PENGAGIHAN KUASA PINTAR	SMART POWER DISTRIBUTION SYSTEM
Kredit* *Credit**	3	3
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	120	120
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*		

	Versi Bahasa Malaysia *Malay Version*	Versi Bahasa Inggeris *English Version*
Hasil Pembelajaran Kursus* *Course Learning Outcomes**	CLO 1. MENGANALISA KONSEP-KONSEP SISTEM KUASA ELEKTRIK. CLO 2. MENILAI KESAN-KESAN PERSEPADUAN TEKNOLOGI RENDAH KARBON KEPADA OPERASI SISTEM PENGAGIHAN ELEKTRIK. CLO 3. MENCADANGKAN PENYELESAIAN YANG SESUAI UNTUK PERMASALAHAN PERANCANGAN SISTEM PENGAGIHAN ELEKTRIK.	CLO 1. ANALYSE THE CONCEPTS OF ELECTRICAL POWER SYSTEM. CLO 2. ASSESS THE EFFECTS OF LOW CARBON TECHNOLOGY INTEGRATION TO THE OPERATION OF ELECTRICAL DISTRIBUTION SYSTEM. CLO 3. PROPOSE FEASIBLE SOLUTIONS FOR ELECTRICAL DISTRIBUTION SYSTEM PLANNING PROBLEMS.
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Kursus ini memperkenalkan konsep-konsep penting didalam sistem kuasa elektrik. Kursus ini juga menyediakan pengetahuan mendalam tentang penjana agihan dan teknologi rendah karbon serta kesan dan cabaran persepaduan teknologi ini kepada perancangan dan operasi rangkaian pengagihan moden. Pelajar akan mempelajari kaedah-kaedah yang bersesuaian bagi memenuhi keperluan piawaian tempatan dan antarabangsa berkenaan dengan perancangan perkembangan dan operasi sistem pengagihan di dalam menuju konsep grid pintar.	This course introduces important concepts in power system. The course also provides in-depth knowledge on the distributed generation and low carbon technology as well as the impacts and challenges of its integration into modern distribution networks. Students will learn how to design appropriate solutions for distribution system planning to satisfy national and international electrical distribution standards in anticipation of future smart grid concepts.
Pemberatan Penilaian* (%) *Assessment Weightage**	Continuous Assessment : 50 Examination : 50	Continuous Assessment : 50 Examination : 50
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	Maklumbalas secara dalam talian	Online feedback
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-Kaedah Peraturan-Peraturan Universiti Malaya (Ijazah Sarjana) (Versi Terkini)	Universiti Malaya (Master Degree) Rules and Regulations (Latest Version)

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Jabatan *Department*	KEJURUTERAAN ELEKTRIK	ELECTRICAL ENGINEERING
Nama Program Akademik *Name of Academic Programme*	SARJANA KEJURUTERAAN SISTEM SARJANA KEJURUTERAAN SISTEM	MASTER OF SYSTEMS ENGINEERING MASTER OF SYSTEMS ENGINEERING
Kod Kursus* *Course Code**	KQC7019	KQC7019
Tajuk Kursus* *Course Title**	SISTEM TENAGA HIJAU	GREEN ENERGY SYSTEMS
Kredit* *Credit**	3	3
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	120	120
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*		

	Versi Bahasa Malaysia *Malay Version*	Versi Bahasa Inggeris *English Version*
Hasil Pembelajaran Kursus* *Course Learning Outcomes**	CLO 1. MENGANALISA SISTEM PENUKARAN TENAGA DAN PENYIMPANAN UNTUK TEKNOLOGI BOLEH DIPERBAHARUI. CLO 2. MENILAI PRESTASI DAN KEBOLEHPERCAYAAN SISTEM TENAGA BOLEH DIPERBAHARUI CLO 3. MEREKABENTUK SISTEM TENAGA BOLEH DIPERBAHARUI YANG KECIL.	CLO 1. ANALYZE ENERGY CONVERSION SYSTEMS AND STORAGE FOR RENEWABLE TECHNOLOGIES. CLO 2. EVALUATE THE PERFORMANCE AND THE RELIABILITY OF RENEWABLE ENERGY SYSTEMS. CLO 3. DESIGN A SMALL RENEWABLE ENERGY SYSTEM
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Masyarakat moden bergantung kepada bekalan tenaga stabil sedia ada. Tenaga boleh diperbaharui merupakan komponen yang semakin penting kepada penghasilan tenaga baru. Kursus ini merangkumi penukaran tenaga, penggunaan dan penyimpanan tenaga boleh diperbaharui seperti angin, biojisim, solar, sel bahan api dan sistem hibird. Konsep Termodinamik (termasuk undang-undang pertama dan kedua) akan menjadi asas untuk pemodelan sistem tenaga boleh diperbaharui. Kursus ini juga merangkumi kesan-kesan ke atas alam sekitar akibat daripada penukaran tenaga dan cara-cara tenaga boleh diperbaharui dapat mengurangkan pencemaran alam sekitar dan perubahan iklim global.	Modern society relies on stable, readily available energy supplies. Renewable energy is an increasingly important component of the new energy mix. The course covers energy conversion, utilization and storage for renewable technologies such as wind, solar, hydro, Oceanic Energy and hybrid systems. Thermodynamics concepts (including the first and second law) will form the basis for modeling the renewable energy systems. The course also touches upon the environmental consequences of energy conversion and how renewable energy can reduce air pollution and global climate change.
Pemberatan Penilaian* (%) *Assessment Weightage**	Continuous Assessment : 50 Examination : 50	Continuous Assessment : 50 Examination : 50
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	Maklumbalas secara dalam talian	Online feedback
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-Kaedah Peraturan-Peraturan Universiti Malaya (Ijazah Sarjana) (Versi Terkini)	Universiti Malaya (Master Degree) Rules and Regulations (Latest Version)

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Jabatan *Department*	KEJURUTERAAN ELEKTRIK	ELECTRICAL ENGINEERING
Nama Program Akademik *Name of Academic Programme*	SARJANA KEJURUTERAAN SISTEM SARJANA KEJURUTERAAN SISTEM	MASTER OF SYSTEMS ENGINEERING MASTER OF SYSTEMS ENGINEERING
Kod Kursus* *Course Code**	KQC7020	KQC7020
Tajuk Kursus* *Course Title**	ELEKTRONIK KUASA	POWER ELECTRONICS
Kredit* *Credit**	3	3
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	120	120
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*		

	Versi Bahasa Malaysia *Malay Version*	Versi Bahasa Inggeris *English Version*
Hasil Pembelajaran Kursus* *Course Learning Outcomes**	CLO 1. MEMILIH PERANTI KUASA UNTUK PENUKAR ELEKTRONIK KUASA. CLO 2. MENILAI PRESTASI PENUKAR UNTUK APLIKASI PERINDUSTRIAN. CLO 3. MEREKABENTUK PENUKAR KUASA YANG BERKAITAN DENGAN APLIKASI PERINDUSTRIAN MENGIKUT PIAWAIAN.	CLO 1. SELECT POWER DEVICES FOR POWER ELECTRONICS CONVERTERS. CLO 2. EVALUATE THE CONVERTER PERFORMANCE FOR INDUSTRIAL APPLICATIONS. CLO 3. DESIGN POWER CONVERTERS RELATED TO INDUSTRIAL APPLICATIONS ACCORDING TO STANDARDS.
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Kursus ini membentangkan aplikasi elektronik kuasa, standard EMC, DC-DC-suis mod penukar, teknik PWM, ‘buck’ tiga-fasa, rangsangan dan ‘flyback’ penukar, penukar salunan dan penyongsang bertingkat.	This course presents power electronics applications, EMC standards, DC-DC switch-mode converters, PWM techniques, three-phase buck, boost and flyback converters, resonant converters and multilevel inverters.
Pemberatan Penilaian* (%) *Assessment Weightage**	Continuous Assessment : 50 Examination : 50	Continuous Assessment : 50 Examination : 50
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	Maklumbalas secara dalam talian.	Online feedback.
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-Kaedah Peraturan-Peraturan Universiti Malaya (Ijazah Sarjana) (Versi Terkini)	Universiti Malaya (Master Degree) Rules and Regulations (Latest Version)

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Jabatan *Department*	KEJURUTERAAN ELEKTRIK	ELECTRICAL ENGINEERING
Nama Program Akademik *Name of Academic Programme*	SARJANA KEJURUTERAAN SISTEM SARJANA KEJURUTERAAN SISTEM	MASTER OF SYSTEMS ENGINEERING MASTER OF SYSTEMS ENGINEERING
Kod Kursus* *Course Code**	KQC7022	KQC7022
Tajuk Kursus* *Course Title**	KUALITI KUASA	POWER QUALITY
Kredit* *Credit**	3	3
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	120	120
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*		

	Versi Bahasa Malaysia *Malay Version*	Versi Bahasa Inggeris *English Version*
Hasil Pembelajaran Kursus* *Course Learning Outcomes**	CLO 1. MENYIASAT FENOMENA KUALITI KUASA DAN KEPENTINGANNYA KEPADA MASYARAKAT DAN INDUSTRI. CLO 2. MENILAI MASALAH-MASALAH KUALITI KUASA. CLO 3. MENCADANGKAN TEKNIK MENGURANGKAN GANGGUAN KUALITI KUASA DENGAN MENGAMBIL KIRA ISU-ISU ETIKA.	CLO 1. INVESTIGATE THE POWER QUALITY PHENOMENON AND ITS IMPORTANCE TO SOCIETY AND INDUSTRY. CLO 2. EVALUATE POWER QUALITY PROBLEMS. CLO 3. PROPOSE TECHNIQUES TO MITIGATE POWER QUALITY DISTURBANCES BY CONSIDERING ETHICAL ISSUES
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Kursus ini memperkenalkan pelbagai jenis isu kualiti kuasa yang berlaku di industri. Sejarah kualiti kuasa, punca-punca dan kesan kepada pengguna elektrik dan pembekal kuasa dibentangkan. Teori di sebalik kejadian kualiti kuasa diberi secara mendalam. Dalam kursus ini, penekanan adalah diberi kepada voltan lendut dan harmonik, yang mana kerap dihadapi oleh pengguna elektrik. Piawaian dan penyelesaian yang sesuai untuk menghadapi masalah kualiti kuasa akan dibentangkan. Beberapa contoh masalah kualiti kuasa di industri akan diberi sebagai kajian kes.	This course introduces different type of power quality issues that occurs in industry. The history of power quality, its causes and impact to electrical consumers and power provider are presented. Theory behind power quality occurrence is given in details. In this course, emphasis is given to voltage sags and harmonic, which frequent face by electrical consumers. Standard and suitable solutions to mitigate power quality will be presented. Few examples of power quality problems in industry will also give as a study case.
Pemberatan Penilaian* (%) *Assessment Weightage**	Continuous Assessment : 50 Examination : 50	Continuous Assessment : 50 Examination : 50
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	Maklumbalas secara dalam talian.	Online feedback.
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-Kaedah Peraturan-Peraturan Universiti Malaya (Ijazah Sarjana) (Versi Terkini)	Universiti Malaya (Master Degree) Rules and Regulations (Latest Version)

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Jabatan *Department*	KEJURUTERAAN ELEKTRIK	ELECTRICAL ENGINEERING
Nama Program Akademik *Name of Academic Programme*	SARJANA KEJURUTERAAN SISTEM SARJANA KEJURUTERAAN SISTEM	MASTER OF SYSTEMS ENGINEERING MASTER OF SYSTEMS ENGINEERING
Kod Kursus* *Course Code**	KQC7023	KQC7023
Tajuk Kursus* *Course Title**	PEMPROSESAN ISYARAT DIGIT	DIGITAL SIGNAL PROCESSING
Kredit* *Credit**	3	3
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	120	120
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*		

	Versi Bahasa Malaysia *Malay Version*	Versi Bahasa Inggeris *English Version*
Hasil Pembelajaran Kursus* *Course Learning Outcomes**	CLO 1. MENGANALISA ISYARAT DALAM SISTEM KOMUNIKASI MENGGUNAKAN TEKNIK PEMPROSESAN ISYARAT DIGIT. CLO 2. MENILAI ISYARAT KOMUNIKASI UNTUK MEMENUHI KEPERLUAN TERTENTU. CLO 3. MENERANGKAN PENDEKATAN PENYELESAIAN MASALAH UNTUK MEMBUAT KEPUTUSAN MENGGUNAKAN METODOLOGI KEJURUTERAAN YANG BAIK.	CLO 1. ANALYSE SIGNALS IN COMMUNICATION SYSTEMS USING DIGITAL SIGNAL PROCESSING TECHNIQUE. CLO 2. ASSESS THE COMMUNICATION SIGNALS TO MEET A PARTICULAR REQUIREMENT. CLO 3. EXPLAIN THE PROBLEM SOLVING APPROACHES TO MAKE DECISIONS USING SOUND ENGINEERING METHODOLOGIES.
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Kursus ini membentangkan pengenalan luas kepada reka bentuk sistem pemprosesan isyarat digital dan asas kukuh dalam teori dan teknik yang boleh digunakan dalam pelbagai aplikasi kejuruteraan. Topik-topik yang diliputi adalah analog untuk proses penukaran digital, penapis digital, jelmaan Laplace, jelmaan-Z, perkakasan dan perisian untuk pemproses isyarat digital, dan aplikasi pemprosesan isyarat digital untuk memproses imej dan isyarat audio.	This course presents a broad-based introduction to digital signal processing system design and a solid grounding in theory and techniques which can be applied in various engineering applications. Topics covered are analogue to digital conversion process, digital filters, Laplace transform, Z-transform, hardware and software for digital signal processors, and applications of digital signal processing to process image and audio signal.
Pemberatan Penilaian* (%) *Assessment Weightage**	Continuous Assessment : 50 Examination : 50	Continuous Assessment : 50 Examination : 50
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	Maklumbalas secara dalam talian.	Online feedback.
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-Kaedah Peraturan-Peraturan Universiti Malaya (Ijazah Sarjana) (Versi Terkini)	Universiti Malaya (Master Degree) Rules and Regulations (Latest Version)

UNIVERSITI MALAYA	**PRO FORMA KURSUS** **COURSE PRO FORMA**

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Jabatan *Department*	KEJURUTERAAN ELEKTRIK	ELECTRICAL ENGINEERING
Nama Program Akademik *Name of Academic Programme*	SARJANA KEJURUTERAAN SISTEM SARJANA KEJURUTERAAN SISTEM	MASTER OF SYSTEMS ENGINEERING MASTER OF SYSTEMS ENGINEERING
Kod Kursus* *Course Code**	KQC7024	KQC7024
Tajuk Kursus* *Course Title**	RANGKAIAN KOMUNIKASI	COMMUNICATION NETWORKS
Kredit* *Credit**	3	3
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	120	120
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*		

	Versi Bahasa Malaysia *Malay Version*	Versi Bahasa Inggeris *English Version*
Hasil Pembelajaran Kursus* *Course Learning Outcomes**	CLO 1. MENILAI PELBAGAI JENIS RANGKAIAN KOMUNIKASI DAN ISU-ISU PELAKSANAANNYA. CLO 2. MEMBANDINGKAN CIRI-CIRI PROTOKOL PENGHALAAN BERKENAAN DENGAN TEKNOLOGI RANGKAIAN KOMUNIKASI MASA KINI. CLO 3. MENCADANGKAN BAGAIMANA SESUATU APLIKASI PENGGUNA TERTENTU HARUS MENGGUNAKAN RANGKAIAN MAJU KELAJUAN TINGGI.	CLO 1. EVALUATE VARIOUS TYPES OF COMMUNICATION NETWORKS AND THEIR IMPLEMENTATION ISSUES. CLO 2. COMPARE THE CHARACTERISTICS OF ROUTING PROTOCOLS WITH RESPECT TO THE CURRENT COMMUNICATION TECHNOLOGIES. CLO 3. PROPOSE HOW A SPECIFIC USER APPLICATION SHOULD USE ADVANCED HIGH SPEED NETWORKS.
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Kursus ini direkabentuk untuk menyediakan pelajaran mendalam dalam bidang rangkaian komunikasi dan teknologi berkaitan. Ia meliputi evolusi dalam teknologi rangkaian daripada rangkaian pensuisan-litar kepada rangkaian pensuisan-paket, dan bagaimana rangkaian ini menyokong berbagai jenis aplikasi seperti VPN dan MPLS. Selain itu, keselamatan rangkaian turut diperkenalkan.	This course is designed to provide an in-depth study on communication networks and their supporting technologies. It covers the evolution of networking technologies from circuit switching to packet-switching networks, and how these networks are used in supporting various types of applications, such as VPN and MPLS. Besides, network security is also introduced.
Pemberatan Penilaian* (%) *Assessment Weightage**	Continuous Assessment : 50 Examination : 50	Continuous Assessment : 50 Examination : 50
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	Maklumbalas secara dalam talian melalui Spectrum.	Online feedback via Spectrum.
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-Kaedah Peraturan-Peraturan Universiti Malaya (Ijazah Sarjana) (Versi Terkini)	Universiti Malaya (Master Degree) Rules and Regulations (Latest Version)

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Jabatan *Department*	KEJURUTERAAN ELEKTRIK	ELECTRICAL ENGINEERING
Nama Program Akademik *Name of Academic Programme*	SARJANA KEJURUTERAAN SISTEM SARJANA KEJURUTERAAN SISTEM	MASTER OF SYSTEMS ENGINEERING MASTER OF SYSTEMS ENGINEERING
Kod Kursus* *Course Code**	KQC7025	KQC7025
Tajuk Kursus* *Course Title**	SISTEM KOMUNIKASI TANPA WAYAR	WIRELESS COMMUNICATION SYSTEMS
Kredit* *Credit**	3	3
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	120	120
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*		

	Versi Bahasa Malaysia *Malay Version*	Versi Bahasa Inggeris *English Version*
Hasil Pembelajaran Kursus* *Course Learning Outcomes**	CLO 1. MEMBANDINGKAN PELBAGAI TEKNOLOGI KOMUNIKASI TANPA WAYAR. CLO 2. MENERANGKAN OPERASI RANGKAIAN TANPA WAYAR BERGERAK DAN APLIKASINYA. CLO 3. MENILAI PRESTASI SISTEM KOMUNIKASI TANPA WAYAR.	CLO 1. COMPARE VARIOUS WIRELESS COMMUNICATION TECHNOLOGIES. CLO 2. EXPLAIN THE OPERATION OF WIRELESS MOBILE NETWORKS AND ITS APPLICATIONS. CLO 3. EVALUATE THE PERFORMANCE OF WIRELESS COMMUNICATION SYSTEMS.
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Kursus ini memberikan teknologi komunikasi tanpa wayar. Kursus ini juga mempamerkan konsep tanpa wayar setempat dan kawasan rangkaian persendirian. Selain itu, rangkaian tanpa wayar bergerak dan aplikasinya juga diterangkan.	This course provides wireless communication technology. This course also presents the concept of wireless local and personal area networks. Besides that, wireless mobile networks and applications is also presented.
Pemberatan Penilaian* (%) *Assessment Weightage**	Continuous Assessment : 50 Examination : 50	Continuous Assessment : 50 Examination : 50
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	Maklumbalas secara dalam talian.	Online feedback.
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-Kaedah Peraturan-Peraturan Universiti Malaya (Ijazah Sarjana) (Versi Terkini)	Universiti Malaya (Master Degree) Rules and Regulations (Latest Version)

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Jabatan *Department*	KEJURUTERAAN ELEKTRIK	ELECTRICAL ENGINEERING
Nama Program Akademik *Name of Academic Programme*	SARJANA KEJURUTERAAN SISTEM SARJANA KEJURUTERAAN SISTEM	MASTER OF SYSTEMS ENGINEERING MASTER OF SYSTEMS ENGINEERING
Kod Kursus* *Course Code**	KQC7027	KQC7027
Tajuk Kursus* *Course Title**	PERANTI OPTIK	OPTICAL DEVICES
Kredit* *Credit**	3	3
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	120	120
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*		

	Versi Bahasa Malaysia *Malay Version*	Versi Bahasa Inggeris *English Version*
Hasil Pembelajaran Kursus* *Course Learning Outcomes**	CLO 1. MENENTUKAN HAD YANG DITETAPKAN OLEH GENTIAN OPTIK DAN PRINSIP KERJA PENGUAT AND PERANTI OPTIK YANG LAIN SERTA HAD MASING-MASING. CLO 2. MENENTU UKUR SATU SISTEM KOMUNIKASI OPTIK BERDASARKAN KEPADA ANGGARAN KUASA, ANGGARAN PENCAPAHAN, DAN PRESTASI BER. CLO 3. MEREKABENTUK SATU SISTEM WDM DAN MENGANALISA PRESTASINYA DISEBABKAN KESAN PENCAPAHAN DAN TIDAK LINEAR DENGAN MENGAMBIL KIRA FAKTOR EKONOMI.	CLO 1. DETERMINE THE LIMITS IMPOSED BY OPTICAL FIBERS AND THE WORKING PRINCIPLE OF OPTICAL AMPLIFIERS AND OTHER OPTICAL DEVICES AND THEIR LIMITATIONS. CLO 2. VALIDATE AN OPTICAL COMMUNICATION SYSTEM BASED ON POWER BUDGET, DISPERSION BUDGET AND BER PERFORMANCE. CLO 3. DESIGN A WDM SYSTEM AND ANALYZE ITS PERFORMANCE DUE TO DISPERSION AND NONLINEAR EFFECTS BY CONSIDERING THE ECONOMICAL FACTOR.
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Kursus ini memperkenalkan asas gentian optik, pengenalan kepada komunikasi optik, pelemahan dalam sistem gentian optik, penguat optik, sumber ketidaksamaan, kesan tidak linear, senibina jaringan optik, peranti optik pasif dan aktif.	This course presents the fundamental of fiber optic, introduction to optical communication, attenuation in optical fiber systems, optical amplifiers, sources of impairments, nonlinear effects, dispersion management, optical network, passive and active optical devices.
Pemberatan Penilaian* (%) *Assessment Weightage**	Continuous Assessment : 50 Examination : 50	Continuous Assessment : 50 Examination : 50
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	Maklumbalas secara dalam talian	Online feedback
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-Kaedah Peraturan-Peraturan Universiti Malaya (Ijazah Sarjana) (Versi Terkini)	Universiti Malaya (Master Degree) Rules and Regulations (Latest Version)

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Akademi/Fakulti/Institut/Pusat *Academy/Faculty/Institute/Centre*	FAKULTI KEJURUTERAAN	FACULTY OF ENGINEERING
Jabatan *Department*	KEJURUTERAAN ELEKTRIK	ELECTRICAL ENGINEERING
Nama Program Akademik *Name of Academic Programme*	SARJANA KEJURUTERAAN SISTEM SARJANA KEJURUTERAAN SISTEM	MASTER OF SYSTEMS ENGINEERING MASTER OF SYSTEMS ENGINEERING
Kod Kursus* *Course Code**	KQC7028	KQC7028
Tajuk Kursus* *Course Title**	REKABENTUK MEMS	MEMS DESIGN
Kredit* *Credit**	3	3
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	120	120
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*		

	Versi Bahasa Malaysia *Malay Version*	Versi Bahasa Inggeris *English Version*
Hasil Pembelajaran Kursus* *Course Learning Outcomes**	CLO 1. MENGAPLIKASIKAN PRINSIP ASAS DAN HUKUM PENSKALAAN DALAM TEKNOLOGI-TEKNOLOGI BERLAINAN YANG BOLEH DIGUNAKAN DALAM REKABENTUK MEMS. CLO 2. 2. MENYESUAIKAN TEKNOLOGI MEMS UNTUK MIKROPENDERIA DAN PENGGERAK DENGAN PENEKANAN TERHADAP PENGGUNAAN BAHAN DAN STRUKTUR PINTAR. CLO 3. MENILAI PELUANG KOMERSIAL UNTUK STATUS SEMASA TEKNOLOGI MEMS (DENGAN CONTOH KAJIAN KES YANG SPESIFIK) DAN MENYEDIAKAN APLIKASI BERPOTENSI UNTUK MASA DEPAN.	CLO 1. APPLY BASIC PRINCIPLES AND SCALING LAWS UNDERLYING DIFFERENT TECHNOLOGIES APPLIED IN MEMS DESIGN. CLO 2. ADAPT MEMS TECHNOLOGY FOR MICROSENSORS AND ACTUATORS WITH AN EMPHASIS ON USAGE OF SMART MATERIALS AND STRUCTURES. CLO 3. EVALUATE COMMERCIAL OPPORTUNITIES FOR THE CURRENT STATUS OF MEMS TECHNOLOGY (WITH SPECIFIC EXAMPLES OR CASE STUDIES) AND PROVIDE POTENTIAL FUTURISTIC APPLICATIONS.
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	MEMS adalah peranti kecil bersaiz mikro yang berkebolehan untuk menjalankan banyak tugas dan fungsi berhubung dengan isyarat elektrik, mekanik, haba, optik, bendalir dan jenis-jenis isyarat yang lain. Kursus ini akan menyediakan asas daripada disiplin-disiplin yang berkaitan dengan pemahaman dan aplikasi teknologi MEMS (Micro-Electro-Mechanical Systems). Topik rekabentuk akan merangkumi prinsip mekanik, frekuensi radio dan prinsip mikrobendalir. Kaedah fabrikasi akan merangkumi teknik mikropemesinan pukal dan permukaan yang kebanyakannya bergantung kepada pemprosesan VLSI. Kursus ini juga akan memperkenalkan proses integrasi di antara platform peranti sedia ada dan sifat bahan berkaitan dengan rekabentuk dan fabrikasi MEMS.	MEMS are miniature devices in micron dimensions that are capable of performing many tasks and functions that involve electrical, mechanical, thermal, optical, fluidic, and other types of signals. This course will provide the fundamentals from many disciplines relevant to the understanding and application of Micro-Electro-Mechanical Systems (MEMS) technology. Design topics will include mechanical, RF and microfluidic principles. Fabrication methods will cover bulk and surface micromachining techniques that rely heavily on VLSI processing. Process integration with existing device platforms and materials properties related to MEMS design and fabrication will be discussed.
Pemberatan Penilaian* (%) *Assessment Weightage**	Continuous Assessment : 50 Examination : 50	Continuous Assessment : 50 Examination : 50
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	Maklumbalas secara dalam talian	Online feedback
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-Kaedah Peraturan-Peraturan Universiti Malaya (Ijazah Sarjana) (Versi Terkini)	Universiti Malaya (Master Degree) Rules and Regulations (Latest Version)

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Jabatan *Department*	KEJURUTERAAN ELEKTRIK	ELECTRICAL ENGINEERING
Nama Program Akademik *Name of Academic Programme*	SARJANA KEJURUTERAAN SISTEM SARJANA KEJURUTERAAN SISTEM	MASTER OF SYSTEMS ENGINEERING MASTER OF SYSTEMS ENGINEERING
Kod Kursus* *Course Code**	KQC7029	KQC7029
Tajuk Kursus* *Course Title**	SISTEM TERBENAM	EMBEDDED SYSTEMS
Kredit* *Credit**	3	3
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	120	120
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*		

	Versi Bahasa Malaysia *Malay Version*	Versi Bahasa Inggeris *English Version*
Hasil Pembelajaran Kursus* *Course Learning Outcomes**	CLO 1. MEREKABENTUK KOMPONEN PERKAKASAN SEPERTI MIKROPEMPROSES, BAS DAN PENGANTARAMUKAAN PERSISIAN UNTUK SISTEM TERBENAM. CLO 2. MEMBANGUN KOMPONEN PERISIAN PERINGKAT RENDAH SISTEM TERBENAM. CLO 3. MEMBINA PROJEK REKA BENTUK SISTEM TERBENAM SKALA KECIL.	CLO 1. DESIGN HARDWARE COMPONENTS SUCH AS MICROPROCESSOR, BUS AND PERIPHERAL INTERFACING OF AN EMBEDDED SYSTEM. CLO 2. COMPOSE THE LOW-LEVEL SOFTWARE COMPONENTS OF AN EMBEDDED SYSTEM. CLO 3. CONSTRUCT SMALL EMBEDDED SYSTEM DESIGN PROJECT.
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Kursus ini menyediakan pengenalan praktikal untuk reka bentuk sistem elektronik berasaskan mikropemproses. Kuliah dan kerja projek akan mendedahkan pelajar kepada pelbagai peringkat dalam projek kejuruteraan (reka bentuk, pelaksanaan, pengujian dan dokumentasi) dan pelbagai konsep sistem terbenam.	This course provides a practical introduction to the design of microprocessor-based electronic systems. The lectures and project work will expose students to the various stages in an engineering project (design, implementation, testing and documentation) and a range of embedded system concepts.
Pemberatan Penilaian* (%) *Assessment Weightage**	Continuous Assessment : 50 Examination : 50	Continuous Assessment : 50 Examination : 50
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	Gred/markah untuk tugasan, ujian dan/atau pembentangan individu diumumkan dalam kelas dan/atau dipamerkan di papan kenyataan.	Grades/marks for assignment, test and/or individual presentation announced in class and/or displayed on the notice board.
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-Kaedah Peraturan-Peraturan Universiti Malaya (Ijazah Sarjana) (Versi Terkini)	Universiti Malaya (Master Degree) Rules and Regulations (Latest Version)

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Jabatan *Department*	KEJURUTERAAN ELEKTRIK	ELECTRICAL ENGINEERING
Nama Program Akademik *Name of Academic Programme*	SARJANA KEJURUTERAAN SISTEM SARJANA KEJURUTERAAN SISTEM	MASTER OF SYSTEMS ENGINEERING MASTER OF SYSTEMS ENGINEERING
Kod Kursus* *Course Code**	KQC7030	KQC7030
Tajuk Kursus* *Course Title**	REKABENTUK IC	IC DESIGN
Kredit* *Credit**	3	3
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	120	120
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*		

	Versi Bahasa Malaysia *Malay Version*	Versi Bahasa Inggeris *English Version*
Hasil Pembelajaran Kursus* *Course Learning Outcomes**	CLO 1. MENGANALISA KONSEP TEORI LITAR VLSI CMOS ANALOG. CLO 2. MENGINTEGRASIKAN LITAR CMOS ANALOG ASAS. CLO 3. MENILAI PRESTASI LITAR TERKAMIL ANALOG CMOS DENGAN MENGADAPTASIKAN PERISIAN KOMPUTER CANGGIH.	CLO 1. ANALYZE THE THEORETICAL CONCEPTS OF ANALOG CMOS VLSI CIRCUITS. CLO 2. INTEGRATE BASIC ANALOG CMOS VLSI CIRCUITS. CLO 3. EVALUATE THE PERFORMANCE OF INTEGRATED CMOS ANALOG CIRCUITS ADAPTING STANDARDIZED STATE OF THE ART TOOLS
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Kursus ini berperanan dalam memperkenalkan konsep pemodelan, merekabentuk dan analisis litar CMOS VLSI analog. Pelajar dilengkapkan dengan teori latarbelakang litar terkamil analog yang kukuh dengan penekanan kepada rekabentuk dan analisis. Rekabentuk CMOS berasaskan cermin arus, penguat pembezaan bersepadu, kepersisan rujukan voltan/arus dan litar analog tak lelurus akan dibincangkan dengan mempertimbangkan parameter praktikal, dan mengadaptasi faedah dan batasannya. Pelajar akan didedahkan dalam pengunaan perisian EDA bertahap industri untuk merekabentuk, mempertingkatkan dan simulasi litar terkamil CMOS analog.	The goal of this course is to introduce the modelling, design and analysis of analog CMOS VLSI circuits. A strong theoretical background of integrated analog circuits design is imparted to the students along with the emphasis on their design and analysis. Design of CMOS based current mirrors, integrated differential amplifiers, precision voltage/current reference and nonlinear analog circuits are discussed considering practical parameters, adapting their advantages and limitations. Students will be exposed to use industry standard EDA tools to design, optimize and simulate analog CMOS integrated circuits.
Pemberatan Penilaian* (%) *Assessment Weightage**	Continuous Assessment : 50 Examination : 50	Continuous Assessment : 50 Examination : 50
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	Gred/markah untuk tugasan, ujian dan/atau pembentangan individu diumumkan dalam kelas dan/atau dipamerkan di papan kenyataan.	Grades/marks for assignment, test and/or individual presentation announced in class and/or displayed on the notice board.
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-Kaedah Peraturan-Peraturan Universiti Malaya (Ijazah Sarjana) (Versi Terkini)	Universiti Malaya (Master Degree) Rules and Regulations (Latest Version)

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Jabatan *Department*	KEJURUTERAAN ELEKTRIK	ELECTRICAL ENGINEERING
Nama Program Akademik *Name of Academic Programme*	SARJANA KEJURUTERAAN SISTEM SARJANA KEJURUTERAAN SISTEM	MASTER OF SYSTEMS ENGINEERING MASTER OF SYSTEMS ENGINEERING
Kod Kursus* *Course Code**	KQC7031	KQC7031
Tajuk Kursus* *Course Title**	AUTOMASI INDUSTRI DAN ROBOTIK	INDUSTRIAL AUTOMATION AND ROBOTICS
Kredit* *Credit**	3	3
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	120	120
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*		

	Versi Bahasa Malaysia *Malay Version*	Versi Bahasa Inggeris *English Version*
Hasil Pembelajaran Kursus* *Course Learning Outcomes**	CLO 1. MEMAHAMI PRINSIP FUNGSI PENDERIA DAN PENGGERAK PERINDUSTRIAN YANG BIASA. CLO 2. MEREKABENTUK ATURCARA PLC YANG DAPAT MENAFSIRKAN MAKLUMAT DARIPADA PENDERIA DAN MENUKARKANNYA KE DALAM PENGGERAKKAN YANG SEPADAN. CLO 3. MENGANALISA MASALAH ROBOTIK YANG DIBERIKAN DAN MEMILIH PENDERIA/PENGGERAK YANG SESUAI UNTUKNYA BAGI KEGUNAAN KOMERSIAL.	CLO 1. UNDERSTAND THE FUNCTIONING PRINCIPLES OF THE COMMON INDUSTRIAL SENSORS AND ACTUATORS. CLO 2. DESIGN PLC PROGRAMS THAT ABLE TO INTERPRET THE INFORMATION FROM SENSORS AND CONVERT IT INTO THE CORRESPONDING ACTUATION. CLO 3. ANALYSE A GIVEN ROBOTIC PROBLEM AND SELECT APPROPRIATE SENSORS/ACTUATORS NEEDED FOR IT FOR COMMERCIAL USE.
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Kursus ini merangkumi pelbagai topik penting dalam bidang automasi industri dan robotik termasuk penderia dan penggerak, Pengawal Logik Boleh-atur (PLC) dan prinsip robotik dan seni bina kawalannya.	This course covers a wide range of important topics in industrial automation and robotics including sensors and actuators, Programmable Logic Controller (PLC) and principles of robotics and its control architecture.
Pemberatan Penilaian* (%) *Assessment Weightage**	Continuous Assessment : 50 Examination : 50	Continuous Assessment : 50 Examination : 50
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	Maklumbalas secara atas talian dan komen secara lisan semasa kuliah.	Online feedback and oral comments during lectures.
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-Kaedah Peraturan-Peraturan Universiti Malaya (Ijazah Sarjana) (Versi Terkini)	Universiti Malaya (Master Degree) Rules and Regulations (Latest Version)

UNIVERSITI MALAYA	**PRO FORMA KURSUS** **COURSE PRO FORMA**

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Jabatan *Department*	KEJURUTERAAN ELEKTRIK	ELECTRICAL ENGINEERING
Nama Program Akademik *Name of Academic Programme*	SARJANA KEJURUTERAAN SISTEM SARJANA KEJURUTERAAN SISTEM	MASTER OF SYSTEMS ENGINEERING MASTER OF SYSTEMS ENGINEERING
Kod Kursus* *Course Code**	KQC7033	KQC7033
Tajuk Kursus* *Course Title**	SISTEM KAWALAN MASA-DISKRET	DISCRETE-TIME CONTROL SYSTEMS
Kredit* *Credit**	3	3
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	120	120
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*		

	Versi Bahasa Malaysia *Malay Version*	Versi Bahasa Inggeris *English Version*
Hasil Pembelajaran Kursus* *Course Learning Outcomes**	CLO 1. MEMBINA PERWAKILAN SISTEM MASA-DISKRET MENGGUNAKAN PERSAMAAN PERBEZAAN, RANGKAP PINDAH DAN MODEL RUANG KEADAAN. CLO 2. MENGANALISA PRESTASI DAN KESTABILAN BAGI SISTEM MASA-DISKRET. CLO 3. MEREKABENTUK PENGAWAL DIGIT YANG BOLEH MEMENUHI SPESIFIKASI YANG DITETAPKAN.	CLO 1. CONSTRUCT DISCRETE-TIME SYSTEMS REPRESENTATION USING DIFFERENCE EQUATIONS, TRANSFER FUNCTION AND STATE SPACE MODELS. CLO 2. ANALYZE DISCRETE-TIME SYSTEM PERFORMANCE AND STABILITY. CLO 3. DESIGN DIGITAL CONTROLLERS THAT ABLE TO MEET THE DEFINED SPECIFICATIONS.
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Kursus ini berkaitan dengan teori dan reka bentuk sistem kawalan masa-diskret. Topik utama termasuk jelmaan-Z, pensampelan dan pembinaan semula data, analisa prestasi dan kestabilan sistem masa-diskret dan reka bentuk pengawal digital menggunakan teknik berasaskan sambutan frekuensi dan berasaskan ruang-keadaan.	This course deals with the theory and the design of discrete-time control systems. Major topics include Z-transform, sampling and data reconstruction, performance and stability analysis of discrete-time systems and design of digital controller using frequency response based and state-space based techniques.
Pemberatan Penilaian* (%) *Assessment Weightage**	Continuous Assessment : 50 Examination : 50	Continuous Assessment : 50 Examination : 50
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	Maklumbalas secara atas talian dan komen secara lisan semasa kuliah.	Online feedback and oral comments during lectures.
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-Kaedah Peraturan-Peraturan Universiti Malaya (Ijazah Sarjana) (Versi Terkini)	Universiti Malaya (Master Degree) Rules and Regulations (Latest Version)

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Jabatan *Department*	KEJURUTERAAN ELEKTRIK	ELECTRICAL ENGINEERING
Nama Program Akademik *Name of Academic Programme*	SARJANA KEJURUTERAAN SISTEM SARJANA KEJURUTERAAN SISTEM	MASTER OF SYSTEMS ENGINEERING MASTER OF SYSTEMS ENGINEERING
Kod Kursus* *Course Code**	KQC7034	KQC7034
Tajuk Kursus* *Course Title**	KESERASIAN DAN GANGGUAN ELEKTROMAGNET	ELECTROMAGNETIC COMPATIBILITY AND INTERFERENCE
Kredit* *Credit**	3	3
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	120	120
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*		

	Versi Bahasa Malaysia *Malay Version*	Versi Bahasa Inggeris *English Version*
Hasil Pembelajaran Kursus* *Course Learning Outcomes**	CLO 1. MENJALANKAN PENGUKURAN PANCARAN DAN UJIAN KELALIAN. CLO 2. MENILAI MEKANISMA GANDINGAN GANGGUAN, KONFIGURASI PERALATAN DAN PEMBUMIAN. CLO 3. MEREKABENTUK LITAR ANALOG DAN DIGITAL UNTUK KAWALAN PANCARAN DENGAN MENGAMBIL KIRA IMPAK KEPADA MANUSIA DAN PERSEKITARAN.	CLO 1. PERFORM EMISSION MEASUREMENTS AND IMMUNITY TESTS. CLO 2. EVALUATE INTERFERENCE COUPLING MECHANISMS, EQUIPMENT LAYOUT AND GROUNDING. CLO 3. DESIGN ANALOGUE AND DIGITAL CIRCUIT FOR EMISSION CONTROL BY CONSIDERING THE IMPACT TO HUMAN AND ENVIRONMENT.
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Kursus ini bermula dengan pengenalan kepada subjek inteferens dan provisi untuk direktif EMC serta kaedah dalam mencapai pematuhan. Pelbagai piawaian yang berkaitan akan dibincangkan. Ia termasuk pengenalan kepada peralatan, kaedah ujian dan beberapa punca kesalahan dan ketidakpastian dalam pengujian EMC. Ini termasuk perbincangan berkenaan teknik-teknik untuk mencapai prestasi EMC boleh terima pada tahap rekabentuk. Ia juga meliputi prinsip asas penilaian mekanisma gandingan interferen, pemilihan konfigurasi litar, ciri komponen dan perisian. Pengurusan EMC dan prinsip-prinsip kawalan juga dibincangkan.	This course starts with the introduction on subject of interference and the provision of the EMC directive and the means of achieving compliance. Various standards which are relevant are discussed. It includes introduction to the equipment, the test methods and some of the causes of error and uncertainty that attend EMC testing. Discussions on techniques for achieving an acceptable EMC performance at the design stage are included. It also covers basic principles involve in coupling electromagnetic interference, as well as choice of circuit configuration, components and software feature. EMC management and control principles are also discussed.
Pemberatan Penilaian* (%) *Assessment Weightage**	Continuous Assessment : 50 Examination : 50	Continuous Assessment : 50 Examination : 50
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	Perbincangan dalam kelas Gred akhir akan dimaklumkan kepada pelajar	Discussion in class Final grades will be given to students
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-Kaedah Peraturan-Peraturan Universiti Malaya (Ijazah Sarjana) (Versi Terkini)	Universiti Malaya (Master Degree) Rules and Regulations (Latest Version)

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Jabatan *Department*	KEJURUTERAAN ELEKTRIK	ELECTRICAL ENGINEERING
Nama Program Akademik *Name of Academic Programme*	SARJANA KEJURUTERAAN SISTEM	MASTER OF SYSTEMS ENGINEERING
Kod Kursus* *Course Code**	KQC7035	KQC7035
Tajuk Kursus* *Course Title**	PROJEK PENYELIDIKAN	RESEARCH PROJECT
Kredit* *Credit**	12	12
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	480	480
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*		

	Versi Bahasa Malaysia *Malay Version*	Versi Bahasa Inggeris *English Version*
Hasil Pembelajaran Kursus* *Course Learning Outcomes**	CLO 1. MEMBINA KAJIAN LITERATUR DAN KAJIAN TEORI YANG DIPERLUKAN UNTUK PENYELIDIKAN. CLO 2. MENGANALISA HASIL KAJIAN BERKENAAN DENGAN KESANNYA TERHADAP SOSIAL DAN ALAM SEKITAR. CLO 3. MEREKABENTUK SATU KAEDAH UNTUK MEMBUAT KAJIAN EKSPERIMEN ATAU TEORI CLO 4. MENYIASAT MASALAH PENYELIDIKAN MELALUI KAEDAH YANG DITETAPKAN. CLO 5. MEMBENTANGKAN PROJEK PENYELIDIKAN KEPADA KHALAYAK DARI PELBAGAI LATAR BELAKANG. CLO 6. MENGANALISA DATA DAN DAPATAN KAJIAN DENGAN ALAT ANALISA EKSPERIMEN DAN PERISIAN YANG SESUAI. CLO 7. MENGANALISA DATA NUMERIK DAN GRAFIK MENGGUNAKAN ALAT KUANTITATIF ATAU KUALITATIF YANG SESUAI UNTUK PEMBELAJARAN DAN TUGASAN PROJEK. CLO 8. MEWAJARKAN KEPUTUSAN DAN TAFSIRAN PENYELIDIKAN DENGAN SUMBER ILMIAH TERKINI, MENUNJUKKAN FLEKSIBILITI TERHADAP PERSPEKTIF BARU. CLO 9. MENGANALISA KESAN EKONOMI DARI HASIL PENYELIDIKAN.	CLO 1. CONSTRUCT LITERATURE REVIEW AND THEORETICAL STUDY REQUIRED FOR THE RESEARCH. CLO 2. ANALYSE THE OUTCOMES OF THE RESEARCH WITH RESPECT TO ITS IMPACTS ON SOCIAL AND ENVIRONMENT. CLO 3. DESIGN A METHODOLOGY TO CARRY OUT EXPERIMENTAL OR THEORETICAL RESEARCH CLO 4. INVESTIGATE THE RESEARCH PROBLEM THROUGH A DEFINED METHODOLOGY. CLO 5. PRESENT THE RESEARCH PROJECT TO AUDIENCE OF VARIOUS BACKGROUND. CLO 6. ANALYSE THE DATA AND FINDINGS OF THE RESEARCH USING THE APPROPRIATE EXPERIMENTAL AND SOFTWARE ANALYSIS TOOLS. CLO 7. ANALYSE NUMERICAL AND GRAPHICAL DATA USING APPROPRIATE QUANTITATIVE OR QUALITATIVE TOOLS FOR LEARNING AND PROJECT-BASED TASKS. CLO 8. JUSTIFY RESEARCH DECISIONS AND INTERPRETATIONS WITH UP-TO-DATE SCHOLARLY SOURCES, SHOWING FLEXIBILITY TOWARD EMERGING PERSPECTIVES. CLO 9. ANALYSE THE ECONOMIC IMPACTS OF THE RESEARCH OUTCOMES.
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Projek penyelidikan akan mendedahkan pelajar dalam membuat ulangkaji risalah berkaitan dengan topik kajian spesifik, merancang kaedah kajian, mengumpul data eksperimen dan menghuraikan data, menulis laporan dan membuat pembentangan.	Research project will expose students to carry out literature review on a specific research topic, plan a research methodology, collect experimental data and Interpret data, write a dissertation and carry out a presentation
Pemberatan Penilaian* (%) *Assessment Weightage**	Continuous Assessment : 100 Examination : 0	Continuous Assessment : 100 Examination : 0
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	Maklumbalas dalam talian	Online feedback
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-Kaedah Peraturan-Peraturan Universiti Malaya (Ijazah Sarjana) (Versi Terkini)	Universiti Malaya (Master Degree) Rules and Regulations (Latest Version)

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Jabatan *Department*	KEJURUTERAAN ELEKTRIK	ELECTRICAL ENGINEERING
Nama Program Akademik *Name of Academic Programme*	SARJANA KEJURUTERAAN SISTEM	MASTER OF SYSTEMS ENGINEERING
Kod Kursus* *Course Code**	KQC7036	KQC7036
Tajuk Kursus* *Course Title**	INTERAKSI MANUSIA-KOMPUTER	HUMAN-COMPUTER INTERACTION
Kredit* *Credit**	3	3
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	120	120
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*		

	Versi Bahasa Malaysia *Malay Version*	Versi Bahasa Inggeris *English Version*
Hasil Pembelajaran Kursus* *Course Learning Outcomes**	CLO 1. MENGGUNAKAN PRINSIP KEBOLEHGUNAAN, KONSEP DAN TEORI UNTUK MEMBANGUNKAN INTERAKSI MANUSIA-KOMPUTER YANG BERKESAN. CLO 2. MEREKABENTUK SISTEM INTERAKSI MANUSIA-KOMPUTER(HCI) UNTUK PELBAGAI APLIKASI DENGAN PERSEKITARAN KOLABORATIF. CLO 3. MENILAI IMPLIKASI ETIKA, SOSIAL DAN UNDANG-UNDANG HCI.	CLO 1. APPLY USABILITY PRINCIPLES, CONCEPTS AND THEORIES TO DEVELOP EFFECTIVE HUMAN-COMPUTER INTERACTION(HCI). CLO 2. DESIGN HUMAN-COMPUTER INTERACTION(HCI) SYSTEMS FOR VARIOUS APPLICATIONS WITH COLLABORATIVE ENVIRONMENTS. CLO 3. EVALUATE THE ETHICAL, SOCIAL AND LEGAL IMPLICATION OF HCI.
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Kursus ini meneroka prinsip asas, teori dan aplikasi Interaksi Manusia-Komputer(HCI), berdasarkan buku “Interaksi Manusia-Komputer” oleh Alan Dix, Janet Finlay, Gregory Abowd, dan Russell Beale. Kursus ini memberi tumpuan kepada rekabentuk berpusatkan pengguna, model interaksi dan teknik penilaian kebolehgunaan untuk mencipta sistem digital yang intuitif, cekap dan boleh diakses. Topik utama termasuk prinsip kebolehgunaan penilaian heuristik, paradigma interaksi(GUI, suara, sentuhan, antara muka berbilang mod), dan teknologi baru AI dan meningkatkan usaha pengalaman pengguna. Implikasi etika, sosial dan undang-undang HCI juga diterokai untuk pertimbangan lanjut.	This course explores the fundamental principles, theories, and applications of Human-Computer Interaction (HCI), based on the book "Human-Computer Interaction" by Alan Dix, Janet Finlay, Gregory Abowd, and Russell Beale. The course focuses on user-centered design, interaction models, and usability evaluation techniques to create intuitive, efficient, and accessible digital systems. Key topics include usability principles, heuristic evaluation, interaction paradigms (GUI, voice, touch, multimodal interfaces), and emerging technologies AI and enhancing user experience efforts. Ethical, social and legal implication of HCI are also explored for further consideration.
Pemberatan Penilaian* (%) *Assessment Weightage**	Continuous Assessment : 50 Examination : 50	Continuous Assessment : 50 Examination : 50
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	Maklumbalas secara atas talian dan komen secara lisan semasa kuliah.	Online feedback and oral comments during lectures.
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-Kaedah Peraturan-Peraturan Universiti Malaya (Ijazah Sarjana) (Versi Terkini)	Universiti Malaya (Master Degree) Rules and Regulations (Latest Version)

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Jabatan *Department*	KEJURUTERAAN ELEKTRIK	ELECTRICAL ENGINEERING
Nama Program Akademik *Name of Academic Programme*	SARJANA KEJURUTERAAN SISTEM	MASTER OF SYSTEMS ENGINEERING
Kod Kursus* *Course Code**	KQC7037	KQC7037
Tajuk Kursus* *Course Title**	ANALISIS BERANGKA LANJUTAN	ADVANCED NUMERICAL ANALYSIS
Kredit* *Credit**	3	3
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	120	120
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*		

	Versi Bahasa Malaysia *Malay Version*	Versi Bahasa Inggeris *English Version*
Hasil Pembelajaran Kursus* *Course Learning Outcomes**	CLO 1. MENETAPKAN KAEDAH BERANGKA ASAS YANG DIGUNAKAN DALAM PENGIRAAN SAINTIFIK DAN KEJURUTERAAN CLO 2. MENGGUNAKAN TEKNIK BERANGKA UNTUK MENYELESAIKAN MASALAH MATEMATIK, TERMASUK INTERPOLASI, PEMBEZAAN, DAN PENGAMIRAN CLO 3. MENGANALISIS KETEPATAN DAN KESTABILAN ALGORITMA BERANGKA.	CLO 1. ESTABLISH THE FUNDAMENTAL NUMERICAL METHODS USED IN SCIENTIFIC AND ENGINEERING COMPUTATIONS. CLO 2. APPLY NUMERICAL TECHNIQUES TO SOLVE MATHEMATICAL PROBLEMS, INCLUDING INTERPOLATION, DIFFERENTIATION, AND INTEGRATION. CLO 3. ANALYZE THE ACCURACY AND STABILITY OF NUMERICAL ALGORITHMS.
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Kursus ini memperkenalkan kaedah berangka asas dan lanjutan yang digunakan dalam pengkomputeran kejuruteraan dan saintifik. Topik merangkumi pembezaan berangka, pengamiran, teknik pencarian akar, penyelesaian persamaan linear, dan analisis ralat. Pelajar akan melaksanakan kaedah ini menggunakan MATLAB dan Python, serta memperoleh pengalaman praktikal dalam menyelesaikan masalah kejuruteraan.	This course introduces fundamental and advanced numerical methods used in engineering and scientific computing. Topics include numerical differentiation, integration, root-finding techniques, solving linear equations, and error analysis. Students will implement these methods using MATLAB and Python, gaining hands-on experience in solving practical engineering problems.
Pemberatan Penilaian* (%) *Assessment Weightage**	Continuous Assessment : 50 Examination : 50	Continuous Assessment : 50 Examination : 50
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	Maklumbalas secara atas talian dan komen secara lisan semasa kuliah.	Online feedback and oral comments during lectures
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-Kaedah Peraturan-Peraturan Universiti Malaya (Ijazah Sarjana) (Versi Terkini)	Universiti Malaya (Master Degree) Rules and Regulations (Latest Version)

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Jabatan *Department*	KEJURUTERAAN ELEKTRIK	ELECTRICAL ENGINEERING
Nama Program Akademik *Name of Academic Programme*	SARJANA KEJURUTERAAN SISTEM	MASTER OF SYSTEMS ENGINEERING
Kod Kursus* *Course Code**	KQC7038	KQC7038
Tajuk Kursus* *Course Title**	REKABENTUK SISTEM PENJAGAAN KESIHATAN PINTAR	INTELLIGENT HEALTHCARE SYSTEM DESIGN
Kredit* *Credit**	3	3
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	120	120
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*		

	Versi Bahasa Malaysia *Malay Version*	Versi Bahasa Inggeris *English Version*
Hasil Pembelajaran Kursus* *Course Learning Outcomes**	CLO 1. MENGANALISIS PRINSIP DAN TEKNIK AI TERAS YANG BERKAITAN DENGAN KEJURUTERAAN SISTEM PENJAGAAN KESIHATAN CLO 2. MENGAPLIKASIKAN TEKNIK PEMPROSESAN ISYARAT DANIMEJ YANG MELIBATKAN PENDERIA ELEKTRONIK DAN PENUKARAN ANALOG/DIGITAL UNTUK MENGANALISA DATA PENJAGAAN KESIHATAN CLO 3. MENILAI STRATEGI PENGOPTIMUMAN DALAM MODEL PEMBELAJARAN MESIN UNTUK MEREALISASIKAN PERKAKASAN YANG CEKAP	CLO 1. ANALYZE CORE AI PRINCIPLES AND TECHNIQUES RELEVANT TO HEALTHCARE SYSTEMS ENGINEERING. CLO 2. APPLY SIGNAL AND IMAGE PROCESSING TECHNIQUES INVOLVING ELECTRONIC SENSOR AND ANALOG/DIGITAL CONVERSION TO ANALYZE HEALTHCARE DATA CLO 3. EVALUATE OPTIMIZATION STRATEGIES IN MACHINE LEARNING MODELS FOR EFFICIENT HARDWARE REALIZATION
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Kursus ini memperkenalkan prinsip dan aplikasi Kecerdasan Buatan (AI) dalam reka bentuk sistem penjagaan kesihatan, dengan menekankan konsep-keputusan kejuruteraan sistem seperti pemprosesan isyarat, penderia elektronik, pencitraan perubatan, dan sistem terbina dalam untuk memungkinkan penyelesaian penjagaan kesihatan yang dipacu oleh AI. Ia meneroka teknik AI seperti pembelajaran mesin dan pembelajaran mendalam untuk meningkatkan pembuatan keputusan klinikal, mengautomasikan diagnostik, memperibadikan rawatan dan meningkatkan kecekapan operasi dalam sistem penjagaan kesihatan. Pelajar akan belajar untuk mengintegrasikan sistem perkakasan tertanam AI dan juga termasuk strategi pengoptimuman dalam model pembelajaran mesin untuk merealisasikan perkakasan yang cekap. Menjelang akhir kursus, pelajar akan dapat mereka bentuk, melaksana dan menilai penyelesaian berasaskan AI dalam kejuruteraan sistem untuk pelbagai aplikasi penjagaan kesihatan sambil memahami kesan etika dan kemasyarakatan mereka.	This course introduces the principles and applications of Artificial Intelligence (AI) in the design of healthcare systems, emphasizing on systems engineering concepts such as signal processing, electronic sensors, medical imaging, and embedded systems to enable AI-driven healthcare solutions. It explores AI techniques such as machine learning and deep learning to enhance clinical decision-making, automate diagnostics, personalize treatment, and improve operational efficiency in healthcare systems. The students wil learn to integrate AI embedded hardware systems and also include optimization strategies in machine learning models for efficient hardware realization. By the end of the course, students will be able to design, implement, and evaluate AI-based solutions in systems engineering for various healthcare applications while understanding their ethical and societal impacts.
Pemberatan Penilaian* (%) *Assessment Weightage**	Continuous Assessment : 50 Examination : 50	Continuous Assessment : 50 Examination : 50
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	Maklumbalas atas talian	Online Feedback
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-Kaedah Peraturan-Peraturan Universiti Malaya (Ijazah Sarjana) (Versi Terkini)	Universiti Malaya (Master Degree) Rules and Regulations (Latest Version)

UNIVERSITI MALAYA	**PRO FORMA KURSUS** **COURSE PRO FORMA**

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Akademi/Fakulti/Institut/Pusat *Academy/Faculty/Institute/Centre*	FAKULTI KEJURUTERAAN	FACULTY OF ENGINEERING
Jabatan *Department*	KEJURUTERAAN ELEKTRIK	ELECTRICAL ENGINEERING
Nama Program Akademik *Name of Academic Programme*	SARJANA KEJURUTERAAN SISTEM	MASTER OF SYSTEMS ENGINEERING
Kod Kursus* *Course Code**	KQC7039	KQC7039
Tajuk Kursus* *Course Title**	PEMBELAJARAN MENDALAM UNTUK REKABENTUK SISTEM PENJAGAAN KESIHATAN	DEEP LEARNING FOR HEALTHCARE SYSTEM DESIGN
Kredit* *Credit**	3	3
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	120	120
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*		

	Versi Bahasa Malaysia *Malay Version*	Versi Bahasa Inggeris *English Version*
Hasil Pembelajaran Kursus* *Course Learning Outcomes**	CLO 1. MENILAI DENGAN KRITIKAL SENI BINA PEMBELAJARAN MENDALAM, STRATEGI LATIHAN, DAN TEKNIK PENGOPTIMUMAN, DENGAN PENEKANAN PADA ASAS TEORI, KEKUATAN, DAN KETERBATASANNYA DALAM MENANGANI PELBAGAI SISTEM PENJAGAAN KESIHATAN. CLO 2. MENILAI CABARAN, PERTIMBANGAN ETIKA, DAN KEKANGAN KHUSUS MASALAH DALAM MENGAPLIKASIKAN PEMBELAJARAN MENDALAM KEPADA REKEBENTUK SISTEM PENJAGAAN KESIHATAN. CLO 3. MEREKABENTUK PENYELESAIAN ANALITIK DATA PINTAR BAGI SISTEM PENJAGAAN KESIHATAN DENGAN MENGINTEGRASIKAN PEMBELAJARAN MENDALAM YANG SESUAI BERSAMA DATA KESIHATAN DUNIA SEBENAR.	CLO 1. EVALUATE CRITICALLY DEEP LEARNING ARCHITECTURES, TRAINING STRATEGIES, AND OPTIMIZATION TECHNIQUES, WITH EMPHASIS ON THEIR THEORETICAL FOUNDATIONS, STRENGTHS, AND LIMITATIONS IN HANDLING VARIOUS HEALTHCARE SYSTEMS CLO 2. APPRAISE THE CHALLENGES, ETHICAL CONSIDERATIONS, AND PROBLEM-SPECIFIC CONSTRAINTS IN APPLYING DEEP LEARNING TO DESIGN HEALTHCARE SYSTEMS. CLO 3. DESIGN INTELLIGENT DATA ANALYTICS SOLUTIONS FOR HEALTHCARE SYSTEMS BY INTEGRATING APPROPRIATE DEEP LEARNING METHOD WITH REAL-WORLD HEALTH DATA.
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Kursus ini memperkenalkan prinsip dan aplikasi pembelajaran mendalam dalam konteks reka bentuk sistem penjagaan kesihatan. Ia merangkumi seni bina utama pembelajaran mendalam seperti rangkaian neural konvolusi (CNN), rangkaian neural berulang (RNN), autoenkoder, dan transformer, dengan penekanan terhadap peranan teknologi ini dalam membolehkan sistem penjagaan kesihatan yang pintar dan berasaskan data. Pelajar akan mempelajari kaedah memproses dan menganalisis pelbagai jenis data penjagaan kesihatan bagi mereka bentuk penyelesaian berasaskan AI yang dapat meningkatkan prestasi sistem, sokongan keputusan, dan hasil pesakit. Kursus ini diakhiri dengan projek pembelajaran berasaskan masalah (PBL), di mana pelajar membangunkan penyelesaian pembelajaran mendalam untuk cabaran sebenar dalam reka bentuk dengan menggabungkan ketelitian teknikal dan pertimbangan etika.	This course introduces the principles and applications of deep learning in the context of healthcare system design. It explores key deep learning architectures such as convolutional neural networks (CNNs), recurrent neural networks (RNNs), autoencoders, and transformers, emphasizing their roles in enabling intelligent and data-driven healthcare technologies. Students will learn how to process and analyze diverse healthcare data to design AI-driven solutions that enhance system performance, decision support, and patient outcomes. The course culminates in a problem-based learning (PBL) project, where students develop deep learning solutions for real-world challenges, integrating both technical rigor and ethical considerations.
Pemberatan Penilaian* (%) *Assessment Weightage**	Continuous Assessment : 50 Examination : 50	Continuous Assessment : 50 Examination : 50
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	Maklumbalas secara dalam talian.	Online Feedback
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-Kaedah Peraturan-Peraturan Universiti Malaya (Ijazah Sarjana) (Versi Terkini)	Universiti Malaya (Master Degree) Rules and Regulations (Latest Version)

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Jabatan *Department*	KEJURUTERAAN ELEKTRIK	ELECTRICAL ENGINEERING
Nama Program Akademik *Name of Academic Programme*	SARJANA KEJURUTERAAN SISTEM	MASTER OF SYSTEMS ENGINEERING
Kod Kursus* *Course Code**	KQC7040	KQC7040
Tajuk Kursus* *Course Title**	PERANTI PENUKARAN TENAGA	ENERGY CONVERSION DEVICES
Kredit* *Credit**	3	3
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	120	120
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*		

	Versi Bahasa Malaysia *Malay Version*	Versi Bahasa Inggeris *English Version*
Hasil Pembelajaran Kursus* *Course Learning Outcomes**	CLO 1. MENGANGGARKAN REKABENTUK ASAS, PARAMETER ANGKUTAN DAN FUNGSI PERANTI PENUKARAN/ PENYIMPANAN TENAGA. CLO 2. MEMBENARKAN TEKNIK PENCIRIAN DAN FABRIKASI YANG SESUAI BAGI PERANTI PENUKARAN/ PENYIMPANAN TENAGA. CLO 3. MEREKABENTUK PERANTI PENUKARAN/ PENYIMPANAN TENAGA YANG MENGANDUNGI TEKNOLOGI BAHAN DAN STRUKTUR PERANTI.	CLO 1. ESTIMATE BASIC DESIGN, TRANSPORT PARAMETER AND FUNCTION OF ENERGY CONVERSION/STORAGE DEVICE. CLO 2. JUSTIFY SUITABLE CHARACTERIZATION AND FABRICATION TECHNIQUES FOR ENERGY CONVERSION/ STORAGE DEVICE. CLO 3. DESIGN ENERGY CONVERSION/STORAGE DEVICE EMPLOYING MATERIAL AND DEVICE STRUCTURE TECHNOLOGIES.
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Pada masa kini, peranti penukaran/penyimpanan tenaga memainkan peranan yang penting dalam teknologi pengumpulan tenaga elektrik dengan mengitar semula sumber tenaga yang terbuang. Matlamat kursus ini adalah untuk menghasilkan pelajar yang mampu mencadang dan merekabentuk peranti penukaran/penyimpanan tenaga termaju dengan pengetahuan asas yang mencukupi dalam prinsip, bahan, teknik fabrikasi dan pengukuran peranti. Melalui kursus ini, pelajar akan didedahkan dengan teknologi terkini dan asas-asas peranti termoelektrik, ferroelektrik, fotovoltaik dan bateri. Tidak terhad kepada prinsip-prinsip asas dan rekabentuk peranti, pelajar juga akan didedahkan kepada teknik fabrikasi dan pengukuran termaju.	Nowadays, energy conversion/storage device plays an important role in harvesting electrical energy technology by recycling waste energy resources. The goal of this course is to prepare students to be able to propose or design an advanced energy conversion/storage device with adequate basic in knowledge of device principle, material, fabrication technique and characterization. Throughout the course, students will be exposed with current technologies and fundamentals of thermoelectric, ferroelectric and photovolatic devices, and batteries. Not limited to its principles and device designs, students will also be exposed to its advanced fabrication technique and characterization.
Pemberatan Penilaian* (%) *Assessment Weightage**	Continuous Assessment : 50 Examination : 50	Continuous Assessment : 50 Examination : 50
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	Maklumbalas secara dalam talian	Online feedback
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-Kaedah Peraturan-Peraturan Universiti Malaya (Ijazah Sarjana) (Versi Terkini)	Universiti Malaya (Master Degree) Rules and Regulations (Latest Version)

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Jabatan *Department*	KEJURUTERAAN ELEKTRIK	ELECTRICAL ENGINEERING
Nama Program Akademik *Name of Academic Programme*	SARJANA KEJURUTERAAN SISTEM	MASTER OF SYSTEMS ENGINEERING
Kod Kursus* *Course Code**	KQC7041	KQC7041
Tajuk Kursus* *Course Title**	REKABENTUK ANTENA MODEN DAN PERAMBATAN	MODERN ANTENNA DESIGN AND PROPAGATION
Kredit* *Credit**	3	3
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	120	120
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*		

	Versi Bahasa Malaysia *Malay Version*	Versi Bahasa Inggeris *English Version*
Hasil Pembelajaran Kursus* *Course Learning Outcomes**	CLO 1. MENILAI PARAMETER PENTING ANTENA YANG DIGUNAKAN DI DALAM REKABENTUK ANTENA. CLO 2. MEREKABENTUK ANTENA DENGAN MEMPERTIMBANGKAN PENYUAP, SUBSTRATUM, DAN STUKTUR PENYALUN. CLO 3. MENGESAHKAN PELBAGAI JENIS ANTENA DAN KONSEP PENGUKURAN ANTENA.	CLO 1. EVALUATE THE IMPORTANT PARAMETERS USED IN ANTENNA DESIGN. CLO 2. DESIGN THE ANTENNA BY CONSIDERING THE FEEDER, SUBSTRATE, AND RESONATOR STRUCTURE. CLO 3. VALIDATE VARIOUS TYPE OF ANTENNA AND THE CONCEPT OF ANTENNA MEASUREMENT.
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Pengenalan kepada prinsip asas antena. Bermula dengan gelombang satah elektromagnetik dan hukum-hukum yang berkaitan dengan perambatan gelombang antara antena penghantaran dan penerimaan. Parameter penting antena seperti corak, kearahan, dan gandaan diterangkan. Kursus ini meliputi jenis-jenis antena seperti dwi-kutub elektrik, gelung dan tatasusun lelurus dan termasuk juga konsep asas pengukuran antena.	Introduce the basic essentials of antenna. Starting with the plane electromagnetic waves and the laws that governs the propagation between the transmitting and receiving antennas, the important antennas parameters such as patterns, directivity and gain is explained. The course covers the antenna family that describes various antenna types, the electric dipoles, the loop antennas, uniform linear arrays and the basic concept of antenna measurements.
Pemberatan Penilaian* (%) *Assessment Weightage**	Continuous Assessment : 50 Examination : 50	Continuous Assessment : 50 Examination : 50
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	Maklumbalas secara dalam talian.	Online feedback.
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-Kaedah Peraturan-Peraturan Universiti Malaya (Ijazah Sarjana) (Versi Terkini)	Universiti Malaya (Master Degree) Rules and Regulations (Latest Version)

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Jabatan *Department*	KEJURUTERAAN KIMIA	CHEMICAL ENGINEERING
Nama Program Akademik *Name of Academic Programme*	SARJANA KEJURUTERAAN KESELAMATAN, KESIHATAN DAN ALAM SEKITAR SARJANA KEJURUTERAAN KESELAMATAN, KESIHATAN DAN ALAM SEKITAR SARJANA KEJURUTERAAN KESELAMATAN, KESIHATAN DAN ALAM SEKITAR SARJANA KEJURUTERAAN SISTEM	MASTER OF SAFETY, HEALTH AND ENVIRONMENT ENGINEERING MASTER OF SAFETY, HEALTH AND ENVIRONMENT ENGINEERING MASTER OF SAFETY, HEALTH AND ENVIRONMENT ENGINEERING MASTER OF SYSTEMS ENGINEERING
Kod Kursus* *Course Code**	KQD7014	KQD7014
Tajuk Kursus* *Course Title**	FAKTOR KEMANUSIAN DAN PENGURUSAN TEMPAT KERJA	HUMAN FACTOR AND MANAGEMENT AT WORK PLACE
Kredit* *Credit**	3	3
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	120	120
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*		

	Versi Bahasa Malaysia *Malay Version*	Versi Bahasa Inggeris *English Version*
Hasil Pembelajaran Kursus* *Course Learning Outcomes**	CLO 1. MENGENALPASTI KEPENTINGAN FAKTOR KEMANUSIAN DALAM APLIKASI PERALATAN DAN PERSEKITARAN TEMPAT KERJA. CLO 2. MENGANALISA REKABENTUK YANG BERKAITAN DAN PENTING BAGI PERSEKITARAN TEMPAT KERJA DI INDUSTRI. CLO 3. MENGAMALKAN KESEDARAN DIRI, TANGGUNGJAWAB DAN KEPERCAYAAN DIRI DI TEMPAT KERJA.	CLO 1. IDENTIFY THE IMPORTANCE OF HUMAN FACTOR IN THE APPLICATION OF TOOLS AND WORK ENVIRONMENT. CLO 2. ANALYSE RELEVANT AND SIGNIFICANT HUMAN FACTOR DESIGN FOR WORK ENVIRONMENT IN INDUSTRIES. CLO 3. PRACTICE SELF-AWARENESS, RESPONSIBILITY AND SELF-BELIEF AT THE WORKPLACE.
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Kursus ini mengandungi beberapa bahagian penting terutama: mengenalpasti, aplikasi dan analisis rekabentuk untuk persekitaran tempat kerja. Kursus ini juga membincangkan pembangunan kesedaran, tanggungjawab dan kepercayaan diri, serta peranan pengurus, dalam mewujudkan organisasi berprestasi tinggi.	This course contains topics which include: Identification, application and analysis the importance of ergonomics in the application and design for special population. This course also discusses the awareness building, responsibility and self-belief, as well as roles of manager, in creating a high performance organization.
Pemberatan Penilaian* (%) *Assessment Weightage**	Continuous Assessment : 100 Examination : 0	Continuous Assessment : 100 Examination : 0
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	1. Perbincangan di dalam kelas 2. Pengembalian penilaian dan ujian yang telah digredkan 3. Gred akhir akan diumumkan	1. Discussions in class 2. Returning graded assignments and tests 3. Final grades are announced
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-Kaedah Peraturan-Peraturan Universiti Malaya (Ijazah Sarjana) (Versi Terkini)	Universiti Malaya (Master Degree) Rules and Regulations (Latest Version)

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Jabatan *Department*	PEJABAT DEKAN	DEAN'S OFFICE
Nama Program Akademik *Name of Academic Programme*	SARJANA KEJURUTERAAN SISTEM SARJANA KEJURUTERAAN KESELAMATAN, KESIHATAN DAN ALAM SEKITAR MASTER OF BIOMEDICAL ENGINEERING	MASTER OF SYSTEMS ENGINEERING MASTER OF SAFETY, HEALTH AND ENVIRONMENT ENGINEERING SARJANA KEJURUTERAAN BIOPERUBATAN
Kod Kursus* *Course Code**	KQX7003	KQX7003
Tajuk Kursus* *Course Title**	METODOLOGI PENYELIDIKAN BAGI KERJA KURSUS	RESEARCH METHODOLOGY FOR COURSEWORK
Kredit* *Credit**	3	3
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	120	120
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*		

	Versi Bahasa Malaysia *Malay Version*	Versi Bahasa Inggeris *English Version*
Hasil Pembelajaran Kursus* *Course Learning Outcomes**	CLO 1. MENSINTESIS MASALAH PENYELIDIKAN, SOALAN PENYELIDIKAN, DAN OBJEKTIF UNTUK MEMBANGUNKAN HALA TUJU PENYELIDIKAN YANG KOHEREN DAN BERSTRUKTUR DALAM DISIPLIN KEJURUTERAAN CLO 2. MENSINTESIS LITERATUR YANG RELEVAN UNTUK MEMBINA ULASAN KRITIKAL DAN BERASASKAN BUKTI DALAM PENYELIDIKAN KEJURUTERAAN CLO 3. MEMBINA CADANGAN PENYELIDIKAN YANG KOMPREHENSIF DENGAN MENGINTEGRASIKAN ULASAN LITERATUR, METODOLOGI, DAN PERTIMBANGAN ETIKA DALAM PENYELIDIKAN KEJURUTERAAN CLO 4. MEMBENTANGKAN PENEMUAN PENYELIDIKAN DENGAN BERKESAN MELALUI PENULISAN AKADEMIK, PEMBENTANGAN LISAN, DAN LAPORAN TEKNIKAL MENGIKUT STANDARD KOMUNIKASI KEJURUTERAAN	CLO 1. SYNTHESIZE RESEARCH PROBLEMS, RESEARCH QUESTIONS, AND OBJECTIVES IN DEVELOPING COHERENT AND WELL-STRUCTURED RESEARCH DIRECTIONS IN ENGINEERING DISCIPLINES CLO 2. SYNTHESIZE RELEVANT LITERATURE TO CONSTRUCT A CRITICAL AND WELL-FOUNDED REVIEW IN ENGINEERING RESEARCH CLO 3. CONSTRUCT A COMPREHENSIVE RESEARCH PROPOSAL INTEGRATING A LITERATURE REVIEW, METHODOLOGY, AND ETHICAL CONSIDERATIONS IN ENGINEERING RESEARCH. CLO 4. PRESENT RESEARCH FINDINGS EFFECTIVELY THROUGH ACADEMIC WRITING, ORAL PRESENTATIONS, AND TECHNICAL REPORTS FOLLOWING ENGINEERING COMMUNICATION STANDARDS
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Kursus ini menawarkan gambaran menyeluruh mengenai prinsip asas dan kaedah yang digunakan dalam menjalankan penyelidikan dalam bidang kejuruteraan. Pelajar akan didedahkan kepada pelbagai metodologi penyelidikan, termasuk pendekatan kaedah campuran, kuantitatif, dan kualitatif, dengan penekanan khusus pada kaedah penyelidikan saintifik. Pada permulaan kursus, pelajar akan meneroka asas-asas reka bentuk penyelidikan, kaedah pengumpulan data, dan pertimbangan etika dalam penyelidikan. Mereka akan memperoleh pemahaman mengenai kepentingan integriti dalam kerja ilmiah, tanggungjawab dalam penyelidikan, dan etika penyelidikan. Selain itu, kursus ini akan memberi peluang kepada pelajar untuk menggunakan kaedah yang sesuai dalam tafsiran dan pengesahan data melalui pemahaman tentang reka bentuk eksperimen dan teknik analisis statistik. Di samping itu, pelajar akan mempelajari cara menilai literatur secara kritikal, mengenal pasti jurang penyelidikan, serta membangunkan masalah penyelidikan, objektif, dan hipotesis yang tersusun dengan baik. Fokus utama kursus ini adalah pada penguasaan kemahiran asas penyelidikan, termasuk penulisan cadangan penyelidikan yang berkesan, penulisan akademik, dan pengurusan sitasi. Tambahan pula, pelajar akan meningkatkan keupayaan mereka untuk menyampaikan hasil penyelidikan melalui pembentangan lisan yang terstruktur, laporan teknikal, dan penerbitan saintifik mengikut standard komunikasi kejuruteraan. Setelah tamat kursus, pelajar akan memiliki kemahiran yang diperlukan untuk menyatakan hasil penyelidikan mereka dengan yakin, menganalisis data secara sistematik, serta mereka bentuk dan melaksanakan projek penyelidikan, sekaligus mempersiapkan diri untuk penyelidikan lanjutan dalam bidang kejuruteraan masing-masing.	This course offers a thorough overview of the fundamental principles and methods of conducting research in engineering disciplines. Students will be exposed to a variety of research methodologies, such as mixed-method, quantitative, and qualitative approaches, with a particular emphasis on scientific research methods. Students will investigate the fundamentals of research design, data acquisition methodologies, and ethical considerations in research at the commencement of the course. They will acquire a comprehension of the significance of integrity in scholarly work, responsible conduct of research, and research ethics. Furthermore, the course will provide students with the opportunity to employ appropriate methods for data interpretation and validation by covering experimental design and statistical analysis techniques. In addition, students will acquire the ability to critically evaluate literature, identify research gaps, and develop well-organized research problems, objectives, and hypotheses. The primary focus will be on the acquisition of fundamental research skills, such as effective proposal writing, academic writing, and citation management. Additionally, students will improve their capacity to communicate research findings through structured oral presentations, technical reports, and scientific publications, in accordance with engineering communication standards. Upon completion of the course, students will possess the necessary skills to confidently articulate their findings, analyze data systematically, and design and execute research projects, thereby preparing them for advanced research in their respective engineering fields.
Pemberatan Penilaian* (%) *Assessment Weightage**	Continuous Assessment : 100 Examination : 0	Continuous Assessment : 100 Examination : 0
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	Keputusan akan diumumkan melalui papan notis dan dalam talian, manakala maklum balas terhadap tugasan akan diberikan melalui Sistem Pengurusan Pembelajaran (SPECTRUM)	Results will be announced via the notice board and online, while feedback on assignments will be provided through the Learning Management System (SPECTRUM).
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-Kaedah dan Peraturan-Peraturan Universiti Malaya (Ijazah Sarjana Muda) (Versi Terkini)	Universiti Malaya (Degree) Rules and Regulations (Latest Version)

COURSEWORK PROGRAMME | KQL

06

Master of Road Safety Engineering

COURSE TYPE	MODE OF STUDY	INDICATIVE DURATION
Coursework	Full-time or part-time	FT: 2 semesters + 1 special semester PT: 4 semesters + 1 special semester

PROGRAMME AT A GLANCE

A specialised postgraduate programme in road safety engineering, it combines theoretical foundations with practical applications in traffic safety, road safety audit, traffic crash analysis, transport planning and safer mobility systems. Supported by experienced academics and research-led learning, the programme prepares graduates for specialised roles in road safety, highways, transport planning and traffic engineering.

View the official programme page

Source: Universiti Malaya Study portal | Page last updated 16 May 2026

UNIVERSITI MALAYA

FACULTY OF ENGINEERING

Master of Road Safety Engineering

Academic Programme Information

MRSE	42	FULL TIME & PART TIME
PROGRAMME REFERENCE	TOTAL CREDITS	TYPES OF STUDY

ACADEMIC SESSION 2026/2027

Universiti Malaya

Contents

This section provides the current programme profile, admission requirements, curriculum, learning outcomes and study pathways for the Master of Road Safety Engineering.

01	Programme Overview
02	Admission Requirements
03	Programme Goal and Educational Objectives
04	Programme Learning Outcomes
05	Curriculum Structure
06	Study Pathways by Intake
07	Registration and Research Project Guidance
08	Career Prospects and Current Information

Programme Overview

The Master of Road Safety Engineering is a **42-credit** coursework programme that develops specialist knowledge for analysing road safety risks, designing evidence-based interventions and managing safer transport systems. The curriculum connects traffic engineering, crash analysis, data analytics, safety auditing and transport planning with professional decision-making and applied research.

Students complete **seven taught core courses, three electives** and **one 12-credit research project**. The current iPAcS specification identifies the programme as full-time coursework delivered conventionally in English. Study at UM also publishes part-time duration and fee information; applicants interested in that route should confirm availability with the Faculty before applying.

Programme at a Glance

Programme	Master of Road Safety Engineering
Programme abbreviation	MEng Road Safety
Programme code	SCWKQLFTCV01
Faculty	Faculty of Engineering
National Education Code	0716 Civil Engineering
Mode of Study	Coursework
Type and delivery	Full time, Parti Time | Conventional
Medium of instruction	English
Published full-time duration	2 semesters and 1 Special Semester
Total credits	42 credits

Curriculum Composition

Taught core	Electives	Research project	Programme total
21 credits	**9 credits**	**12 credits**	**42 credits**

Admission Requirements

Academic Qualification

Applicants must hold a Bachelor's Degree in Engineering, Science, Computing or a related field and fulfil the University's general entry requirements.

Applicants with a CGPA of at least 3.00 may be considered on the basis of the recognised qualification above.

Applicants with a CGPA from 2.50 to 2.99 must meet at least one of the following criteria:

- Graduate of Universiti Malaya.
- At least one year of work experience in a related field.
- Publication in a related field.
- Recipient of a scholarship.
- Staff member of a government agency.
- Pass an interview conducted by the Faculty.
- Pass a special evaluation conducted by the Faculty.

English Language Requirement for International Applicants

Applicants who are required to demonstrate English proficiency must obtain at least one of the following results:

Qualification	Minimum result
Malaysian University English Test (MUET)	Band 4.0
IELTS Academic	Band 6.0
TOEFL iBT (Centre Based)	Score 60
TOEFL Essentials (Online)	Score 8.5
Pearson Test of English Academic	Score 59
Cambridge B1 Preliminary, B2 First, C1 Advanced or C2 Proficiency	Score 169

Programme Goal and Educational Objectives

Programme Goal

The programme aims to develop graduates with advanced knowledge of road safety engineering, sound professional and ethical judgement, and the critical-thinking skills required to make informed decisions on complex road safety issues.

Programme Educational Objectives

Objective	Expected graduate achievement
PEO1	Graduates practise professional leadership in the field of road safety.
PEO2	Graduates engage in research and development activities in road safety to support their career development.
PEO3	Graduates contribute actively in sustainable development of road safety and the well-being of society.

What These Objectives Emphasise

Professional leadership strategic decision-making and leadership in road safety practice.

Research and innovation evidence-based research, technical development and continuous career advancement.

Sustainable impact safer and more sustainable transport systems that enhance societal well-being.

Programme Learning Outcomes

On successful completion of the programme, graduates should be able to demonstrate the following outcomes.

Code	Learning outcome	Competency domain
PLO1	Demonstrate continuing advanced knowledge and able to further develop the knowledge in solving complex road safety problems.	CLS1 Knowledge and understanding
PLO2	Analyze complex road safety problems or issues critically and provide solutions through the application of specialized concepts and / or methods.	CLS2 Cognitive skills
PLO3	Apply and design appropriate solutions to road safety problems using appropriate research methods, tools and approaches.	CLS3 A Practical skills
PLO4	Communicate ideas and rationales using appropriate methods as individuals or groups, experts or non-experts ethically, critically and professionally.	CLS3 B Communication and interpersonal practice
PLO5	Demonstrate competency by combining digital technology as well as appropriate software and statistics in resolving complex road safety issues and problems.	CLS3 C Digital and numeracy skills
PLO6	Demonstrates high leadership, responsible and interpersonal skills in planning and management of road safety project.	CLS3 D Leadership, autonomy and responsibility
PLO7	Identify the need for continuous and sustainable professional development and entrepreneurial elements in the context of road safety.	CLS4 Professional and entrepreneurial skills
PLO8	Demonstrate adherence to ethical and professional codes of practice in planning and execution of the technical or research project relevant to road safety.	CLS5 Ethics and professionalism

Curriculum Structure

Students complete **21 credits of core courses**, **9 elective credits** and a **12-credit research project**. The full programme carries 42 credits.

Core Courses

Course code	Course title	Credits
KQL7001	Traffic Engineering and Safety	3
KQL7002	Road Safety Management	3
KQL7003	Data Analytic Applications in Road Safety	3
KQL7004	Road Safety Audit and Traffic Risk Analysis	3
KQL7005	Traffic Crash Analysis	3
KQX7001	Research Methodology	3
KQX7002	Project Management	3
KQL7013	Research Project	12
Total taught core credits		**33**

Research Sequence

Foundation	Development	Completion
KQX7001 Research Methodology	KQL7013 Research Project 1 (P1)	KQL7013 Research Project 2 (P2)

Integrated Learning Path

Understand	Evaluate	Apply
Road Safety Traffic Engineering Crash Causation Human Factors Research Design Project Planning	Safety Audit Traffic Risk Data Analyics Modelling Simulation ITS Vehicle Safety	Safety Management Intervention Sustainable Transport Urban Planning Applied Research Communication

Elective Courses Guide

Students complete **9 elective credits** by selecting **two approved three-credit courses**. Availability may vary by semester and remains subject to programme advice.

Course code	Course title	Credits
KQL7007	Human Behaviour in Road Safety	3
KQL7008	Intelligent Transport System in Road Safety	3
KQL7009	Sustainable Transport System	3
KQL7010	Traffic Modelling, Simulation and Safety	3
KQL7011	Urban Transport Planning and Safety	3
KQL7012	Vehicle Safety System	3
Elective credits required		**9**

Choosing Electives

People and road-user behaviour human factors, behavioural influences and evidence-based approaches to improving road-safety user

Smart mobility and vehicle safety intelligent transport systems and vehicle safety technologies for safer, connected and responsive transport networks

Traffic modelling and urban planning traffic simulation, transport planning and analytical approaches to improving safety within complex urban environments

Sustainable transport systems sustainable mobility strategies that balance road safety, accessibility, environmental responsibility and long-term transport needs

Indicative Study Plan

The official specification places taught core courses across Semester 1 and Semester 2, with the Research Project shown across Semester 2 and Semester 3 or the Special Semester. Its 12 credits are counted once within the 33-credit core total. Electives are registered according to programme advice and course availability.

Study period	Core Courses	Core Credits	Elective Planning
Semester I	KQX7001 Research Methodology KQX7002 Project Management KQL7001 Traffic Engineering and Safety KQL7005 Traffic Crash Analysis	18	Register approved elective or courses as advised
Semester II	KQL7004 Road Safety Audit and Traffic Risk Analysis KQL7003 Data Analytic Applications in Road Safety KQL7002 Road Safety Management KQL7013 Research Project 1	18	Continue the approved elective plan
Special Semester	KQL7013 Research Project 2	6	Complete any outstanding approved elective requirement.

Core	Electives	Total
33 credits	**9 credits**	**42 credits**

Planning Notes

- KQL7013 remains one 12-credit course in the official programme structure. The Part 1 and Part 2 labels show the recommended progression of work and do not create separate course codes.
- Students must complete three approved electives totalling 9 credits. Elective availability may vary by semester.
- The Semester II-entry sequence is indicative and requires confirmation from the programme coordinator before registration.

Programme Alignment

The PLO to PEO mapping shows how learning achieved during the programme supports longer-term graduate objectives.

Learning outcome	PEO1	PEO2	PEO3
PLO1	YES		
PLO2	YES		
PLO3		YES	
PLO4		YES	
PLO5		YES	
PLO6	YES		
PLO7			YES
PLO8			YES

Alignment Summary

Objective	Primary emphasis	Supporting outcomes
PEO1	Professional leadership and practice	PLO1, PLO2 and PLO6
PEO2	Research, innovation and career development	PLO3, PLO4 and PLO5
PEO3	Sustainable development and societal well-being	PLO7 and PLO8

Important Academic Information

Course registration, elective offerings and candidature requirements are governed by current Universiti Malaya regulations and Faculty decisions. Students should use this handbook section together with their offer letter, registration notices and official programme advice.

Career Prospects

Build a career dedicated to creating safer, smarter and more sustainable transport systems. Graduates may pursue professional opportunities in road safety management, traffic engineering, transport planning, road safety auditing, crash analysis, intelligent transport systems, research and public policy across government agencies, engineering consultancies, research institutions and the transport industry.

Career area	Examples
Engineering and operations	Road Safety Engineer; Intelligent Transport System Engineer; Vehicle Safety Engineer; Traffic Simulation Specialist
Analysis and assurance	Traffic Safety Analyst; Data Analyst in Road Safety; Road Safety Auditor; Traffic Crash Analyst
Planning and management	Traffic Management Specialist; Transportation Planner; Urban Transport Safety Planner; Sustainable Transport System Engineer

Official References

Programme page: Study@UM – Master of Road Safety Engineering (Coursework)

Faculty information: Faculty of Engineering – Postgraduate Programmes

Department information: https://engine.um.edu.my/about-civil-engineering

FACULTY OF ENGINEERING

Master of Road Safety Engineering Study Planners

Academic Session 2026/2027

42	21	9	12
TOTAL CREDITS	TAUGHT CORE	ELECTIVE CREDITS	RESEARCH CREDITS

How to Read the Planner

1 Follow the stages	2 Select three electives	3 Verify each semester
Complete the semester sequence shown for your intake.	Complete 9 elective credits from the approved programme directory.	Confirm the timetable, electives and KQL7013 project milestones before registration.

Programme code SCWKQLFTCV01 **Mode** Full-time or Part Time coursework **Delivery** Conventional **Medium** English

Planner for Master of Road Safety Engineering

Semester I Intake

A 42-credit full-time coursework pathway comprising 21 taught-core credits, 9 elective credits and a 12-credit research project.

STAGE 1 SEMESTER I	STAGE 2 SEMESTER II	STAGE 3 SPECIAL SEMESTER
Entry semester	**Second study period**	**Final study period**
REQUIRED COURSES **KQX7001** Research Methodology **[3]** **KQX7002** Project Management **[3]** **KQL7001** Traffic Engineering and Safety **[3]** **KQL7005** Traffic Crash Analysis **[3]** **ELECTIVE OPTIONS** **SELECT 2** Approved elective courses from the programme directory **[6]** **Select 6 elective credits** **PLANNED LOAD 12 required + 6 elective = 18 credits**	**REQUIRED COURSES** **KQL7004** Road Safety Audit and Traffic Risk Analysis **[3]** **KQL7003** Data Analytic Applications in Road Safety **[3]** **KQL7002** Road Safety Management **[3]** **KQL7013** Research Project Part 1 **[6]** **ELECTIVE OPTIONS** **SELECT 1** Approved elective course from the programme directory **[3]** **Select 3 elective credits** **PLANNED LOAD 15 required + 3 elective = 18 credits**	**REQUIRED COURSES** **KQL7013** Research Project Part 2 **[6]** **ELECTIVE OPTIONS** *No elective allocation in the standard sequence.* **PLANNED LOAD 6 required + 0 elective = 6 credits**

Core courses	Electives	Research projects	Programme total
21 credits	**9 credits**	**12 credits**	**42 credits**

Planner for Master of Road Safety Engineering

Semester II Intake

A 42-credit full-time coursework pathway comprising 21 taught-core credits, 9 elective credits and a 12-credit research project.

STAGE 1 SEMESTER II	STAGE 2 SPECIAL SEMESTER	STAGE 3 SEMESTER I
Entry semester	**Second study period**	**Final study period in the following academic session**
REQUIRED COURSES **KQX7001** Research Methodology **[3]** **KQX7002** Project Management **[3]** **KQL7004** Road Safety Audit and Traffic Risk Analysis **[3]** **KQL7003** Data Analytic Applications in Road Safety **[3]** **KQL7002** Road Safety Management **[3]** **ELECTIVE OPTIONS** **SELECT 1** Approved elective course from the programme directory **[3]** **Select 3 elective credits** **PLANNED LOAD 15 required + 3 elective = 18 credits**	**REQUIRED COURSES** **KQL7013** Research Project Part 1 **[6]** **ELECTIVE OPTIONS** *No elective allocation in the standard sequence.* **PLANNED LOAD 6 required + 0 elective = 6 credits**	**REQUIRED COURSES** **KQL7001** Traffic Engineering and Safety **[3]** **KQL7005** Traffic Crash Analysis **[3]** **KQL7013** Research Project Part 2 **[6]** **ELECTIVE OPTIONS** **SELECT 2** Approved elective courses from the programme directory **[6]** **Select 6 elective credits** **PLANNED LOAD 12 required + 6 elective = 18 credits**

Core courses	Electives	Research projects	Programme total
21 credits	**9 credits**	**12 credits**	**42 credits**

Elective Planning Directory

Approved programme electives | 3 credits per course | Select three courses

Choose courses totalling 9 credits. The specification does not assign electives to fixed semesters, so availability must be checked against the published timetable.

ELECTIVE OPTIONS 01-03	ELECTIVE OPTIONS 04-06
KQL7007 Human Behaviour in Road Safety	**KQL7010** Traffic Modelling, Simulation and Safety
KQL7008 Intelligent Transport System in Road Safety	**KQL7011** Urban Transport Planning and Safety
KQL7009 Sustainable Transport System	**KQL7012** Vehicle Safety System

UNIVERSITI MALAYA	**PRO FORMA KURSUS** ***COURSE PRO FORMA***

PENTING / *IMPORTANT*:
Kandungan Pro Forma ini tidak boleh diubah tanpa kelulusan Senat bagi perkara-perkara yang telah ditandakan*. Pindaan kepada perkara lain boleh diluluskan di peringkat Akademi/Fakulti/Institut/Pusat.
*Contents of this Pro Forma shall not be changed without the Senate's approval for items indicated with *. Changes to the other items can be approved at the Academy/Faculty/Institution/Centre level.*

	Versi Bahasa Malaysia ***Malay Version***	**Versi Bahasa Inggeris** ***English Version***
Akademi/Fakulti/Institut/Pusat *Academy/Faculty/Institute/Centre*	Fakulti Kejuruteraan	*Faculty of Engineering*
Jabatan *Department*	Pejabat Timbalan Dekan (Ijazah Tinggi)	*Deputy Dean (Postgraduates) Office*
Nama Program Akademik Name of Academic *Programme*	Sarjana Kejuruteraan Bioperubatan Sarjana Kejuruteraan Mekanikal Sarjana Kejuruteraan Sistem Sarjana Kejuruteraan Keselamatan, Kesihatan dan Alam Sekitar Sarjana Kejuruteraan Keselamatan Jalan Raya	*Master of Biomedical Engineering* *Master of Mechanical Engineering* *Master of Systems Engineering* *Master of Safety, Health and Environment Engineering* *Master of Road Safety Engineering*
Kod Kursus* *Course Code**	KQX7001	*KQX7001*
Tajuk Kursus* *Course Title**	Metodologi Penyelidikan	*Research Methodology*
Kredit* *Credit**	3	*3*
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	120	*120*
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*	Tiada	*None*
Hasil Pembelajaran Kursus* *Course Learning Outcomes**	Di akhir kursus ini, pelajar dapat:	*At the end of the course, students are able to:*

	1. Menentukan masalah penyelidikan yang bersesuai dengan bidang kejuruteraan 2. Merekabentuk kaedah kajian untuk menyelesaikan masalah kajian 3. Menilai secara kritikal kebolehlaksanaan dan kepraktisan kaedah kajian untuk menyelesaikan masalah kajian. 4. Menyelaras maklumat penyelidikan yang relevan ke dalam laporan teknikal yang komprehensif	*1. Determine research problem or issues related to the respective engineering field.* *2. Design appropriate research methodology to solve the research problem* *3. Evaluate critically the feasibility and practicality of relevant methods and tools to solve the research problem* *4. Coordinate relevant research information into comprehensive technical report.*
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Kursus ini mendedahkan pelajar kepada teknik – teknik bagaimana untuk menjalankan kajian. Di awal kursus pelajar di ajar dengan pelbagai teknik kajian termasuk, kaedah kajian saintifik. Kemudian, etika kajian, reka bentuk eksperimen dan teknik statistik di terangkan kepada pelajar di ikuti dengan mengenal pasti masalah kajian dan penulisan cadangan. Pelajar akan menguasai kemahiran kajian, penulisan saintifik, komunikasi lisan bagi dapatan kajian.	*This course exposes students to the techniques of how to conduct research. At the beginning of the course students are taught with various research techniques including, scientific research methods. Then, research ethics, experimental design and statistical techniques are explained to students followed by identifying research problems and writing suggestions. Students will master research skills, scientific writing, and oral communication for research findings.*
Pemberatan Penilaian* *Assessment Weightage**	Penilaian Berterusan: 100% Peperiksaan Akhir:-	*Continuous Assessment:100%* *Final Examination: -*
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	Ditampal di papan notis atau dimaklumkan melalui talian.	*Results will be notified through notice board and online*
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-Kaedah Universiti Malaya (Ijazah Sarjana) 2019. Peraturan-Peraturan Universiti Malaya (Ijazah Sarjana) 2019.	*University of Malaya Rules (Master's Degree) 2019* *University of Malaya Regulations (Master's Degree) 2019*

UNIVERSITI MALAYA	**PRO FORMA KURSUS** ***COURSE PRO FORMA***

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	Versi Bahasa Malaysia ***Malay Version***	**Versi Bahasa Inggeris** ***English Version***
Akademi/Fakulti/Institut/Pusat *Academy/Faculty/Institute/Centre*	Fakulti Kejuruteraan	*Faculty of Engineering*
Jabatan *Department*	Pejabat Timbalan Dekan (Ijazah Tinggi)	*Deputy Dean (Postgraduates) Office*
Nama Program Akademik Name of Academic *Programme*	Sarjana Kejuruteraan Bioperubatan Sarjana Kejuruteraan Mekanikal Sarjana Kejuruteraan Sistem Sarjana Kejuruteraan Keselamatan, Kesihatan dan Alam Sekitar Sarjana Kejuruteraan Keselamatan Jalan Raya	*Master of Biomedical Engineering* *Master of Mechanical Engineering* *Master of Systems Engineering* *Master of Safety, Health and Environment Engineering* *Master of Road Safety Engineering*
Kod Kursus* *Course Code**	KQX7002	*KQX7002*
Tajuk Kursus* *Course Title**	Pengurusan Projek	*Project Management*
Kredit* *Credit**	3	*3*
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	120	*120*
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*	Tiada	*None*
Hasil Pembelajaran Kursus* *Course Learning Outcomes**	Di akhir kursus ini, pelajar dapat:	*At the end of the course, students are able to:*

	1. Menganalisa prinsip komponen dan konsep pengurusan projek. 2. Membenarkan pelbagai pemacu perubahan yang boleh menjejaskan projek selama kitaran hidupnya. 3. Menyelesaikan segala cabaran semasa projek secara efektif. 4. Mengaplikasikan kemahiran keusahawanan dan kepimpinan dalam pengurusan sesuatu projek.	*1. Analyze the principle components and concepts of project management.* *2. Justify the various drivers of change which may impact a project during its life cycle.* *3. Solve every challenges faced during the project.* *4. Apply entrepreneurial and leadership skills in a project management.*
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Kursus ini memberikan pengenalan yang sistematik dan menyeluruh untuk semua aspek pengurusan projek. Projek adalah aspek yang semakin penting dalam perniagaan kejuruteraan moden. Oleh itu, kursus ini mengutarakan pentingnya memahami hubungan antara projek dan matlamat strategik organisasi. Kursus ini juga membincangkan kemahiran teknikal, budaya, dan interpersonal yang diperlukan untuk menguruskan projek dengan jayanya dari awal hingga akhir. Ia menekankan bahawa pengurusan projek adalah disiplin profesional yang merangkumi pengetahuan dan kemahirannya yang tersendiri. Konsep diperkukuhkan dengan menggunakan kajian kes yang merangkumi pelbagai jenis projek dan industri.	*This course provides a systematic and thorough introduction to all aspects of project management. Projects are an increasingly important aspect of modern engineering business. Therefore, the course underlines the importance of understanding the relation between projects and the strategic goals of the organisation. The course also discusses the technical, cultural, and interpersonal skills necessary to successfully manage projects from start to finish. It emphasises that project management is a professional discipline with its own tools, body of knowledge, and skills. Concepts are reinforced by case studies covering a wide variety of project types and industries.*
Pemberatan Penilaian* *Assessment Weightage**	Penilaian Berterusan: 50% Peperiksaan Akhir: 50%	*Continuous Assessment: 50%* *Final Examination: 50%*
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	Ditampal di papan notis atau dimaklumkan melalui talian.	*Results will be notified through notice board and online*
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-Kaedah Universiti Malaya (Ijazah Sarjana) 2019 Peraturan-Peraturan Universiti Malaya (Ijazah Sarjana) 2019	*University of Malaya Rules (Master's Degree) 2019* *University of Malaya Regulations (Master's Degree) 2019*

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Akademi/Fakulti/Institut/Pusat *Academy/Faculty/Institute/Centre*	Fakulti Kejuruteraan	*Faculty of Engineering*
Jabatan *Department*	Jabatan Kejuruteraan Awam	*Department of Civil Engineering*
Nama Program Akademik Name of Academic *Programme*	Sarjana Kejuruteraan Keselamatan Jalan Raya	*Master of Road Safety Engineering*
Kod Kursus* *Course Code**	KQL7001	*KQL7001*
Tajuk Kursus* *Course Title**	Kejuruteraan Trafik dan Keselamatan	*Traffic Engineering and Safety*
Kredit* *Credit**	3	*3*
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	120	*120*
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*	-	-
Hasil Pembelajaran Kursus* *Course Learning Outcomes**	Di akhir kursus ini, pelajar dapat: 1. Mengenalpasti komponen infrastruktur utama dan petunjuk prestasi dalam keselamatan trafik. 2. Menggunakan metodologi dan teknik yang berbeza pada komponen infrastruktur keselamatan trafik yang berbeza.	*At the end of the course, students are able to:* *1. Identify the main infrastructure components and performance indicators in traffic safety.* *2. Apply distinct methodologies and techniques to the different traffic safety infrastructure components.*

	3. Menganalisis penyelesaian keselamatan dengan mempertimbangkan prestasi. 4. Merekabentuk penyelesaian yang cekap dan selamat dalam aspek kejuruteraan.	*3. Analyze safety solutions by considering performance.* *4. Design efficient and safe solutions in the engineering aspect.*
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Kursus ini akan mendedahkan pelajar dengan masalah keselamatan yang berkaitan dengan reka bentuk infrastruktur dan kejuruteraan trafik. Selain itu, pelbagai komponen dan aspek keselamatan dalam kajian kejuruteraan trafik juga terkandung dalam kursus ini.	*This course will expose students with safety issues relating the traffic infrastructures design and traffic engineering. Besides, various safety component and aspects in traffic engineering study also covered in this course.*
Pemberatan Penilaian* *Assessment Weightage**	Penilaian Berterusan: 50% Peperiksaan Akhir: 50%	*Continuous Assessment: 50%* *Final Examination: 50%*
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	Ditampal di papan notis atau dimaklumkan melalui talian.	*Results will be notified through notice board and online*
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-Kaedah Universiti Malaya (Ijazah Sarjana) 2019. Peraturan-Peraturan Universiti Malaya (Ijazah Sarjana) 2019.	*University of Malaya Rules (Master's Degree) 2019* *University of Malaya Regulations (Master's Degree) 2019*

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Jabatan *Department*	Jabatan Kejuruteraan Awam	*Department of Civil Engineering*
Nama Program Akademik Name of Academic *Programme*	Sarjana Kejuruteraan Keselamatan Jalan Raya	*Master of Road Safety Engineering*
Kod Kursus* *Course Code**	KQL7002	*KQL7002*
Tajuk Kursus* *Course Title**	Pengurusan Keselamatan Jalan Raya	*Road Safety Management*
Kredit* *Credit**	3	*3*
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	120	*120*
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*	-	-
Hasil Pembelajaran Kursus* *Course Learning Outcomes**	Di akhir kursus ini, pelajar dapat: 1. Memahami saiz dan trend bagi masalah keselamatan jalan raya dalam masyarakat yang berbeza. 2. Membedah faktor-faktor kemalangan, pendedahan, risiko kemalangan, serta kesannya terhadap angka kemalangan dan tahap kecederaan.	*At the end of the course, students are able to:* *1. Comprehend the size and the trend of the road safety problem in different societies.* *2. Dissect the accident factors, exposure, accident risks, and their influence to the accident numbers and the injury severity.*

	3. Menilaikan prestasi cara penyelesaian yang berbeza dalam meningkatkan keselamatan jalan raya.	*3. Evaluate the performance of different countermeasures that enhance road safety.*
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Kursus ini akan mendedahkan pelajar dengan masalah keselamatan yang berkaitan dengan pengurusan lalu lintas. Kajian mengenai pelbagai polisi keselamatan lalu lintas, penyebab kemalangan dan keutamaan lain yang berkaitan dengan pengurusan lalu lintas, tindakan pencegahan 3E - Pendidikan, Kejuruteraan & Penguatkuasaan, dan rancangan tindakan akan dirangkumi dalam kursus ini.	*This course will expose students with safety issues relating to the traffic management. Study on various traffic safety policies, accident causes and other priorities that related to traffic management, countermeasures 3E – Education, Engineering & Enforcement, and action plan will be covered in this course.*
Pemberatan Penilaian* *Assessment Weightage**	Penilaian Berterusan: 50% Peperiksaan Akhir: 50%	*Continuous Assessment: 50%* *Final Examination: 50%*
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	Ditampal di papan notis atau dimaklumkan melalui talian.	*Results will be notified through notice board and online*
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-Kaedah Universiti Malaya (Ijazah Sarjana) 2019. Peraturan-Peraturan Universiti Malaya (Ijazah Sarjana) 2019.	*University of Malaya Rules (Master's Degree) 2019* *University of Malaya Regulations (Master's Degree) 2019*

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Akademi/Fakulti/Institut/Pusat *Academy/Faculty/Institute/Centre*	Fakulti Kejuruteraan	*Faculty of Engineering*
Jabatan *Department*	Jabatan Kejuruteraan Awam	*Department of Civil Engineering*
Nama Program Akademik Name of Academic *Programme*	Sarjana Kejuruteraan Keselamatan Jalan Raya	*Master of Road Safety Engineering*
Kod Kursus* *Course Code**	KQL7003	*KQL7003*
Tajuk Kursus* *Course Title**	Aplikasi Data Analitikal di dalam Keselamatan Jalan Raya	*Data Analytic Applications in Road Safety*
Kredit* *Credit**	3	*3*
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	120	*120*
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*	-	-
Hasil Pembelajaran Kursus* *Course Learning Outcomes**	Di akhir kursus ini, pelajar dapat: 1. Menerangkan asas-asas untuk teknik teknik statistikal. 2. Menunjukkan teknik yang mencukupi dalam analisis pengolahan data dengan menggunakan pelbagai kaedah statistical dan strategi.	*At the end of the course, students are able to:* *1. Explain the fundamentals of statistical techniques.* *2. Demonstrate adequate technique in data treatment analysis using various statistical methods and strategies.*

	3. Menganalisis data daripada masalah-masalah atau isu-isu berkaitan keselamatan jalan raya. 4. Menilai keputusan-keputusan yang diperoleh daripada analisis dengan masalah-masalah atau isu-isu sebenar berkaitan keselamatan jalan raya	*3. Analyse the data from the problems or issues related to road safety.* *4. Evaluate the results obtained from the analysis with the real problems or issues on road safety.*
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Kursus ini menyediakan dan memperkenalkan pelajar mengenai bagaimana menganalisis data dari bidang keselamatan lalu lintas dan menukar maklumat menjadi pengetahuan berguna. Pengetahuan ini akan membantu pelajar untuk memahami makna di sebalik penemuan dengan menerapkan pendekatan empirikal yang sesuai yang membolehkan mereka membuat keputusan yang lebih baik dalam masalah yang berkaitan. Dalam kursus ini, pelbagai analisis data yang menggunakan alat statistik canggih akan dibincangkan, misalnya, analisis deskriptif, inferensi dan ramalan.	*This course prepares and introduces students on how to analyze data from traffic safety area and convert the information to useful knowledge. This knowledge will help the students to understand the meaning behind the findings by applying appropriate empirical approaches which enable them to make better decisions in the related issues. In this course, a wide range of data analytic techiques which are using advanced statistical tools will be discussed, for instance, descriptive, inferential and predictive analytics.*
Pemberatan Penilaian* *Assessment Weightage**	Penilaian Berterusan: 50% Peperiksaan Akhir: 50%	*Continuous Assessment: 50%* *Final Examination: 50%*
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	Ditampal di papan notis atau dimaklumkan melalui talian.	*Results will be notified through notice board and online*
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-Kaedah Universiti Malaya (Ijazah Sarjana) 2019. Peraturan-Peraturan Universiti Malaya (Ijazah Sarjana) 2019.	*University of Malaya Rules (Master's Degree) 2019* *University of Malaya Regulations (Master's Degree) 2019*

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Jabatan *Department*	Jabatan Kejuruteraan Awam	*Department of Civil Engineering*
Nama Program Akademik Name of Academic *Programme*	Sarjana Kejuruteraan Keselamatan Jalan Raya	*Master of Road Safety Engineering*
Kod Kursus* *Course Code**	KQL7004	*KQL7004*
Tajuk Kursus* *Course Title**	Audit Keselamatan Jalan Raya dan Analisis Risiko Trafik	*Road Safety Audit and Traffic Risk Analysis*
Kredit* *Credit**	3	*3*
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	120	*120*
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*	-	-
Hasil Pembelajaran Kursus* *Course Learning Outcomes**	Di akhir kursus ini, pelajar dapat: 1. Memahami peranan dan tanggungjawab kumpulan audit serta senarai semak Audit Keselamatan Jalan bagi setiap peringkat pengauditan. (C2) 2. Menilai laporan Audit Keselamatan Jalan Raya dan Laporan Penilaian Risiko Trafik menggunakan	*At the end of the course, students are able to:* *1. Understand audit team roles and responsibility, a Safety Audit checklists for each stage of the audit. (* *2. Evaluate a Road Safety Audit and Traffic Risk Ass report using knowledge in road geometric specifica traffic risk assessment methods. (C5)*

	pengetahuan dalam spesifikasi geometri jalan raya dan kaedah penilaian risiko trafik. (C5) 3. Menganalisa contoh-contoh praktikal dalam kajian kes berkenaan isu keselamatan jalan dalam konteks Audit Keselamatan Jalan dan Penilaian Risiko Traffik dalam satu kumpulan. (C4)	*3. Analyse practical examples of road safety issues in a case study in the context of road safety audit and traffic risk assessment in a team. (C4)*
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Prinsip-prinsip dan penggunaan praktikal audit keselamatan jalan raya peringkat 1-5 dan analisis risiko trafik.	*Principles and practical application of Road Safety Audit Stage 1-5 dan traffic risk analysis.*
Pemberatan Penilaian* *Assessment Weightage**	Penilaian Berterusan: 50% Peperiksaan Akhir: 50%	*Continuous Assessment: 50%* *Final Examination: 50%*
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	Ditampal di papan notis atau dimaklumkan melalui talian.	*Results will be notified through notice board and online*
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-Kaedah Universiti Malaya (Ijazah Sarjana) 2019. Peraturan-Peraturan Universiti Malaya (Ijazah Sarjana) 2019.	*University of Malaya Rules (Master's Degree) 2019* *University of Malaya Regulations (Master's Degree) 2019*

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Jabatan *Department*	Jabatan Kejuruteraan Awam	*Department of Civil Engineering*
Nama Program Akademik Name of Academic *Programme*	Sarjana Kejuruteraan Keselamatan Jalan Raya	*Master of Road Safety Engineering*
Kod Kursus* *Course Code**	KQL7005	*KQL7005*
Tajuk Kursus* *Course Title**	Analisis Kemalangan Trafik	*Traffic Crash Analysis*
Kredit* *Credit**	3	*3*
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	120	*120*
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*	-	-
Hasil Pembelajaran Kursus* *Course Learning Outcomes**	Di akhir kursus ini, pelajar dapat: 1. Menerangkan pembangunan-pembangunan terkini di dalam bidang analisis kemalangan trafik. 2. Menganalisis punca-punca kemalangan melalui kajian sebelum dan selepas kejadian kemalangan.	*At the end of the course, students are able to:* *1. Explain the most recent developments in traffic crash analysis field* *2. Analyze the causes of crashes through pre and post-crash studies.* *3. Understand various methods in collecting and*

	3. Memahami pelbagai kaedah di dalam mengumpul dan memproses data kemalangan trafik. 4. Menerangkan strategi-strategi yang berkesan untuk memperbaiki keselamatan jalan raya berdasarkan contoh-contoh sebenar dan penyelesaian-penyelesaian praktikal	*processing traffic crash data analysis.* *4. Describe the effective strategies to improve road safety based on the real-life examples and practical solutions.*
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Kursus ini berkaitan dengan penyiasatan kemalangan lalu lintas dan menonjolkan perincian dari hasil yang dijangka berdasarkan analisis yang relevan. Dalam kursus ini, pelbagai perkembangan terkini dalam analisis kemalangan lalu lintas akan dibincangkan dan penyebab kemalangan akan dianalisis. Di samping itu, pelbagai kaedah yang berkaitan dengan pengumpulan data dan analisis data kemalangan jalan raya akan dibincangkan dengan para pelajar. Contoh situasi kemalangan nyata dan penyelesaian praktikal dalam menyusun strategi yang berkesan juga akan disertakan.	*This course is related to investigation on traffic accident and highlighting the details from the expected output based on relevant analysis. In this course, various recent development in traffic accident analysis will be discussed and the causes of accident will be analyzed. In addition, various methods related to data collection and traffic accident data analysis will be discussed with the students. The examples of real-life situation during accident and practical solutions in developing effective strategies will also be included.*
Pemberatan Penilaian* *Assessment Weightage**	Penilaian Berterusan: 50% Peperiksaan Akhir: 50%	*Continuous Assessment: 50%* *Final Examination: 50%*
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	Ditampal di papan notis atau dimaklumkan melalui talian.	*Results will be notified through notice board and online*
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-Kaedah Universiti Malaya (Ijazah Sarjana) 2019. Peraturan-Peraturan Universiti Malaya (Ijazah Sarjana) 2019.	*University of Malaya Rules (Master's Degree) 2019* *University of Malaya Regulations (Master's Degree) 2019*

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Jabatan *Department*	KEJURUTERAAN AWAM	CIVIL ENGINEERING
Nama Program Akademik *Name of Academic Programme*	SARJANA KEJURUTERAAN KESELAMATAN JALAN RAYA	MASTER OF ROAD SAFETY ENGINEERING
Kod Kursus* *Course Code**	KQL7013	KQL7013
Tajuk Kursus* *Course Title**	RESEARCH PROJECT	PROJEK PENYELIDIKAN
Kredit* *Credit**	12	12
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	480	480
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*		

	Versi Bahasa Malaysia *Malay Version*	Versi Bahasa Inggeris *English Version*
Hasil Pembelajaran Kursus* *Course Learning Outcomes**	CLO 1. MEMBINA ULASAN KRITIKAL DAN KAJIAN TEORI YANG DIPERLUKAN UNTUK PENYELIDIKAN. CLO 2. MEREKA BENTUK KAEDAH UNTUK MENJALANKAN PENYELIDIKAN KESELAMATAN TRAFIK YANG KOMPLEKS. CLO 3. MENYELESAIKAN MASALAH PENYELIDIKAN MELALUI METODOLOGI DAN ALAT YANG BERSESUAIAN DENGAN PENYELIDIKAN. CLO 4. MENILAI DATA DAN PENEMUAN PENYELIDIKAN MENGGUNAKAN ALAT DIGITAL YANG SESUAI. CLO 5. MENUNJUKKAN HASIL PROJEK PENYELIDIKAN KEPADA LATAR BELAKANG KHALAYAK YANG BERBEZA MELALUI PEMBENTANGAN. CLO 6. MENGGUNAKAN KEMAHIRAN PENGURUSAN PROJEK YANG SESUAI DALAM MENYELESAIKAN PROJEK PENYELIDIKAN. CLO 7. MENJELASKAN KESAN KEWANGAN DAN EKONOMI DARIPADA HASIL PENYELIDIKAN. CLO 8. MENGHUBUNGKAITKAN HASIL PENYELIDIKAN BERKENAAN DENGAN KESANNYA KEPADA MASYARAKAT.	CLO 1. CONSTRUCT CRITICAL REVIEW AND THEORETICAL STUDY REQUIRED FOR THE RESEARCH. CLO 2. DESIGN A METHODOLOGY TO CARRY OUT COMPLEX TRAFFIC SAFETY RESEARCH. CLO 3. SOLVE THE RESEARCH PROBLEM THROUGH APPROPRIATE METHODOLOGY AND TOOLS. CLO 4. EVALUATE THE DATA AND FINDINGS OF THE RESEARCH USING THE APPROPRIATE DIGITAL TOOLS. CLO 5. DEMONSTRATE THE OUTCOME OF RESEARCH PROJECT TO DIFFERENT BACKGROUND OF AUDIENCE THROUGH PRESENTATION. CLO 6. APPLY APPROPRIATE PROJECT MANAGEMENT SKILLS IN COMPLETING THE RESEARCH PROJECT. CLO 7. EXPLAIN THE FINANCIAL AND ECONOMIC IMPACTS OF THE RESEARCH OUTCOMES. CLO 8. RELATE THE OUTCOMES OF THE RESEARCH WITH RESPECT TO ITS IMPACTS ON SOCIETY.
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Projek penyelidikan akan mendedahkan pelajar dalam membuat ulangkaji risalah berkaitan dengan topik kajian spesifik, merancang kaedah kajian, mengumpul data eksperimen dan menghuraikan data, menulis laporan dan membuat pembentangan.	Research project will expose students to carry out literature review on a specific research topic, plan a research methodology, collect experimental data and Interpret data, write a dissertation and carry out a presentation
Pemberatan Penilaian* (%) *Assessment Weightage**	Continuous Assessment : 100 Examination : 0	Continuous Assessment : 100 Examination : 0
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	Ditampal di papan notis atau dimaklumkan melalui talian.	Results will be notified through notice board and online
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-Kaedah Peraturan-Peraturan Universiti Malaya (Ijazah Sarjana) (Versi Terkini)	Universiti Malaya (Master Degree) Rules and Regulations (Latest Version)

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Jabatan *Department*	Jabatan Kejuruteraan Awam	*Department of Civil Engineering*
Nama Program Akademik Name of Academic *Programme*	Sarjana Kejuruteraan Keselamatan Jalan Raya	*Master of Road Safety Engineering*
Kod Kursus* *Course Code**	KQL7007	*KQL7007*
Tajuk Kursus* *Course Title**	Tingkah Laku Manusia dalam Keselamatan Jalan Raya	*Human Behaviour in Road Safety*
Kredit* *Credit**	3	*3*
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	120	*120*
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*	-	-
Hasil Pembelajaran Kursus* *Course Learning Outcomes**	Di akhir kursus ini, pelajar dapat: 1. Memahami penyesuaian tingkah laku dan sumbangan kritikal mereka terhadap faktor manusia dalam kemalangan jalan.	*At the end of the course, students are able to:* *1. Comprehend the behavioural adaptations and their critical contributions to the human factors in traffic crashes.* *2. Discover the theories and models that describe the road user behaviour, performance and errors.*

	2. Mengetahui teori dan model yang menggambarkan tingkah laku, prestasi dan kesilapan pengguna jalan raya. 3. Mengenalpasti peranan manusia, mesin dan persekitaran, keadaan dan keperluan pengguna jalan raya yang berbeza. 4. Menilaikan contoh bagi teori-teori tingkahlaku sebenar untuk memahami punca kemalangan dalam merangka strategi untuk meningkatkan keselamatan jalan raya.	*3. Identify the roles of man, machine and environment, the conditions and needs of different road-users.* *4. Evaluate real-life examples of behavioural theories and models to understand the causes of crashes in developing strategies for improving road safety.*
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Kursus ini memperkenalkan kesan penyesuaian tingkah laku terhadap keselamatan pengguna jalan raya, faktor-faktor yang mempengaruhi pemandu dan pengguna jalan raya lain untuk mengubah tingkah laku mereka, pelbagai teknik yang digunakan untuk menjelaskan dan menilai kesan penyesuaian tingkah laku terhadap keselamatan pengguna jalan raya.	*This course introduces the impacts of behavioural adaption on road user safety, factors that affect drivers and other road users to alter their behaviour, different techniques to explain and evaluate impacts of behavioural adaption on road user safety.*
Pemberatan Penilaian* *Assessment Weightage**	Penilaian Berterusan: 50% Peperiksaan Akhir: 50%	*Continuous Assessment: 50%* *Final Examination: 50%*
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	Ditampal di papan notis atau dimaklumkan melalui talian.	*Results will be notified through notice board and online*
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-Kaedah Universiti Malaya (Ijazah Sarjana) 2019. Peraturan-Peraturan Universiti Malaya (Ijazah Sarjana) 2019.	*University of Malaya Rules (Master's Degree) 2019* *University of Malaya Regulations (Master's Degree) 2019*

UNIVERSITI MALAYA	**PRO FORMA KURSUS** ***COURSE PRO FORMA***

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Akademi/Fakulti/Institut/Pusat *Academy/Faculty/Institute/Centre*	Fakulti Kejuruteraan	*Faculty of Engineering*
Jabatan *Department*	Jabatan Kejuruteraan Awam	*Department of Civil Engineering*
Nama Program Akademik Name of Academic *Programme*	Sarjana Kejuruteraan Keselamatan Jalan Raya	*Master of Road Safety Engineering*
Kod Kursus* *Course Code**	KQL7008	*KQL7008*
Tajuk Kursus* *Course Title**	Sistem Pengangkutan Pintar dalam Keselamatan Jalan Raya	*Intelligent Transport System in Road Safety*
Kredit* *Credit**	3	*3*
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	120	*120*
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*	Tiada	*None*
Hasil Pembelajaran Kursus* *Course Learning Outcomes**	Di akhir kursus ini, pelajar dapat: 1. Mengaitkan elemen sistem pengangkutan pintar dan keselamatan jalan raya melalui teknologi termaju. 2. Mengkaji kesan-kesan keselamatan jalan raya melalui pemilihan pengguna rangkaian	*At the end of the course, students are able to:* *1. Relate the elements of intelligent transportation systems and road safety through advanced technologies.*

	pengangkutan multimodal dengan menggunakan kajian-kajian kes sebenar. 3. Simulasi scenario realistik dalam rangkaian pengangkutan untuk kecekapan pengangkutan di masa hadapan.	*2. Examine the effects of road safety through the selection of multimodal transport networks users using real case studies.* *3. Simulate realistic scenarios in the transport networks for future efficiency of transportation.*
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Kursus ini memperkenalkan kepada elemen asas sistem pengangkutan pintar (ITS), yang memfokuskan pada aspek teknologi dan keselamatan lalu lintas. Topiknya merangkumi kaedah dan model untuk simulasi rangkaian pengangkutan multimodal, menunjukkan ramalan pemboleh ubah keadaan dan tingkah laku pengguna yang terlibat dalam proses pilihan jalan dalam rangkaian multimodal; keselamatan lalu lintas di rangkaian bandar; penggunaan sistem teknologi canggih dan simulasi masa nyata.	*This course introduces to the basic elements of intelligent transportation systems (ITS), focusing on technological aspects and traffic safety. The topics include the methods and models for the simulation of multimodal transport networks, pointing out the forecasting of state variables and the behaviour of users involved in the path choice process in multimodal networks; traffic safety in urban networks; the deployment of advanced technology system and real time simulation.*
Pemberatan Penilaian* *Assessment Weightage**	Penilaian Berterusan: 50% Peperiksaan Akhir: 50%	*Continuous Assessment: 50%* *Final Examination: 50%*
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	Maklumbalas pelajar akan diberikan melalui perbincangan di dalam kelas dan juga melalui platform Spectrum	*Student's feedback will be given through class discussion and Spectrum platform*
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Sila rujuk Kaedah-kaedah Universiti Malaya (Ijazah Sarjana) 2019 dan Peraturan-Peraturan Universiti Malaya (Ijazah Sarjana) 2019.	*Please refer to the University of Malaya (Masters Degree) Rules 2019 and University of Malaya (Masters Degree) Regulations 2019.*

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Akademi/Fakulti/Institut/Pusat *Academy/Faculty/Institute/Centre*	Kejuruteraan	*Engineering*
Jabatan *Department*	Kejuruteraan Awam	*Civil Engineering*
Nama Program Akademik Name of Academic *Programme*	Sarjana Kejuruteraan Keselamatan Jalan Raya	*Master of Road Safety Engineering*
Kod Kursus* *Course Code**	KQL7009	*KQL7009*
Tajuk Kursus* *Course Title**	Sistem Pengangkutan Lestari	*Sustainable Transport System*
Kredit* *Credit**	3	*3*
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	120	*120*
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*	Tiada	*None*
Hasil Pembelajaran Kursus* *Course Learning Outcomes**	Di akhir kursus ini, pelajar dapat: 1. Terangkan prinsip asas yang berkaitan dengan reka bentuk lestari dan kejuruteraan pengangkutan. (C2) 2. Menyelidiki isu-isu yang berkaitan dengan sektor pengangkutan termasuk ketergantungan kepada	*At the end of the course, students are able to:* *1. Explain fundamental principles relating to sustainable design and transportation engineering. (C2)* *2. Investigate underlying issues associated with the transport sector including automobile*

	kenderaan, penggunaan tanah dan dan tingkah laku perjalanan, pergolakan bandar, dan perubahan iklim berdasarkan data, statistik, dan pengetahuan fakta. (C4) 3. Menganalisis penyelesaian pengangkutan lestari yang diperlukan untuk mengurangkan kesan-kesan seperti pembangunan masyarakat lestari, alternatif mod dan tenaga, pembangunan berorientasikan transit, dasar dan harga, pengurusan permintaan pengangkutan, dan adaptasi dan mitigasi terhadap perubahan iklim. (C4) 4. Gunakan kaedah berkelanjutan, ukuran prestasi, prinsip reka bentuk perancangan pengangkutan, dan teknik analisis kapasiti untuk menyelesaikan masalah pengangkutan. (C3)	*dependence, land use and travel behavior, urban sprawl, and climate change impacts on the basis of data, statistics, and factual knowledge. (C4)* *3. Analyze possible sustainable transportation solutions to reduce impacts such as sustainable community development, modal and energy alternatives, transit-oriented development, policy and pricing, transportation demand management, and adaptation and mitigation to climate change. (C4)* *4. Apply sustainable methods, performance measures, transportation planning design principles, and capacity analysis techniques to solve transportation problems. (C3)*
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Kursus ini memperkenalkan sistem kejuruteraan pengangkutan dan proses keputusan mengenai perancangan pengangkutan yang berorientasikan prinsip mobiliti lestari. Kursus ini akan meneliti keseimbangan antara meningkatkan mobiliti sambil mengurangkan kesan-kesan terhadap persekitaran, sosial, dan ekonomi. Pertama dengan memeriksa masalah yang berkaitan dengan sistem pengangkutan di abad ke-21, dan kedua dengan mencari jalan penyelesaian yang mungkin untuk perancangan masa depan. Masalah pengangkutan yang disiasat meliputi ketergantungan kepada kenderaan, penggunaan bahan bakar, penyebaran bandar, dan kesan perubahan iklim. Untuk menanggani masalah ini, penyelesaian seperti pembangunan komuniti lestari, alternatif mod, pembangunan berorientasi transit, dan pengurusan permintaan pengangkutan diselidiki bersama dengan alat seperti, analisis kapasiti, ukuran prestasi, dan sistem penilaian lestari. Prinsip, kaedah, alat, dan kajian kes ini memberikan gambaran mengenai integrasi dan	*This course introduces the engineering of transportation systems and the decision process about transport planning oriented to sustainable mobility principles. This course will look at the balance between enhancing mobility while reducing impacts on the environment, society, and economy. First by looking at the problems associated with twenty-first-century transport system, and second by discovering possible solutions to future planning. The transport problems that are explored include automobile dependence, fuel consumption, urban sprawl, and climate change impacts. To respond to these implications, solutions such as sustainable community development, modal alternatives, transit-oriented development, and transportation demand management are investigated along with tools such as, capacity analysis, performance measures, and sustainable rating systems. These principles, methods, tools, and case studies provide insight into*

	kemajuan keberlanjutan ke dalam sistem pengangkutan.	*the integration and progression of sustainability into the transportation system.*
Pemberatan Penilaian* *Assessment Weightage**	Penilaian Berterusan: 50% Peperiksaan Akhir: 50%	*Continuous Assessment: 50%* *Final Examination: 50%*
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	Maklumbalas pelajar akan diberikan melalui perbincangan di dalam kelas dan juga melalui platform Spectrum	*Student's feedback will be given through class discussion and Spectrum platform*
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Sila rujuk Kaedah-kaedah Universiti Malaya (Ijazah Sarjana) 2019 dan Peraturan-Peraturan Universiti Malaya (Ijazah Sarjana) 2019.	*Please refer to the University of Malaya (Masters Degree) Rules 2019 and University of Malaya (Masters Degree) Regulations 2019.*

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Jabatan *Department*	Jabatan Kejuruteraan Awam	*Department of Civil Engineering*
Nama Program Akademik Name of Academic *Programme*	Sarjana Kejuruteraan Keselamatan Jalan Raya	*Master of Road Safety Engineering*
Kod Kursus* *Course Code**	KQL7010	*KQL7010*
Tajuk Kursus* *Course Title**	Pemodelan Trafik, Simulasi dan Keselamatan	*Traffic Modelling, Simulation and Safety*
Kredit* *Credit**	3	*3*
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	120	*120*
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*	-	-
Hasil Pembelajaran Kursus* *Course Learning Outcomes**	Di akhir kursus ini, pelajar dapat: 1. Memahami alat dan teknik asas dalam pemodelan dan simulasi trafik. 2. Menilai prestasi pelbagai kaedah reka bentuk melalui kajian kes yang berbeza.	*At the end of the course, students are able to:* *1. Comprehend the fundamental tools and techniques of traffic modelling and simulation.* *2. Evaluate the performance of various design methods through different case study.* *3. Apply different methods in modelling and*

	3. Menggunakan kaedah yang berbeza dalam pemodelan dan simulasi untuk menyokong pengambilan keputusan dalam konteks keselamatan.	*simulation to support the decision making in the safety context.*
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Kursus ini akan memberi pendedahan kepada pelajar dengan alat dan teknik pemodelan yang berbeza yang terdapat di pasaran seperti EMME, VISUM, VISSIM, pakej pemodelan CUBE dan lain-lain. Sistem keselamatan dan mobiliti keselamatan akan dibangunkan dengan menggunakan perisian pemodelan dan simulasi yang berbeza ini. Selain itu, pelajar juga akan didedahkan dengan pelbagai kajian kes dari dalam dan luar negara mengenai reka bentuk sistem trafik yang selamat.	*This course will expose students with different modelling tools and techniques available in the market such as EMME, VISUM, VISSIM, CUBE modelling package etc. The safety mobility and transport system will be develop using these different modelling and simulation software. Besides, students will also be exposed with various case study from local and abroad on the safe traffic system design.*
Pemberatan Penilaian* *Assessment Weightage**	Penilaian Berterusan: 50% Peperiksaan Akhir: 50%	*Continuous Assessment: 50%* *Final Examination: 50%*
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	Ditampal di papan notis atau dimaklumkan melalui talian.	*Results will be notified through notice board and online*
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-Kaedah Universiti Malaya (Ijazah Sarjana) 2019. Peraturan-Peraturan Universiti Malaya (Ijazah Sarjana) 2019.	*University of Malaya Rules (Master's Degree) 2019* *University of Malaya Regulations (Master's Degree) 2019*

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Akademi/Fakulti/Institut/Pusat *Academy/Faculty/Institute/Centre*	Fakulti Kejuruteraan	*Faculty of Engineering*
Jabatan *Department*	Jabatan Kejuruteraan Awam	*Department of Civil Engineering*
Nama Program Akademik Name of Academic *Programme*	Sarjana Kejuruteraan Keselamatan Jalan Raya	*Master of Road Safety Engineering*
Kod Kursus* *Course Code**	KQL7011	*KQL7011*
Tajuk Kursus* *Course Title**	Perancangan Pengangkutan Bandar dan Keselamatan	*Urban Transport Planning and Safety*
Kredit* *Credit**	3	*3*
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	120	*120*
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*	-	-
Hasil Pembelajaran Kursus* *Course Learning Outcomes**	Di akhir kursus ini, pelajar dapat: 1. Memahami struktur dan dinamik bandar, serta strategi dalam mempromosikan mobiliti bandar yang mampan. 2. Menilai masalah dan fungsi jalan bandar, serta prinsip penting untuk mewujudkan trafik bandar yang lebih selamat bagi pengguna jalan raya.	*At the end of the course, students are able to:* *1. Comprehend the urban structures and dynamics, and strategies in promotion of sustainable urban mobility.* *2. Evaluate urban streets issues and functions, and vital principles for making urban traffic safer for*

	3. Mentafsirkan masalah yang berkaitan dengan strategi perancangan pengangkutan bandar dengan menggunakan pelbagai kaedah.	*road users.* *3. Interpret the problems related to planning strategies for urban transport using various methods.*
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Kursus ini memperkenalkan kesan dasar perancangan bandar terhadap risiko bandar dan keselamatan jalan raya; pertimbangan jalan bandar dan fungsinya, prinsip penting dalam mewujudkan trafik bandar lebih selamat untuk pejalan kaki, penunggang basikal, dan pengguna pengangkutan awam; teknik yang berbeza untuk menerangkan dan menilai kemalangan jalan raya.	*This course introduces the influences of urban planning policies on susceptibility to urban and road traffic risks; urban streets concerns and their functions, essential principles for forming urban traffic safer for pedestrians, bicyclists, and public transport users; different techniques to explain and evaluate the traffic crashes.*
Pemberatan Penilaian* *Assessment Weightage**	Penilaian Berterusan: 50% Peperiksaan Akhir: 50%	*Continuous Assessment: 50%* *Final Examination: 50%*
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	Ditampal di papan notis atau dimaklumkan melalui talian.	*Results will be notified through notice board and online*
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-Kaedah Universiti Malaya (Ijazah Sarjana) 2019. Peraturan-Peraturan Universiti Malaya (Ijazah Sarjana) 2019.	*University of Malaya Rules (Master's Degree) 2019* *University of Malaya Regulations (Master's Degree) 2019*

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Jabatan *Department*	Jabatan Kejuruteraan Awam	*Department of Civil Engineering*
Nama Program Akademik Name of Academic *Programme*	Sarjana Kejuruteraan Keselamatan Jalan Raya	*Master of Road Safety Engineering*
Kod Kursus* *Course Code**	KQL7012	*KQL7012*
Tajuk Kursus* *Course Title**	Sistem Keselamatan Kenderaan	*Vehicle Safety System*
Kredit* *Credit**	3	*3*
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	120	*120*
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*	-	-
Hasil Pembelajaran Kursus* *Course Learning Outcomes**	Di akhir kursus ini, pelajar dapat: 1. Memahami pengetahuan asas dan kepakaran untuk penyelesaian masalah di bidang keselamatan trafik kenderaan. 2. Membina penyelesaian yang bersesuaian dengan menggunakan pendekatan, kaedah dan peralatan	*At the end of the course, students are able to:* *1. Comprehend the fundamental knowledge and expertise for problem solving in the field of vehicle traffic safety.* *2. Develop appropriate solutions using advanced technological approaches,*

	teknologi termaju bagi mengurangkan risiko kemalangan kenderaan serta kecederaan penumpang. 3. Menggunakan konsep-konsep termaju kaedah berangka yang bersesuaian dengan teknologi digital bagi penyelesaian masalah kompleks keselamatan trafik kenderaan.	*methods and equipment to reduce the risk of vehicle accidents and passenger injuries.* *3. Apply advanced concepts of numerical methods that are compatible with digital technology for solving complex problems of vehicle traffic safety.*
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Teknologi yang dibangunkan di dalam industri automotif khususnya dalam aspek keselamatan kenderaan dan penumpang berkembang secara pesat. Kursus ini memberi tumpuan kepada teknologi canggih dalam sistem keselamatan kenderaan terutamanya dalam bidang sistem keselamatan aktif dan pasif. Sistem keselamatan bukan tradisional berdasarkan penglihatan komputer akan dilindungi. Pelajar juga akan didedahkan dengan pentingnya keselamatan pencegahan aktif dan kerumitan teknologi sistem pemandu / kenderaan / persekitaran (DVE). Kemajuan dalam prinsip sensor dan reka bentuk dan fungsi sistem keselamatan aktif semasa akan dicakupi.	*This course focuses on advanced technology in vechicle safety system especially in the area of active and passive safety system. Non-traditional safety system based on computer vision will be covered. Students will also be exposed to the importance of active preventive safety and the complexity of the driver/vehicle/environment (DVE) system technology. The advancement in sensor principles and the design and functions of current active safety systems will be covered.*
Pemberatan Penilaian* *Assessment Weightage**	Penilaian Berterusan: 50% Peperiksaan Akhir: 50%	*Continuous Assessment: 50%* *Final Examination: 50%*
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	Ditampal di papan notis atau dimaklumkan melalui talian.	*Results will be notified through notice board and online*
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-Kaedah Universiti Malaya (Ijazah Sarjana) 2019. Peraturan-Peraturan Universiti Malaya (Ijazah Sarjana) 2019.	*University of Malaya Rules (Master's Degree) 2019* *University of Malaya Regulations (Master's Degree) 2019*

COURSEWORK PROGRAMME | KQD

03

Master of Safety, Health and Environment Engineering (ODL)

COURSE TYPE	MODE OF STUDY	INDICATIVE DURATION
Coursework	Open and Distance Learning	4 semesters

PROGRAMME AT A GLANCE

Designed for professionals who need greater flexibility, this ODL pathway enables structured learning beyond geographical boundaries through digital resources, guided online engagement and peer interaction. It develops knowledge across occupational safety and health, environmental protection and sustainability, process safety, and Prevention through Design, helping learners balance postgraduate study with career and family commitments.

View the official programme page

Source: Universiti Malaya Study portal | Page last updated 16 May 2026

UNIVERSITI MALAYA

FACULTY OF ENGINEERING

Master of Safety, Health and Environment Engineering (ODL)

Open and Distance Learning Programme Information

MSHEE ODL	43	PART TIME
PROGRAMME	TOTAL CREDITS	TYPES OF STUDY

ACADEMIC SESSION 2026/2027

Universiti Malaya

Contents

This section explains the programme profile, admission requirements, learning outcomes, curriculum and ODL learning experience for prospective and registered students.

01	Programme Overview
02	Admission Requirements
03	Programme Goal and Educational Objectives
04	Programme Learning Outcomes
05	Curriculum Structure
06	Elective Course Guide
07	ODL Learning Experience
08	Academic Journey and Student Guidance
09	Career Pathways and Official Information

Programme Overview

The Master of Safety, Health and Environment Engineering ODL is a flexible 43-credit programme for professionals seeking advanced knowledge in occupational safety and health, environmental protection and process risk.

Students study key areas such as legislation, industrial health, sustainable engineering, risk assessment and hazard evaluation. Elective courses support further specialisation, while a supervised research project applies learning to a real-world professional or industrial challenge.

Programme at a Glance

Programme name	Master of Safety, Health and Environment Engineering
Delivery pathway	Open and Distance Learning
Programme identifier	KQD ODL
Admission code reference	SCWKQDPTD03
Qualification level	Master degree MQF Level 7
Mode of study	Coursework Part time ODL
Normal duration	4 semesters
Total credits	43 credits
Medium of instruction	English
Intakes	Semester 1 October and Semester 2 March subject to availability

Curriculum Composition

Programme core	Electives	Total
31 credits	**12 credits**	**43 credits**

How ODL Works

Learn	Connect	Apply
Self-instructional materials and scheduled online activities	Synchronous sessions, asynchronous discussion and lecturer guidance	Assessment tasks and a supervised industry-relevant research project

Admission Requirements

Applicants must hold a recognised Bachelor's Degree in Engineering, Science, Computing or a related field.

Academic Qualification

Applicants with a CGPA of at least 3.00 may be considered under the general University requirements.

Applicants with a CGPA from 2.50 to 2.99 must meet at least one of the following criteria:

- Graduate of Universiti Malaya.
- At least one year of work experience in a related field.
- Publication in a related field.
- Recipient of a scholarship.
- Staff member of a government agency.
- Pass an interview conducted by the Faculty.
- Pass a special evaluation conducted by the Faculty.

English Language Requirement for International Applicants

International applicants must satisfy the current University English-language requirement. The programme page lists the following accepted results:

Qualification	Minimum result
Malaysian University English Test (MUET)	Band 4.0
IELTS Academic	Band 6.0
TOEFL iBT Centre Based	Score 60
TOEFL Essentials Online	Score 8.5
Pearson Test of English Academic	Score 59
Cambridge B1 Preliminary B2 First C1 Advanced or C2 Proficiency	Score 169

Programme Goal and Educational Objectives

Programme Goal

The programme develops knowledgeable safety, health and environment engineering graduates who can exercise professional judgement, uphold ethical standards and make well-supported decisions in complex practice settings.

Programme Educational Objectives

Objective	Expected graduate achievement
PEO1	Graduates demonstrate advanced technical knowledge, analytical competency, and innovative problem-solving skills, integrating numerical and digital proficiencies to deliver sustainable solutions in engineering design, analysis, and implementation.
PEO2	Graduates exhibit strong leadership, an entrepreneurial mindset, and effective communication and interpersonal skills, driving transformative advancements and innovation within engineering industries.
PEO3	Graduates commit to continuous self-improvement, professional growth, and lifelong learning, upholding ethical standards and professional practices while contributing responsibly to societal and industrial progress.

What These Objectives Emphasise

Technical judgement advanced analysis, digital capability and sustainable engineering solutions.

Professional influence leadership, communication, collaboration and entrepreneurial thinking.

Responsible practice lifelong learning, ethical conduct and positive contribution to society and industry.

Programme Learning Outcomes

On successful completion of the programme, graduates should be able to demonstrate the following outcomes.

Code	Learning outcome	Competency domain and taxonomy
PLO1	Apply knowledge critically and integratively to resolve complex problems in safety, health and environment engineering using advance or innovative approaches.	CLS1 Knowledge and Understanding Cognitive / Psychomotor
PLO2	Analyze and synthesize complex engineering problems critically through the application of specialized concepts in safety, health and environment engineering.	CLS2 Cognitive Skills Cognitive / Psychomotor
PLO3	Develop solutions for complex problems in safety, health and environment engineering using practical skills, tools or investigative techniques which are informed by knowledge.	CLS3A Practical Skills Cognitive / Psychomotor
PLO4	Communicate ideas and rationale of using appropriate methods to peers and experts in safety, health and environment engineering field using oral or written medium.	CLS3B Interpersonal and communication skills Affective / Cognitive
PLO5	Apply appropriate digital technologies and software competently to develop solutions for complex problems in safety, health and environment engineering field.	CLS3C Digital and numeracy skills Affective / Cognitive
PLO6	Demonstrate leadership skill by responsibly planning and managing work within own team in safety, health and environment engineering projects.	CLS3D Leadership autonomy and responsibility Affective / Cognitive
PLO7	Identify need for professional advancement through continuous professional development and entrepreneurial ventures in safety, health and environment engineering.	CLS4 Personal and entrepreneurial skills Affective / Cognitive
PLO8	Demonstrate adherence to ethical and professional codes of practice in addressing community and global issues related to safety, health and environment engineering.	CLS5 Ethics and professionalism Affective / Cognitive

Curriculum Structure

The supplied curriculum structure requires 43 credits**: 31 credits of core courses** and **12 credits of electives.** The core includes a 10-credit research project.

Core Courses

Course code	Course title	Credits
KQX7001D	Research Methodology	3
KQX7002D	Project Management	3
KQD7002D	Safety Health and Environmental Legislation in Malaysia	3
KQD7003D	Occupational and Industrial Health in Engineering	3
KQD7004D	Sustainable Process Engineering	3
KQD7005D	Quantitative Risk Assessment	3
KQD7006D	Hazard Identification and Evaluation	3
KQD7001D	Research Project	10
Total required credits		**31**

Research Sequence

Foundation	Development	Completion
KQX7001D Research Methodology	KQD7001D Research Project 1 (P1)	KQD7001D Research Project 2 (P2)

Integrated Learning Path

Understand	Evaluate	Apply
Legislation Occupational Health Sustainable Practice	Hazards Risk Waste and Ergonomics	Research Project Management Machine Learning

Elective Course Guide

Students complete **four approved three-credit elective courses**. Availability may vary by semester and registration remains subject to programme advice.

Course code	Course title	Credits
KQD7007D	Environmental Monitoring and Assessment	3
KQD7008D	Life Cycle Assessment and Management	3
KQD7009D	Hazardous Waste Control	3
KQD7010D	Industrial Ergonomics	3
KQD7011D	Air Pollution Management and Control	3
KQD7014D	Human Factor and Management at Workplace	3
KQD7015D	Industrial Emergency and Crisis Management	3
Elective credits required		**12**

Choosing Electives

Environment and sustainability monitoring, life-cycle assessment, hazardous waste and air-pollution control.

People and work systems ergonomics, human factors and workplace management.

Preparedness and response emergency planning and crisis management in industrial settings.

ODL Learning Experience

ODL combines scheduled engagement with independent study. Students use the University learning-management environment (SPECTRUM ODL https://odl.um.edu.my/) to access materials, participate in learning activities, communicate with lecturers and peers, submit assessments and monitor progress.

Learning element	What students can expect	Student responsibility
Self-instructional materials	Structured digital resources support independent learning before and after scheduled sessions.	Follow the weekly sequence and complete preparatory work.
Synchronous learning	Live online sessions support explanation, discussion and feedback.	Attend as scheduled and participate actively.
Asynchronous engagement	Forums and learning activities allow considered participation across different schedules.	Contribute by the stated deadlines and engage professionally.
Assessment and feedback	Assignments, projects and other approved assessments demonstrate achievement of course outcomes.	Submit original work and act on feedback.
Academic support	Lecturers and programme staff guide course learning, registration and project progress.	Seek guidance early and use official communication channels.

Research Project

The 10-credit Research Project develops the ability to define a relevant problem, select an appropriate method, analyse evidence and communicate a defensible engineering response. The research field and supervisor should be confirmed before substantive project work begins. Students must follow the milestones, ethics requirements and submission procedures communicated by the Faculty.

Digital Study Readiness

- Reliable internet access and a suitable computer for online learning and technical work.
- Regular access to the University learning platform (SPECTRUM ODL https://odl.um.edu.my/) and official email.
- A weekly study routine that protects time for live sessions, independent work and assessments.
- Early communication with course lecturers when technical, academic or scheduling issues arise.

Academic Journey and Student Guidance

The four-semester sequence supports progressive learning while retaining flexibility for working professionals. The diagram below describes the intended learning progression; it is not a semester-by-semester registration plan.

Semester 1	Semester 2	Semester 3	Semester 4
Build foundations in research, project work and the SHE regulatory context	Develop capability in occupational health, sustainability and risk analysis	Deepen specialist knowledge through hazard evaluation and approved electives	Complete the elective portfolio and supervised research project requirements

Registration and Progress

Register only for courses confirmed as available in the relevant semester. Check the official registration schedule, candidature rules and programme notices before each registration period. Course offerings, assessment arrangements and project milestones may change through approved University and Faculty processes.

Before Each Semester

01	Review the approved course offering and your remaining credit requirements.
02	Confirm registration deadlines and any prerequisites or project milestones.
03	Check the timetable and reserve time for synchronous sessions and independent study.
04	Use your official UM account and verify access to all registered course sites.
05	Contact the programme team promptly if your study load or project progress needs review.

Career Pathways and Official Information

The programme supports professional development in roles that combine technical analysis, regulatory awareness and organisational responsibility for safety, health and environmental performance.

- Safety engineer or occupational safety and health practitioner
- Environmental engineer or environmental compliance officer
- Risk assessment or hazard-management specialist
- Industrial hygiene or occupational-health specialist
- Sustainability or environmental-management professional
- Ergonomics, air-pollution-control or emergency-management specialist
- Consultant, researcher or technical manager in related industries

Official Sources

Study at UM programme page

Faculty of Engineering master programme entry requirements

Faculty postgraduate programmes

FACULTY OF ENGINEERING

Master of Safety, Health and Environment Engineering ODL Study Planners

Academic Session 2026/2027

43	6	15	12	10
TOTAL CREDITS	GENERAL	PROGRAMME CORE	ELECTIVES	RESEARCH PROJECT

How to Read the Planner

1 Follow your intake	2 Complete four electives	3 Confirm each registration
Use the four study periods shown for Semester 1 or Semester 2 entry.	KQD7007DL and KQD7009DL are placed in Year 1. Complete the remaining elective allocation shown for your intake.	Check the approved offering and Research Project stage with the programme coordinator before registering.

Programme MSHEE ODL **Delivery** Open and Distance Learning **Duration** 4 semesters **Medium** English

Planner for Master of Safety Health and Environment Engineering ODL

Semester 1 Intake Four Semester Pathway

The pathway completes 43 credits over four regular semesters. Course availability and project registration remain subject to Faculty confirmation.

STUDY PERIOD 1 SEMESTER I	STUDY PERIOD 2 SEMESTER II	STUDY PERIOD 3 SEMESTER I	STUDY PERIOD 4 SEMESTER II
Year 1 entry semester	**Year 1 second semester**	**Year 2 third study period**	**Year 2 final study period**
REQUIRED COURSES **KQX7002D** Project Management [3] **KQD7004D** Sustainable Process Engineering [3] **KQD7006D** Hazard Identification and Evaluation [3] **KQD7007D** Environmental Monitoring and Assessment [3] **PLANNED LOAD 12 CREDITS**	**REQUIRED COURSES** **KQX7001D** Research Methodology [3] **KQD7002D** Safety Health and Environmental Legislation in Malaysia [3] **KQD7005D** Quantitative Risk Assessment [3] **KQD7009D** Hazardous Waste Control [3] **PLANNED LOAD 12 CREDITS**	**REQUIRED COURSES** **KQD7001D** Research Project 1 [5] **KQD7003D** Occupational and Industrial Health in Engineering [3] **CHOOSE ONE ELECTIVE** **KQD7008D** Life Cycle Assessment and Management [3] OPTION **KQD7010D** Industrial Ergonomics [3] OPTION **Select one 3 credit course** **PLANNED LOAD 11 CREDITS**	**REQUIRED COURSES** **KQD7001D** Research Project 2 [5] **CHOOSE ONE ELECTIVE** **KQD7011D** Air Pollution Management and Control [3] OPTION **KQD7014D** Human Factor and Management at Workplace [3] OPTION **KQD7015D** Industrial Emergency and Crisis Management [3] OPTION **Select one 3 credit course** **PLANNED LOAD 8 CREDITS**

Study period 1	Study period 2	Study period 3	Study period 4	Programme total
12 credits	**12 credits**	**11 credits**	**8 credits**	**43 credits**

Planner for Master of Safety Health and Environment Engineering ODL

Semester 2 Intake Four Semester Pathway

The pathway completes 43 credits over four regular semesters. Course availability and project registration remain subject to Faculty confirmation.

STUDY PERIOD 1 SEMESTER II	STUDY PERIOD 2 SEMESTER I	STUDY PERIOD 3 SEMESTER II	STUDY PERIOD 4 SEMESTER I
Year 1 entry semester	**Year 1 second study period**	**Year 2 third study period**	**Year 2 final study period**
REQUIRED COURSES **KQX7001D** Research Methodology [3] **KQD7002D** Safety Health and Environmental Legislation in Malaysia [3] **KQD7005D** Quantitative Risk Assessment [3] **KQD7009D** Hazardous Waste Control [3] **PLANNED LOAD 12 CREDITS**	**REQUIRED COURSES** **KQX7002D** Project Management [3] **KQD7004D** Sustainable Process Engineering [3] **KQD7006D** Hazard Identification and Evaluation [3] **KQD7007D** Environmental Monitoring and Assessment [3] **PLANNED LOAD 12 CREDITS**	**REQUIRED COURSES** **KQD7001D** Research Project 1 [5] **CHOOSE TWO ELECTIVES** **KQD7011D** Air Pollution Management and Control [3] OPTION **KQD7014D** Human Factor and Management at Workplace [3] OPTION **KQD7015D** Industrial Emergency and Crisis Management [3] OPTION **Select two 3 credit courses** **PLANNED LOAD 11 CREDITS**	**REQUIRED COURSES** **KQD7001D** Research Project 2 [5] **KQD7003D** Occupational and Industrial Health in Engineering [3] **ALTERNATIVE ELECTIVES** **KQD7008D** Life Cycle Assessment and Management [3] OPTION **KQD7010D** Industrial Ergonomics [3] OPTION **Confirm final selection with the programme coordinator** **PLANNED LOAD 8 CREDITS**

Study period 1	Study period 2	Study period 3	Study period 4	Programme total
12 credits	**12 credits**	**11 credits**	**8 credits**	**43 credits**

UNIVERSITI MALAYA	**PRO FORMA KURSUS** ***COURSE PRO FORMA***

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Akademi/Fakulti/Institut/Pusat *Academy/Faculty/Institute/Centre*	Fakulti Kejuruteraan	*Faculty of Engineering*
Jabatan *Department*	Jabatan Kejuruteraan Kimia	*Department of Chemical Engineering*
Nama Program Akademik Name of Academic *Programme*	Sarjana Kejuruteraan Keselamatan, Kesihatan, dan Alam Sekitar	*Master of Safety, Health and Environment Engineering*
Kod Kursus* *Course Code**	KQD7001DL	*KQD7001DL*
Tajuk Kursus* *Course Title**	Projek Penyelidikan	*Research Project*
Kredit* *Credit**	10	*10*
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	400	400
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*	Tiada	*None*

UNIVERSITI MALAYA	**PRO FORMA KURSUS** ***COURSE PRO FORMA***

Hasil Pembelajaran Kursus* *Course Learning Outcomes**	Di akhir kursus ini, pelajar dapat: 1. Mengkaji dokumen saintifik dan melaporkan tinjauan literatur 2. Menentukan jurang penyelidikan dan membina objektif yang boleh dicapai. 3. Mencadangkan metodologi yang sesuai untuk penyelidikan eksperimental atau bukan eksperimental 4. Menganalisa dapatan kajian dan menggunakan alat digital dan perisian yang sesuai. 5. Menunjukkan kemahiran pengurusan projek yang efektif dalam menyiapkan projek penyelidikan dalam masa yang ditentukan. 6. Menganalisa kesan ekonomi dari hasil projek penyelidikan. 7. Menganalisa hasil kajian berkenaan dengan kesannya terhadap kesihatan, keselamatan dan/atau alam sekitar. 8. Membentangkan hasil projek penyelidikan kepada khalayak.	*At the end of the course, students are able to:* *1. Review scientific documents and report literature review* *2. Determine research gap and construct deliverable objectives* *3. Propose suitable methodology to conduct experimental or non-experimental research* *4. Analyse the findings of the research and use appropriate software and digital tools.* *5. Demonstrate effective project management skills in completing the research project on time.* *6. Evaluate the economic impacts of the research project* *7. Evaluate the outcomes of the research with respect to safety, health and/or environment impact.* *8. Present outcome of research project to audience*
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Projek penyelidikan akan mendedahkan pelajar dalam membuat ulangkaji risalah berkaitan dengan topik kajian spesifik, merancang kaedah kajian, mengumpul data eksperimen dan menghuraikan data, menulis laporan dan membuat pembentangan.	*Research project will expose students to carry out literature review on a specific research topic, plan a research methodology, collect experimental data and Interpret data, write a dissertation and carry out a presentation*

Pemberatan Penilaian* *Assessment Weightage**	Penilaian Berterusan: 100% Peperiksaan Akhir: 0%	*Continuous Assessment: 100%* *Final Examination: 0%*
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	Maklumbalas dalam talian	*Online feedback*
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-kaedah Universiti Malaya (Ijazah Sarjana) 2019 Peraturan-peraturan Universiti Malaya (Ijazah Sarjana) 2019	*University of Malaya Rules (Master's Degree) 2019* *University of Malaya Regulations (Master's Degree) 2019*

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Jabatan *Department*	Kejuruteraan Kimia	*Chemical Engineering*
Nama Program Akademik Name of Academic *Programme*	Sarjana Kejuruteraan Keselamatan, Kesihatan, dan Alam Sekitar	*Master of Safety, Health and Environment Engineering*
Kod Kursus* *Course Code**	KQD7002DL	KQD7002DL
Tajuk Kursus* *Course Title**	Perundangan Keselamatan, Kesihatan dan Alam Sekitar di Malaysia	*Safety, Health and Environmental Legislation in Malaysia*
Kredit* *Credit**	3	3
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	120	120
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*	Tiada	Tiada
Hasil Pembelajaran Kursus*	Di akhir kursus ini, pelajar dapat:	*At the end of the course, students are able to:*

*Course Learning Outcomes**	1. Mengenalpasti faktor pendorong utama terhadap pembangunan, tujuan dan bidang 'self-regulating act' (C2) 2. Menganalisa perbezaan di antara preskriptif dan deskriptif bagi undang-undang SHE di Malaysia (C4) 3. Mencadangkan sistem pengurusan Keselamatan dan Kesihatan di tempat kerja yang merangkumi kepatuhan kepada akta dan peraturan tempatan (A5)	*1. Identify the main driver towards the development, purpose and scope of self-regulating act (C2)* *2. Analyse the difference of prescriptive and descriptive SHE legislation in Malaysia (C4)* *3. Propose Safety and Health management system at workplace that incorporates compliance to local acts and regulation (A5)*
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Kursus ini akan memperkenalkan pelajar kepada undang-undang Sejarah keselamatan & kesihatan Malaysia (common law, tort, vicarious liability), Act, Regulation, Order, Code of Practice, Guidelines, Occupational Safety & Health Act 514 (1994), Factory and Machinery Act 139 (1967), Peraturan Kebijakan Keselamatan & Kesihatan (1995), Peraturan Jawatankuasa Keselamatan & Kesihatan (1996), Peraturan Pegawai Keselamatan & Kesihatan (1997), Peraturan Pengendalian Bahaya Kemalangan Besar Industri (CIMAH) (1996, Klasifikasi, Pelabelan dan Data Keselamatan Lembaran Bahan Kimia Berbahaya (2013), Penggunaan dan Pendedahan Piawai Bahan Kimia Berbahaya kepada Kesihatan (USECHH) (2000), Pemberitahuan Kemalangan, Kejadian Berbahaya, Keracunan Pekerjaan & Peraturan Penyakit Pekerjaan (NADOPOD) (2004), Pendedahan Kebisingan (2019) Kod Amalan DOSH: Kualiti Udara Dalam Ruangan / Ruang Terhad / AIDS / Dadah & Alkohol, Kilang dan Jentera Akta 139 (1967): BOWEC / Lead / Mineral Debu / Kebajikan Umum / Asbes, Akta Kualiti Alam Sekeliling (1974) & anak	*This course will introduce students to History of Malaysian safety & health legislation (common law, tort, vicarious liability), Act, Regulation, Order, Code of Practice, Guidelines, Occupational Safety & Health Act 514 (1994), Factory and Machinery Act 139 (1967), Safety & Health Policy Regulation (1995), Safety & Health Committee Regulation (1996), Safety & Health Officer Regulation (1997), Control of Industrial Major Accidents Hazard Regulation (CIMAH) (1996, Classification, Labelling and Safety Data Sheet of Hazardous Chemicals (2013),Use and Standard Exposure of Chemicals Hazardous to Health Regulation (USECHH) (2000), Notification of Accident, Dangerous Occurrence, Occupational Poisoning & Occupational Disease Regulation (NADOPOD) (2004),Noise Exposure (2019) DOSH Code of Practice: Indoor Air Quality / Confined Space / AIDS / Drug & Alcohol, Factory and Machinery Act 139 (1967): BOWEC / Lead / Mineral Dust / General Welfare/Asbestos, Environmental*

	syarikat undang-undang, Akta Perkhidmatan Bomba 134, Sijil Kebakaran 2000, Undang-Undang Bangunan Seragam (1984), sistem Pengurusan Keselamatan & Kesihatan.	*Quality Act (1974) & subsidiary legislation, Fire Services Act 134 , Fire Certificate 2000, Uniform Building By Law (1984), Safety & Health Management system.*
Pemberatan Penilaian* *Assessment Weightage**	Penilaian Berterusan: 50% e-Peperiksaan Akhir: 50%	*Continuous Assessment: 50%* *e-Final Examination: 50%*
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	1. Perbincangan di dalam kelas atas talian 2. Pengembalian penilaian dan ujian yang telah digredkan 3. Gred akhir akan diumumkan	*1. Discussions in online class.* *2. Returning graded assignments and tests* *3. Final grades are announced*
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-kaedah Universiti Malaya (Ijazah Sarjana) 2019 Peraturan-peraturan Universiti Malaya (Ijazah Sarjana) 2019	*University of Malaya Rules (Master's Degree) 2019* *University of Malaya Regulations (Master's Degree) 2019*

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Jabatan *Department*	Kejuruteraan Kimia	*Chemical Engineering*
Nama Program Akademik Name of Academic *Programme*	Sarjana Kejuruteraan Keselamatan, Kesihatan, dan Alam Sekitar	*Master of Safety, Health and Environment Engineering*
Kod Kursus* *Course Code**	KQD7003DL	*KQD7003DL*
Tajuk Kursus* *Course Title**	Kesihatan Pekerjaan dan Industri dalam Kejuruteraan	*Occupational and Industrial Health in Engineering*
Kredit* *Credit**	3	*3*
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	120	120
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*	Tiada	*None*

UNIVERSITI MALAYA	**PRO FORMA KURSUS** ***COURSE PRO FORMA***

Hasil Pembelajaran Kursus* *Course Learning Outcomes**	Di akhir kursus ini, pelajar dapat: 1. Menganalisis bahaya di tempat kerja, penyakit atau ancaman kecederaan. 2. Menentukan langkah-langkah pencegahan untuk bahaya, penyakit dan ancaman kecederaan yang dikenalpasti. 3. Menyarankan persekitaran pekerjaaan dan perindustrian yang selamat dan sihat.	*At the end of the course, students are able to:* *1. Analyze occupational hazards, diseases or impending injuries* *2. Determine preventive actions to address the identified hazards.* *3. Propose a safe and healthy occupational and industrial environment*
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Dalam kursus ini, pelajar akan belajar tentang aspek penting kesihatan pekerjaan dalam industri, termasuk bahaya kesihatan, undang-undang kesihatan pekerjaan, penyakit pekerjaan, kesihatan higen, dan mencegah bahaya kesihatan ditempat kerja.	*In this course, students will be able to learn about the occupational health aspects important to the industry, inclusive of health hazards, occupational health laws, occupational disease, occupational hygiene and prevention of health hazards at the workplace.*
Pemberatan Penilaian* *Assessment Weightage**	Penilaian Berterusan: 50% e-Peperiksaan Akhir: 50%	*Continuous Assessment: 50%* *e-Final Examination*: 50%
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	1. Perbincangan di dalam kelas 2. Pengembalian penilaian dan ujian yang telah digredkan 3. Gred akhir akan diumumkan	*1. Discussions in class* *2. Returning graded assignments and tests* *3. Final grades are announced*
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-kaedah Universiti Malaya (Ijazah Sarjana) 2019 Peraturan-peraturan Universiti Malaya (Ijazah Sarjana) 2019	*University of Malaya Rules (Master's Degree) 2019* *University of Malaya Regulations (Master's Degree) 2019*

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Jabatan *Department*	Kejuruteraan Kimia	*Chemical Engineering*
Nama Program Akademik Name of Academic *Programme*	Sarjana Kejuruteraan Keselamatan, Kesihatan, dan Alam Sekitar	*Master of Safety, Health and Environment Engineering*
Kod Kursus* *Course Code**	KQD7004DL	*KQD7004DL*
Tajuk Kursus* *Course Title**	Proses Kejuruteraan Lestari	*Sustainable Process Engineering*
Kredit* *Credit**	3	*3*
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	120	*120*
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*	Tiada	*None*

UNIVERSITI MALAYA	**PRO FORMA KURSUS** ***COURSE PRO FORMA***

Hasil Pembelajaran Kursus* *Course Learning Outcomes**	Di akhir kursus ini, pelajar dapat: 1. Menjelaskan sifat ekologi kitaran arus dan pengangkutan serta nasib bendasing (C2) 2. Menjelaskan kesan dan akibat dari aktiviti pemprosesan terhadap alam sekitar (A4) 3. Mencadangkan strategi pencegahan pencemaran yang relevan dan bersepadu untuk pembangunan lestari bagi industri pemprosesan (A5)	*At the end of the course, students can:* *1. Explain the ecological nature of cycles and flows and transport and fate of contaminants (C2)* *2. Explain the effects and impacts of processing activities on the environment (A4)* *3. Propose appropriate integrated pollution prevention strategy for sustainable development of processing industries (A5)*
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Kursus ini akan memperkenalkan pelajar kepada isu umum dalam pencemaran alam sekitar, Ciri-ciri dan nasib pencemar alam sekitar,pengangkutan dan transformasi pencemar, dan aktiviti industri dan alam sekitar. Selain itu, para pelajar juga akan diberi pendedahan mengenai pembangunan dan rekabentuk proses lestari, operasi proses lestari, pengurusan pencemaran berintegrasi, peraturan dan komitmen antarabangsa, serta pembangunan lestari.	*This course will introduce the students to general issues in environmental pollution, properties and fate of environmental contaminants, transport and transformation of contaminants and industrial activities and the environment. Moreover, the students also will be exposed to the sustainable process development and design, sustainable process operations, integrated pollution management, regulations and international commitments as well as the sustainable development.*
Pemberatan Penilaian* *Assessment Weightage**	Penilaian Berterusan: 50% e-Peperiksaan Akhir: 50%	*Continuous Assessment: 50%* *e-Final Examination: 50%*
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	1. Perbincangan di dalam kelas 2. Pengembalian penilaian dan ujian yang telah digredkan 3. Gred akhir akan diumumkan	*1. Discussions in class* *2. Returning graded assignments and tests* *3. Final grades are announced*

Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-kaedah Universiti Malaya (Ijazah Sarjana) 2019 Peraturan-peraturan Universiti Malaya (Ijazah Sarjana) 2019	*University of Malaya Rules (Master's Degree) 2019* *University of Malaya Regulations (Master's Degree) 2019*

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Akademi/Fakulti/Institut/Pusat *Academy/Faculty/Institute/Centre*	Kejuruteraan	*Engineering*
Jabatan *Department*	Kejuruteraan Kimia	*Chemical Engineering*
Nama Program Akademik Name of Academic *Programme*	Sarjana Kejuruteraan Keselamatan, Kesihatan, dan Alam Sekitar	*Master of Safety, Health and Environment Engineering*
Kod Kursus* *Course Code**	KQD7005DL	*KQD7005DL*
Tajuk Kursus* *Course Title**	Penilaian Risiko Kuantitatif	*Quantitative Risk Assessment*
Kredit* *Credit**	3	*3*
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	120	120
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*	Tiada	*None*

Hasil Pembelajaran Kursus* *Course Learning Outcomes**	Di akhir kursus ini, pelajar dapat: 1. Mengaplikasikan teknik mengenalpasti bahaya yang sesuai (C4) 2. Menentukan kriteria risiko untuk industri proses dan kesihatan persekitaran (P4) 3. Menganggarkan risiko kepada individu dan masyarakat berdasarkan hasil daripada analisa akibat dan kebarangkalian (C6)	*At the end of the course, students can:* *1. Apply suitable hazard identification techniques (C4)* *2. Determine risk characteristics for both process industry and environmental health hazard (P4)* *3. Estimate individual and societal risks based on outcomes from consequence and probability analysis (C6)*
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Kursus ini akan memperkenalkan pelajar kepada penilaian risiko industri; Mengenalpasti sumber-sumber bahaya seperti ciri-ciri bahan mudah terbakar, meletup dan toksik, analisa pohon kegagalan ('fault tree') dan analisa pohon kejadian ('event tree'); Analisa akibat seperti kebakaran kolam ('pool fire'), kebakaran jet ('jet fire'), bebola api ('fireball') dan BLEVE dan letupan awan wap ('vapour cloud'); serta Analisa kesan yang merangkumi kesan terma, kesan peletupan dan kesan toksik. Selain itu, pelajar juga akan dapat mempelajari tentang Analisa frekuensi/Kebarangkalian seperti pengkalan data kadar kegagalan dan Peraturan kebarangkalian untuk pohon kegagalan; Anggaran Risiko yang merangkumi risiko individu dan risiko sosial; dan juga Penilaian Risiko Alam Sekitar seperti risiko sistematik kesihatan dan risiko kanser.	*This course will introduce student to industrial risk assessment; Identification of sources of hazard such as flammability, explosive and toxic properties of material, fault tree analysis and event tree analysis; Consequence Analysis such as pool fire, jet fire, fireball due to BLEVE and vapour cloud explosion; as well as Effect Analysis which include thermal effect, explosion effect and toxic effect. Besides, students also will be able to learn about Frequency/Probability Analysis like failure rate database and probability rules in fault tree analysis; Risk Estimation which include individual risk and societal risk; and also Environmental Risk Assessment such as systematic health risk and cancer risk.*
Pemberatan Penilaian* *Assessment Weightage**	Penilaian Berterusan: 50% e-Peperiksaan Akhir: 50%	*Continuous Assessment: 50%* *e-Final Examination: 50%*

Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	1. Perbincangan di dalam kelas 2. Pengembalian penilaian dan ujian yang telah digredkan 3. Gred akhir akan diumumkan	*1. Discussions in class* *2. Returning graded assignments and tests* *3. Final grades are announced*
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-kaedah Universiti Malaya (Ijazah Sarjana) 2019 Peraturan-peraturan Universiti Malaya (Ijazah Sarjana) 2019	*University of Malaya Rules (Master's Degree) 2019* *University of Malaya Regulations (Master's Degree) 2019*

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Jabatan *Department*	Kejuruteraan Kimia	*Chemical Engineering*
Nama Program Akademik Name of Academic *Programme*	Sarjana Kejuruteraan Keselamatan, Kesihatan, dan Alam Sekitar	*Master of Safety, Health and Environment Engineering*
Kod Kursus* *Course Code**	KQD7006DL	*KQD7006DL*
Tajuk Kursus* *Course Title**	Mengenalpasti Hazad dan Penilaian	*Hazard Identification and Evaluation*
Kredit* *Credit**	3	*3*
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	120	120
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*	Tiada	*None*

Hasil Pembelajaran Kursus* *Course Learning Outcomes**	Di akhir kursus ini, pelajar dapat: 1. Menganalisa hazad di tempat kerja dan unit pemprosesan sebagai langkah pencegahan kemalangan (C4) 2. Mencadangkan sistem pengurusan keselamatan yang baik di tempat kerja dan penunjuk aras prestasi yang baik untuk mempertingkatkan keselamatan proses (A5) 3. Mengangggarkan risiko oleh letupan dan kekurangan dalam sistem pengurusan keselamatan proses (C5)	*At the end of the course, students can:* *1. Analyze hazards at workplace and processing units as accident preventive measure (C4)* *2. Propose a good safety management system at workplace and better performance indicators for a safety improvement process (A5)* *3. Estimate risks of explosions and deficiencies in process safety management system (C5)*
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Kursus ini akan memperkenalkan pelajar kepada Teknik Mengenalpasti Hazad seperti bancian hazad (Senarai semak), Analisis Keselamatan Kerja, Mengenalpasti Hazad dan Kawalan Penilaian Risiko (HIRAC), HAZOP, Analisis 'Fault Tree' serta Audit Keselamatan, Bahaya dari Tindakbalas Kimia, BLEVE, VCE, Pengendalian Selamat Bahan Kimia, Limit Mudah Terbakar bagi Wap, TLVs dan Letupan, Selain itu, pelajar juga akan dapat mempelajari mengenai Rekabentuk untuk Keselamatan, Pengurusan Proses Keselamatan, Prestasi Piawai bagi Peningkatan Proses Keselamatan, Sikap Keselamatan dan Perilaku Manusia, OSHA 1994, CIMAH, Penganggaran kos kemalangan, Mengulas Kemalangan dan Menganalisis,dan melakukan Penyiasatan Kemalangan.	*This course will introduce students to the Hazard Identification Techniques such as hazard survey (Checklist), Job Safety Analysis, Hazard Identification and Risk Assessment Control (HIRAC), HAZOP, Fault Tree Analysis as well as Safety Audits, Hazards from Chemical Reaction, BLEVE, VCE, Safe Handling of Industrial Chemicals, Flammability Limits for Vapor, TLVs and Explosion. Furthermore, students also will be able to learn about Designing for Safety, Process Safety Management, Performance Standards for a Safety Improvement Process, Safety Attitudes and Human Behaviour, OSHA 1994, CIMAH, Accident Cost Estimation, Accidents Review and Analysis and Accident Investigation Study.*

Pemberatan Penilaian* *Assessment Weightage**	Penilaian Berterusan: 50% e-Peperiksaan Akhir: 50%	*Continuous Assessment: 50%* *e-Final Examination:* 50%
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	1. Perbincangan di dalam kelas 2. Pengembalian penilaian dan ujian yang telah digredkan 3. Gred akhir akan diumumkan	*1. Discussions in class* *2. Returning graded assignments and tests* *3. Final grades are announced*
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-kaedah Universiti Malaya (Ijazah Sarjana) 2019 Peraturan-peraturan Universiti Malaya (Ijazah Sarjana) 2019	*University of Malaya Rules (Master's Degree) 2019* *University of Malaya Regulations (Master's Degree) 2019*

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Akademi/Fakulti/Institut/Pusat *Academy/Faculty/Institute/Centre*	Fakulti Kejuruteraan	*Faculty of Engineering*
Jabatan *Department*	Pejabat Timbalan Dekan (Ijazah Tinggi)	*Deputy Dean (Postgraduates) Office*
Nama Program Akademik Name of Academic *Programme*	Sarjana Kejuruteraan Keselamatan, Kesihatan dan Alam Sekitar	*Master of Safety, Health and Environment Engineering*
Kod Kursus* *Course Code**	KQX7001DL	*KQX7001DL*
Tajuk Kursus* *Course Title**	Metodologi Penyelidikan	*Research Methodology*
Kredit* *Credit**	3	*3*
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	120	*120*
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*	Tiada	*None*
Hasil Pembelajaran Kursus*	Di akhir kursus ini, pelajar dapat:	*At the end of the course, students are able to:*

*Course Learning Outcomes**	1. Menentukan masalah penyelidikan yang bersesuai dengan bidang kejuruteraan (C4) 2. Merekabentuk kaedah kajian untuk menyelesaikan masalah kajian (C6) 3. Menilai secara kritikal kebolehlaksanaan dan kepraktisan kaedah kajian untuk menyelesaikan masalah kajian (A3) 4. Menyelaras maklumat penyelidikan yang relevan ke dalam laporan teknikal yang komprehensif (A4)	*1. Determine research problem or issues related to the respective engineering field (C4)* *2. Design appropriate research methodology to solve the research problem (C6)* *3. Evaluate critically the feasibility and practicality of relevant methods and tools to solve the research problem (A3)* *4. Coordinate relevant research information into comprehensive technical report (A4)*
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Kursus ini mendedahkan pelajar kepada teknik – teknik bagaimana untuk menjalankan kajian. Di awal kursus pelajar di ajar dengan pelbagai teknik kajian termasuk, kaedah kajian saintifik. Kemudian, etika kajian, reka bentuk eksperimen dan teknik statistik di terangkan kepada pelajar di ikuti dengan mengenal pasti masalah kajian dan penulisan cadangan. Pelajar akan menguasai kemahiran kajian, penulisan saintifik, komunikasi lisan bagi dapatan kajian.	*This course exposes students to the techniques of how to conduct research. At the beginning of the course students are taught with various research techniques including, scientific research methods. Then, research ethics, experimental design and statistical techniques are explained to students followed by identifying research problems and writing suggestions. Students will master research skills, scientific writing, and oral communication for research findings.*
Pemberatan Penilaian* *Assessment Weightage**	Penilaian Berterusan: 100% Peperiksaan Akhir: -	*Continuous Assessment: 100%* *Final Examination: -*
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	Dimaklumkan melalui talian.	*Results will be notified through online*
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-Kaedah Universiti Malaya (Ijazah Sarjana) 2019. Peraturan-Peraturan Universiti Malaya (Ijazah Sarjana) 2019.	*University of Malaya Rules (Master's Degree) 2019* *University of Malaya Regulations (Master's Degree) 2019*

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Akademi/Fakulti/Institut/Pusat *Academy/Faculty/Institute/Centre*	Fakulti Kejuruteraan	*Faculty of Engineering*
Jabatan *Department*	Pejabat Timbalan Dekan (Ijazah Tinggi)	*Deputy Dean (Postgraduates) Office*
Nama Program Akademik Name of Academic *Programme*	Sarjana Kejuruteraan Keselamatan, Kesihatan dan Alam Sekitar	*Master of Safety, Health and Environment Engineering*
Kod Kursus* *Course Code**	KQX7002DL	*KQX7002DL*
Tajuk Kursus* *Course Title**	Pengurusan Projek	*Project Management*
Kredit* *Credit**	3	*3*
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	120	*120*
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*	Tiada	*None*

UNIVERSITI MALAYA	**PRO FORMA KURSUS** ***COURSE PRO FORMA***

Hasil Pembelajaran Kursus* *Course Learning Outcomes**	Di akhir kursus ini, pelajar dapat: 1. Menganalisa prinsip komponen dan konsep pengurusan projek (A4) 2. Membenarkan pelbagai pemacu perubahan yang boleh menjejaskan projek selama kitaran hidupnya (A3) 3. Menyelesaikan segala cabaran semasa projek secara efektif (A5) 4. Mengaplikasikan kemahiran keusahawanan dan kepimpinan dalam pengurusan sesuatu projek (C3)	*At the end of the course, students are able to:* *1. Analyze the principle components and concepts of project management (A4)* *2. Justify the various drivers of change which may impact a project during its life cycle (A3)* *3. Solve every challenges faced during the project (A5)* *4. Apply entrepreneurial and leadership skills in a project management (C3)*
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Kursus ini memberikan pengenalan yang sistematik dan menyeluruh untuk semua aspek pengurusan projek. Projek adalah aspek yang semakin penting dalam perniagaan kejuruteraan moden. Oleh itu, kursus ini mengutarakan pentingnya memahami hubungan antara projek dan matlamat strategik organisasi. Kursus ini juga membincangkan kemahiran teknikal, budaya, dan interpersonal yang diperlukan untuk menguruskan projek dengan jayanya dari awal hingga akhir. Ia menekankan bahawa pengurusan projek adalah disiplin profesional yang merangkumi pengetahuan dan kemahirannya yang tersendiri. Konsep diperkukuhkan dengan menggunakan kajian kes yang merangkumi pelbagai jenis projek dan industri.	*This course provides a systematic and thorough introduction to all aspects of project management. Projects are an increasingly important aspect of modern engineering business. Therefore, the course underlines the importance of understanding the relation between projects and the strategic goals of the organisation. The course also discusses the technical, cultural, and interpersonal skills necessary to successfully manage projects from start to finish. It emphasises that project management is a professional discipline with its own tools, body of knowledge, and skills. Concepts are reinforced by case studies covering a wide variety of project types and industries.*
Pemberatan Penilaian* *Assessment Weightage**	Penilaian Berterusan: 100% Peperiksaan Akhir:	*Continuous Assessment: 100%* *Final Examination:*
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	Dimaklumkan melalui talian.	*Notified through online*

Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-Kaedah Universiti Malaya (Ijazah Sarjana) 2019. Peraturan-Peraturan Universiti Malaya (Ijazah Sarjana) 2019.	*University of Malaya Rules (Master's Degree) 2019* *University of Malaya Regulations (Master's Degree) 2019*

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Akademi/Fakulti/Institut/Pusat *Academy/Faculty/Institute/Centre*	Kejuruteraan	*Engineering*
Jabatan *Department*	Kejuruteraan Kimia	*Chemical Engineering*
Nama Program Akademik Name of Academic *Programme*	Sarjana Kejuruteraan Keselamatan, Kesihatan, dan Alam Sekitar	*Master of Safety, Health and Environment Engineering*
Kod Kursus* *Course Code**	KQD7007DL	*KQD7007DL*
Tajuk Kursus* *Course Title**	Penilaian dan Pemantauan Alam Sekitar	*Environmental Monitoring and Assessment*
Kredit* *Credit**	3	*3*
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	120	120
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*	Tiada	*None*

UNIVERSITI MALAYA	**PRO FORMA KURSUS** ***COURSE PRO FORMA***

Hasil Pembelajaran Kursus* *Course Learning Outcomes**	Di akhir kursus ini, pelajar dapat: 1. Mengenalpasti protokol terbaik pensampelan untuk tugas khusus dalam analisis persekitaran (C2) 2. Melakukan analisis kualitatif dan kuantitatif bagi sampel gas, pepejal dan cecair dengan menggunakan GC, HPLC dan ICP-AES (P2) 3. Menganalisa spectrum GC, HPLC dan ICP-AES untuk menganggarkan komposisi elemen bagi sampel cecair, gas dan pepejal (C4)	*At the end of the course, students can:* *1. Identify the best sampling protocol for a specific environmental analysis task (C2)* *2. Perform qualitative and quantitative analysis of gaseous, solids and liquid samples using GC, HPLC and ICP-AES (P2)* *3. Analyse GC, HPLC and ICP-AES spectra for elemental composition estimation of liquid, gas and solid samples (C4)*
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Kursus ini merangkumi beberapa topik penting berkaitan dengan penilaian dan pemantauan alam sekitar iaitu Pensampelan, peralatan pensampelan, protokol pensampelan dalam pensampelan udara (pensampelan cerombong dan pensampelan ambien), pensampelan air dan pensampelan pepejal, tanah dan lumpur. Selain itu, kursus ini memperkenalkan pelajar kepada teknik analitikal, penyediaan sampel, Teknik Kromatografik (GC teknik dan HPLC) secara teori dan aplikasi persekitaran, Teknik Spektroskopik (spektrofotometri); Teknik Spektroskopik (AA dan ICP-AES)- Teori dan Aplikasi Persekitaran; Teknik Elektroanalitikal- Teori dan Aplikasi Persekitaran; ICP-AES Makmal.	*This course covers few important topics for environmental monitoring and assessment such as sampling, sampling equipment, sampling protocols in air sampling (stack sampling and ambient sampling), water sampling and sampling of solids, soils and sludge. Besides, this course introduce students to analytical techniques, sample preparation; Chromatographic techniques (GC techniques)- Theory and Environmental applications; Chromatographic techniques (HPLC techniques)- Theory and Environmental applications; GC and HPLC Laboratory; Spectroscopic techniques (spectrophotometry) - Theory and Environmental applications; Spectroscopic techniques (AA and ICP-AES) - Theory and Environmental applications; Electroanalytical techniques; ICP-AES Laboratory - Theory and Environmental applications.*

Pemberatan Penilaian* *Assessment Weightage**	Penilaian Berterusan: 50% e-Peperiksaan Akhir: 50%	*Continuous Assessment: 50%* *e-Final Examination: 50%*
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	1. Perbincangan di dalam kelas 2. Pengembalian penilaian dan ujian yang telah digredkan 3. Gred akhir akan diumumkan	*1. Discussions in class* *2. Returning graded assignments and tests* *3. Final grades are announced*
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-kaedah Universiti Malaya (Ijazah Sarjana) 2019 Peraturan-peraturan Universiti Malaya (Ijazah Sarjana) 2019	*University of Malaya Rules (Master's Degree) 2019* *University of Malaya Regulations (Master's Degree) 2019*

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Jabatan *Department*	Kejuruteraan Kimia	*Chemical Engineering*
Nama Program Akademik Name of Academic *Programme*	Sarjana Kejuruteraan Keselamatan, Kesihatan, dan Alam Sekitar	*Master of Safety, Health and Environment Engineering*
Kod Kursus* *Course Code**	KQD7008DL	*KQD7008DL*
Tajuk Kursus* *Course Title**	Pengurusan dan Penilaian Kitar Hayat	*Life Cycle Assessment and Management*
Kredit* *Credit**	3	*3*
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	120	120
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*	Tiada	*None*

Hasil Pembelajaran Kursus* *Course Learning Outcomes**	Di akhir kursus ini, pelajar dapat: 1. Menilai pembelajaran penilaian kitar hayat untuk analisis impak (C5) 2. Mengaplikasikan konsep dan metodologi penilaian kitar hayat (C3) 3. Menyelesaikan isu dan pengurusan alam sekitar dengan penggunaan strategi pengurusan kitar hayat (P4)	*At the end of the course, students can:* *1. Assess an LCA study for impacts analysis (C5)* *2. Apply the concepts and methodologies of life cycle assessment (C3)* *3. Solve environmental issues and management using life cycle management strategies (P4)*
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Kursus ini akan memperkenalkan pelajar kepada isu alam sekitar dan Pengurusan, Kitar Hayat Berdasarkan Inisiatif Persekitaran, Pengenalan terhadap siri Matlamat Piawai Penilaian Kitar Hayat dan Definisi Skop, Inventori kitar hayat, Penilaian Kesan Kitar Hayat, Interpretasi Kitar Hayat, SIMA PRO – Perisian simulasi dan LCA, Pengurusan Kitar Hayat. Selain itu, pelajar juga akan diberi pendedahan kepada Peralatan LCM, Sistem Pengurusan Alam Sekitar, Pengurusan Rantaian Terintegrasi, Pendekatan Pengurusan Terhadap LCM, dan Persaingan bagi negara-negara yang sedang membangun.	*This course will introduce students to Environmental Issues and Management, Life Cycle Based Environmental Initiatives, ISO 14040 – Introduction to Life Cycle Assessment (LCA) Series of Standards Goal and Scope Definition, Life Cycle Inventory, Life Cycle Impact Assessment, Life Cycle Interpretation, SIMA PRO – LCA simulation software and LCA course Project. Besides, students also will be exposed to the Life Cycle Management (LCM), LCM Tool Box, Environmental Management Systems, Integrated Chain Management, Management Approaches Toward LCM and Challenges for Developing Countries.*
Pemberatan Penilaian* *Assessment Weightage**	Penilaian Berterusan: 50% e-Peperiksaan Akhir: 50%	*Continuous Assessment: 50%* *e-Final Examination: 50%*
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	1. Perbincangan di dalam kelas 2. Pengembalian penilaian dan ujian yang telah digredkan 3. Gred akhir akan diumumkan	*1. Discussions in class* *2. Returning graded assignments and tests* *3. Final grades are announced*

UNIVERSITI MALAYA	**PRO FORMA KURSUS** ***COURSE PRO FORMA***

Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-kaedah Universiti Malaya (Ijazah Sarjana) 2019 Peraturan-peraturan Universiti Malaya (Ijazah Sarjana) 2019	*University of Malaya Rules (Master's Degree) 2019* *University of Malaya Regulations (Master's Degree) 2019*

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Jabatan *Department*	Kejuruteraan Kimia	*Chemical Engineering*
Nama Program Akademik Name of Academic *Programme*	Sarjana Kejuruteraan Keselamatan, Kesihatan, dan Alam Sekitar	*Master of Safety, Health and Environment Engineering*
Kod Kursus* *Course Code**	KQD7009DL	*KQD7009DL*
Tajuk Kursus* *Course Title**	Kawalan Sisa Merbahaya	*Hazardous Waste Control*
Kredit* *Credit**	3	*3*
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	120	120
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*	Tiada	*None*

UNIVERSITI MALAYA	**PRO FORMA KURSUS** ***COURSE PRO FORMA***

Hasil Pembelajaran Kursus* *Course Learning Outcomes**	Di akhir kursus ini, pelajar dapat: 1. Mengenalpasti pengurusan sisa berbahaya yang diperlukan bagi melindungi manusia dan alam sekitar dengan mempertimbangkan ciri-ciri sisa berbahaya yang umumnya dihasilkan di pelbagai lokasi industri dan bukan-industri (C2) 2. Mengjustifikasi skim rawatan yang tepat untuk pelbagai jenis sisa berbahaya yang dihasilkan dan lokasi yang tercemar dengan sisa berbahaya (C5) 3. Menyelesaikan kajian kes berdasarkan keperluan peraturan dan teknikal yang melibatkan isu-isu umum yang berkaitan dengan pengurusan sisa berbahaya (P4)	*At the end of the course, students are able to:* *1. Identify appropriate hazardous waste management practices required to protect human beings and the environment by taking into consideration the characteristics of hazardous waste commonly generated at various industrial and non-industrials premises (C2)* *2. Justify appropriate treatment schemes for various hazardous waste types generated and sites contaminated with hazardous waste (C5)* *3. Solve case studies based on regulatory and technical requirements involving common issues related to hazardous waste management (P4)*
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Dalam kursus ini, pelajar akan diberi pendedahan mengenai pengenalan dan definasi sisa berbahaya, analisis toksik pada sisa berbahaya, secara amnya pengurusan sisa, audit dan teknik pemilihan pencegahan pencemaran untuk sisa berbahaya. Selain itu, pelajar akan dapat mempelajari mengenai rawatan terma, kimia, fizikal dan biologi, rekabentuk tempat pembuangan dan operasi pelupusan sisa berbahaya, teknik 'site-remediation', peraturan sisa berjadual dan komitmen antarabangsa bagi Malaysia dan juga analisis ringkas risiko yang melibatkan sisa berbahaya.	*In this course, students will be exposed to the introduction and definition of hazardous waste, toxicity analysis for hazardous waste, general waste management practices, auditing and selected pollution prevention techniques for hazardous wastes. Moreover, students also will be able to learn about thermal, chemical, physical and biological treatment, landfill design and operation of hazardous waste disposal, site-remediation techniques, scheduled waste regulations and international commitments for Malaysia and also brief risk analysis involving hazardous waste.*

Pemberatan Penilaian* *Assessment Weightage**	Penilaian Berterusan: 50% e-Peperiksaan Akhir: 50%	*Continuous Assessment: 50%* *e-Final Examination: 50%*
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	1. Perbincangan di dalam kelas 2. Pengembalian penilaian dan ujian yang telah digredkan 3. Gred akhir akan diumumkan	*1. Discussions in class* *2. Returning graded assignments and tests* *3. Final grades are announced*
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-kaedah Universiti Malaya (Ijazah Sarjana) 2019 Peraturan-peraturan Universiti Malaya (Ijazah Sarjana) 2019	*University of Malaya Rules (Master's Degree) 2019* *University of Malaya Regulations (Master's Degree) 2019*

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Jabatan *Department*	Kejuruteraan Kimia	*Chemical Engineering*
Nama Program Akademik Name of Academic *Programme*	Sarjana Kejuruteraan Keselamatan, Kesihatan, dan Alam Sekitar	*Master of Safety, Health and Environment Engineering*
Kod Kursus* *Course Code**	KQD7010DL	*KQD7010DL*
Tajuk Kursus* *Course Title**	Ergonomik Industri	*Industrial Ergonomics*
Kredit* *Credit**	3	*3*
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	120	120
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*	Tiada	*None*

UNIVERSITI MALAYA	**PRO FORMA KURSUS** ***COURSE PRO FORMA***

Hasil Pembelajaran Kursus* *Course Learning Outcomes**	Di akhir kursus ini, pelajar dapat: 1. Menentukan kepentingan factor manusia & ergonomic dan keselamatan & kesihatan dalam aplikasi peralatan dan peranti di persekitaran tempat kerja (C4) 2. Menyatakan kaedah ergonomic untuk mendiagnosis kerja dan rekabentuk pekerjaan (P5) 3. Menginterpretasi amalan kerja dan rekabentuk pekerjaan dalam industri (C5)	*At the end of the course, students can:* *1. Determine the important of human factors & ergonomics and safety & health in designing equipment and in work environments (C4)* *2. Specify ergonomics methods in diagnosing job and work design (P5)* *3. Interpret the practices in job and work design in industries (C5)*
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Kursus ini mengandungi lapan bahagian penting terutama: keselamatan dan kesihatan industri, industri ergonomik, prinsip ergonomik dalam rekabentuk, kesan persekitaran kepada pekerja, fisiologi manusia, antropometri, rekabentuk pekerjaan dan analisis tugas	*This course contains eight essential parts mainly: industrial safety and health, ergonomics industries, ergonomics principal in design, effect of environment on workers, human physiology, anthropometry, works design and analysis of tasks.*
Pemberatan Penilaian* *Assessment Weightage**	Penilaian Berterusan: 50% e-Peperiksaan Akhir: 50%	*Continuous Assessment: 50%* *e-Final Examination: 50%*
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	1. Perbincangan di dalam kelas 2. Pengembalian penilaian dan ujian yang telah digredkan 3. Gred akhir akan diumumkan	*1. Discussions in class* *2. Returning graded assignments and tests* *3. Final grades are announced*
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-kaedah Universiti Malaya (Ijazah Sarjana) 2019 Peraturan-peraturan Universiti Malaya (Ijazah Sarjana) 2019	*University of Malaya Rules (Master's Degree) 2019* *University of Malaya Regulations (Master's Degree) 2019*

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Jabatan *Department*	Kejuruteraan Kimia	*Chemical Engineering*
Nama Program Akademik Name of Academic *Programme*	Sarjana Kejuruteraan Keselamatan, Kesihatan, dan Alam Sekitar	*Master of Safety, Health and Environment Engineering*
Kod Kursus* *Course Code**	KQD7011DL	*KQD7011DL*
Tajuk Kursus* *Course Title**	Pengurusan dan Kawalan Pencemaran Udara	*Air Pollution Management and Control*
Kredit* *Credit**	3	*3*
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	120	120
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*	Tiada	*None*

UNIVERSITI MALAYA	**PRO FORMA KURSUS** ***COURSE PRO FORMA***

Hasil Pembelajaran Kursus* *Course Learning Outcomes**	Di akhir kursus ini, pelajar dapat: 1. Menerangkan konsep kualiti udara dan ciri-ciri, jenis serta sumber dan kesannya terhadap kesihatan dan alam sekitar (C2) 2. Menilai serakan pencemar melalui permodelan (C5) 3. Merumuskan strategi kawalan dan pengurusan untuk pencemar zarahan dan gas (P4)	*At the end of the course, students are able to:* *1. Explain the concept of air quality and its characteristics, types and sources and their impact on health and environment (C2)* *2. Evaluate the dispersion of pollutants through modelling (C5)* *3. Formulate the control and management strategies for particulates and gaseous pollutants (P4)*
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Kursus ini akan memperkenalkan pelajar kepada isu umum yang berkaitan dengan pencemaran udara, kualiti udara, dan juga jenis, sumber dan kesan pencemar udara. Selain itu, pelajar juga akan diberi pendedahan kepada isu pemanasan global, meteorologi udara dan serakan pencemar, serta pengurusan dan kawalan pencemar udara gas dan zarahan udara.	*This course will introduce students to general issues on air pollution, air quality and also types, sources and impacts of air pollutants. Besides, students also will be exposed to the Global warming issue, air meteorology and dispersion of pollutants, as well as management and control of gaseous and particulate air pollutants.*
Pemberatan Penilaian* *Assessment Weightage**	Penilaian Berterusan: 50% e-Peperiksaan Akhir: 50%	*Continuous Assessment:50%* *e-Final Examination:50%*
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	1. Perbincangan di dalam kelas 2. Pengembalian penilaian dan ujian yang telah digredkan 3. Gred akhir akan diumumkan	*1. Discussions in class* *2. Returning graded assignments and tests* *3. Final grades are announced*
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-kaedah Universiti Malaya (Ijazah Sarjana) 2019 Peraturan-peraturan Universiti Malaya (Ijazah Sarjana) 2019	*University of Malaya Rules (Master's Degree) 2019* *University of Malaya Regulations (Master's Degree) 2019*

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Jabatan *Department*	Kejuruteraan Kimia	*Chemical Engineering*
Nama Program Akademik Name of Academic *Programme*	Sarjana Kejuruteraan Keselamatan, Kesihatan, dan Alam Sekitar	*Master of Safety, Health and Environment Engineering*
Kod Kursus* *Course Code**	KQD7014DL	*KQD7014DL*
Tajuk Kursus* *Course Title**	Faktor Kemanusian dan Pengurusan Tempat Kerja	*Human Factor and Management at Work Place*
Kredit* *Credit**	3	*3*
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	120	120
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*	Tiada	*None*

UNIVERSITI MALAYA	**PRO FORMA KURSUS** ***COURSE PRO FORMA***

Hasil Pembelajaran Kursus* *Course Learning Outcomes**	Di akhir kursus ini, pelajar dapat: 1. Mengenalpasti kepentingan faktor kemanusian dalam aplikasi peralatan dan persekitaran tempat kerja (C2) 2. Menganalisa rekabentuk yang berkaitan dan penting bagi persekitaran tempat kerja di industri (C4) 3. Mengamalkan kesedaran diri, tanggungjawab dan kepercayaan diri di tempat kerja (A5)	*At the end of the course, students are able to:* *1. Identify the importance of human factor in the application of tools and work environment (C2)* *2. Analyse relevant and significant human factor design for work environment in industries (C4)* *3. Practice self-awareness, responsibility and self-belief at the workplace (A5)*
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Kursus ini mengandungi beberapa bahagian penting terutama: mengenalpasti, aplikasi dan analisis rekabentuk untuk persekitaran tempat kerja. Kursus ini juga membincangkan pembangunan kesedaran, tanggungjawab dan kepercayaan diri, serta peranan pengurus, dalam mewujudkan organisasi berprestasi tinggi.	*This course contains topics which include: Identification, application and analysis the importance of ergonomics in the application and design for special population. This course also discusses the awareness building, responsibility and self-belief, as well as roles of manager, in creating a high performance organization.*
Pemberatan Penilaian* *Assessment Weightage**	Penilaian Berterusan:50% e-Peperiksaan Akhir:50%	*Continuous Assessment:50%* *e-Final Examination:50%*
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	1. Perbincangan di dalam kelas 2. Pengembalian penilaian dan ujian yang telah digredkan 3. Gred akhir akan diumumkan	*1. Discussions in class* *2. Returning graded assignments and tests* *3. Final grades are announced*
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-kaedah Universiti Malaya (Ijazah Sarjana) 2019 Peraturan-peraturan Universiti Malaya (Ijazah Sarjana) 2019	*University of Malaya Rules (Master's Degree) 2019* *University of Malaya Regulations (Master's Degree) 2019*

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Akademi/Fakulti/Institut/Pusat *Academy/Faculty/Institute/Centre*	Fakluti Kejuruteraan	*Faculty of Engineering*
Jabatan *Department*	Jabatan Kejuruteraan Kimia	*Department of Chemical Engineering*
Nama Program Akademik Name of Academic *Programme*	Sarjana Kejuruteraan Keselamatan, Kesihatan, dan Alam Sekitar	*Master of Safety, Health and Environment Engineering*
Kod Kursus* *Course Code**	KQD7015DL	*KQD7015DL*
Tajuk Kursus* *Course Title**	Pengurusan Kecemasan dan Krisis Industri	*Industrial Emergency and Crisis Management*
Kredit* *Credit**	3	*3*
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	120	120
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*	Tiada	*None*

UNIVERSITI MALAYA	**PRO FORMA KURSUS** ***COURSE PRO FORMA***

Hasil Pembelajaran Kursus* *Course Learning Outcomes**	Di akhir kursus ini, pelajar dapat: 1. Membangunkan Pelan Pengurusan Krisis (CMP) untuk industri yang spesifik (P4) 2. Menyediakan Pelan Tindakan Kecemasan (ERP) untuk scenario industri (A4) 3. Menggunakan kaedah terkini dalam pengurusan krisis (A5)	*At the end of the course, students are able to:* *1. Develop appropriate Crisis Management Plan (CMP) for specific industries (P4)* *2. Prepare an Emergency Response plan (ERP) for industrial scenarios (A4)* *3. Use advanced tools in managing crisis (A5)*
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Dalam kursus ini konsep dan definasi Pengurusan Krisis dan Perancangan Kecemasan di loji-loji industri akan diterangkan. Strategi secara sistematik dan pendekatan akan diajar untuk mengenalpasti, merancang dan mengurus scenario kecemasan di loji-loji industri. Beberapa pembelajaran kes akan digunakan untuk tujuan ini. Kursus ini merangkumi penerangan ke atas kaedah-kaedah pencegahan, persediaan, tindakan dan pemulihan seandainya terdapat sebarang krisis yang timbul. Pelajar juga akan mempelajari penggunaan teknik-teknik terkini seperti GIS (Sistem Informasi Geografi) dan perisian CAMEO di dalam pengurusan krisis.	*In this course the concepts and definitions of Crisis Management and Emergency Planning in industrial plants will be explained. Systematic strategies and approaches will be tough to identify, plan and manage emergency scenarios in industrial plants. Several case studies will be used for this purpose. This course includes explanation of methods of prevention, preparedness, response and recovery in case of crisis. Students will also learn the application of advanced techniques such as GIS (geographical Information System) and CAMEO software in managing emergencies.*
Pemberatan Penilaian* *Assessment Weightage**	Penilaian Berterusan:50% e-Peperiksaan Akhir:50%	*Continuous Assessment:50%* *e-Final Examination:50%*
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	Maklumbalas secara dalam talian	*Online feedback*
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-kaedah Universiti Malaya (Ijazah Sarjana) 2019 Peraturan-peraturan Universiti Malaya (Ijazah Sarjana) 2019	*University of Malaya Rules (Master's Degree) 2019* *University of Malaya Regulations (Master's Degree) 2019*

COURSEWORK PROGRAMME | KQB

04

Master of Biomedical Engineering (ODL)

COURSE TYPE	MODE OF STUDY	INDICATIVE DURATION
Coursework	Open and Distance Learning	2 semesters + 1 special semester

PROGRAMME AT A GLANCE

Designed for flexible professional learning, this ODL programme connects biomedical engineering with healthcare innovation. Students explore medical imaging, telemedicine, artificial intelligence, tissue engineering, biomechanics, rehabilitation and healthcare technology, while developing interdisciplinary perspectives relevant to hospitals, research centres and the wider healthcare industry. The programme also provides a strong foundation for further doctoral study.

View the official programme page

Source: Universiti Malaya Study portal | Page last updated 16 May 2026

UNIVERSITI MALAYA

FACULTY OF ENGINEERING

Master of Biomedical Engineering (ODL)

Open and Distance Learning Programme Information

MBE ODL	42	PART TIME
PROGRAMME	TOTAL CREDITS	Types of Study

ACADEMIC SESSION 2026/2027
Universiti Malaya

Contents

This section presents the programme profile, admission requirements, outcomes, curriculum, ODL learning experience and academic guidance for prospective and registered students.

01	Programme Overview
02	Admission Requirements
03	Programme Goal and Educational Objectives
04	Programme Learning Outcomes
05	Curriculum Structure
06	Elective Course Guide
07	ODL Learning Experience
08	Research Project and Academic Progression
09	Career Pathways and Official Information

Programme Overview

The Master of Biomedical Engineering ODL is a flexible 42-credit programme that integrates engineering, medicine and healthcare.

Students explore bioinstrumentation, healthcare technology, medical imaging, biomechanics, motion analysis and tissue engineering. Electives in artificial intelligence, rehabilitation engineering and telemedicine support further specialisation, while a supervised research project applies learning to a current biomedical engineering challenge.

Programme at a Glance

Programme name	Master of Biomedical Engineering
Delivery pathway	Open and Distance Learning
Programme identifier	KQB ODL
Admission code reference	SCWKQBFTD03
Qualification level	Master degree MQF Level 7
Mode of study	Coursework Full time ODL
Normal duration	2 regular semesters and 1 special semester
Total credits	42 credits
Medium of instruction	English
Intakes	Semester 1 October and Semester 2 March subject to availability

Curriculum Composition

Programme core	Electives	Total
33 credits	**9 credits**	**42 credits**

How ODL Works

Learn	Connect	Apply
Self-instructional materials and scheduled online activities	Synchronous sessions, asynchronous discussion and lecturer guidance	Assessment tasks and a supervised industry-relevant research project

Admission Requirements

Applicants must hold a recognised Bachelor's Degree in Engineering, Science, Computing or a related field.

Academic Qualification

Applicants with a CGPA of at least 3.00 may be considered under the general University requirements.

Applicants with a CGPA from 2.50 to 2.99 must meet at least one of the following criteria:

- Graduate of Universiti Malaya.
- At least one year of work experience in a related field.
- Publication in a related field.
- Recipient of a scholarship.
- Staff member of a government agency.
- Pass an interview conducted by the Faculty.
- Pass a special evaluation conducted by the Faculty.

English Language Requirement for International Applicants

International applicants must satisfy the current University English-language requirement. The programme page lists the following accepted results:

Qualification	Minimum result
Malaysian University English Test (MUET)	Band 4.0
IELTS Academic	Band 6.0
TOEFL iBT Centre Based	Score 60
TOEFL Essentials Online	Score 8.5
Pearson Test of English Academic	Score 59
Cambridge B1 Preliminary B2 First C1 Advanced or C2 Proficiency	Score 169

Programme Goal and Educational Objectives

Programme Goal

The programme develops knowledgeable biomedical engineering graduates who can apply critical thinking, professional judgement and ethical practice when addressing technical and research problems in healthcare.

Programme Educational Objectives

Objective	Expected graduate achievement
PEO1	Graduates hold a senior or decision-making position in government or biomedical engineering sectors.
PEO2	Graduates engage in Research and Development activities in biomedical engineering for their career development.
PEO3	Graduates contribute actively in sustainable development of biomedical engineering and well-being of society.

What These Objectives Emphasise

Engineering insight connects measurements, models and clinical or healthcare needs.

Applied research investigates contemporary biomedical engineering problems systematically.

Responsible practice communicates effectively and observes ethical and professional standards.

Programme Learning Outcomes

On successful completion of the programme, graduates should be able to demonstrate the following outcomes.

Code	Learning outcome	Competency emphasis
PLO1	Demonstrate continuing advanced knowledge in solving complex biomedical engineering problem.	Knowledge and understanding Cognitive / Psychomotor
PLO2	Analyze complex biomedical engineering problems critically and provide solutions through research, using advanced techniques, tools, skills or by a range of integrated approaches.	Cognitive skills Cognitive / Psychomotor
PLO3	Conduct standard and specialized research approaches and apply practical skills, tools or investigative techniques in formulating solutions for contemporary complex biomedical engineering problems.	Practical skills Cognitive / Psychomotor
PLO4	Communicate effectively as individual or in a group to peers, experts, or non-experts ethically and professionally using appropriate methods.	Interpersonal and communication skills Cognitive / Psychomotor
PLO5	Demonstrate competency in using and adapt relevant digital technologies, statistical and numerical knowledge in designing solutions for complex biomedical engineering problems.	Digital and numeracy skills Cognitive / Psychomotor
PLO6	Demonstrate significant independence, leadership, and interpersonal skills as a member or leader in project planning in complex biomedical engineering application	Leadership autonomy and responsibility Affective / Cognitive
PLO7	Identify the needs of self-advancement through continuous professional development and adapt entrepreneurial element in the context of biomedical engineering.	Personal and entrepreneurial skills Affective / Cognitive
PLO8	Demonstrate adherence to ethical and professional codes of practice in planning and execution of the technical or research project relevant to biomedical engineering.	Ethics and professionalism Affective / Cognitive

Curriculum Structure

The programme requires 42 credits**: 33 credits of core courses** and **9 credits of electives**. The core includes a 12-credit research project.

Core Courses

Course code	Course title	Credits
KQX7001D	Research Methodology	3
KQX7002D	Project Management	3
KQB7002D	Bioinstrumentation	3
KQB7003D	Engineering Biomechanics and Motion Analysis	3
KQB7004D	Healthcare Technology	3
KQB7005D	Medical Imaging	3
KQB7006D	Tissues Engineering	3
KQB7001D	Research Project	12
Total required credits		**33**

Research Sequence

Foundation	Development	Completion
KQX7001D Research Methodology	KQB7001D Research Project 1 (P1)	KQB7001D Research Project 2 (P2)

Integrated Learning Path

Measure	Interpret	Design
Bioinstrumentation and physiological or motion data	Medical images clinical needs and engineering evidence	Healthcare rehabilitation telemedicine and AI enabled solutions

Elective Course Guide

The approved curriculum requires **9 elective credits.** The current course list comprises **three three-credit electives**, so the published structure includes all three courses, subject to semester availability and programme advice.

Course code	Course title	Credits
KQB7008DL	Artificial Intelligence in Medicine	3
KQB7009DL	Rehabilitation Engineering	3
KQB7010DL	Telemedicine	3
Elective credits required		**9**

Choosing Electives

Intelligent healthcare artificial intelligence supports clinical interpretation decision support and technology development.

Human function biomechanics motion analysis and rehabilitation connect engineering analysis with human performance.

Connected care telemedicine and healthcare technology support access monitoring and service delivery across distance.

ODL Learning Experience

ODL combines scheduled engagement with independent study. Students use the University learning-management environment (SPECTRUM ODL https://odl.um.edu.my/) to access materials, participate in learning activities, communicate with lecturers and peers, submit assessments and monitor progress.

Learning element	What students can expect	Student responsibility
Self-instructional materials	Structured digital resources support independent learning before and after scheduled sessions.	Follow the weekly sequence and complete preparatory work.
Synchronous learning	Live online sessions support explanation, discussion and feedback.	Attend as scheduled and participate actively.
Asynchronous engagement	Forums and learning activities allow considered participation across different schedules.	Contribute by the stated deadlines and engage professionally.
Assessment and feedback	Assignments, projects and other approved assessments demonstrate achievement of course outcomes.	Submit original work and act on feedback.
Academic support	Lecturers and programme staff guide course learning, registration and project progress.	Seek guidance early and use official communication channels.

Research Project

The 12-credit Research Project develops the ability to define a relevant problem, select an appropriate method, analyse evidence and communicate a defensible engineering response. The research field and supervisor should be confirmed before substantive project work begins. Students must follow the milestones, ethics requirements and submission procedures communicated by the Faculty.

Digital Study Readiness

- Reliable internet access and a suitable computer for online learning and technical work.
- Regular access to the University learning platform (SPECTRUM ODL https://odl.um.edu.my/) and official email.
- A weekly study routine that protects time for live sessions, independent work and assessments.
- Early communication with course lecturers when technical, academic or scheduling issues arise.

Academic Journey and Student Guidance

Research Project

The 12-credit Research Project develops the ability to define a biomedical engineering problem, review relevant evidence, select an appropriate method, analyse findings and communicate a defensible conclusion. Students should begin discussing the research area and supervision arrangements early in the programme and follow the Faculty milestones for title approval, ethics, progress and submission.

Recommended Learning Progression

Semester 1	Semester 2	Special Semester
Build foundations in research methods, biomedical measurement, healthcare technology and analytical thinking.	Integrate specialist knowledge, develop the research study and complete the approved elective requirement.	Complete outstanding project assessment or programme requirements according to the approved study plan.

Registration and Progress

Register only for courses confirmed as available in the relevant semester. Check the official registration schedule, candidature rules and programme notices before each registration period. Course offerings, assessment arrangements and project milestones may change through approved University and Faculty processes.

Before Each Semester

01	Review the approved course offering and your remaining credit requirements.
02	Confirm registration deadlines and any prerequisites or project milestones.
03	Check the timetable and reserve time for synchronous sessions and independent study.
04	Use your official UM account and verify access to all registered course sites.
05	Contact the programme team promptly if your study load or project progress needs review.

Career Pathways and Official Information

The programme supports professional development across healthcare technology, medical devices, clinical engineering, research and digitally enabled healthcare services.

- Biomedical or clinical engineer
- Medical imaging or biomechanics specialist
- Rehabilitation engineer or healthcare technology consultant
- Medical device design or regulatory affairs professional
- Telemedicine or artificial intelligence in healthcare specialist
- Research scientist, academic or biomedical project manager

Official Sources

Study at UM programme page

Faculty of Engineering master programme entry requirements

Faculty postgraduate programmes

FACULTY OF ENGINEERING

Master of Biomedical Engineering ODL Study Planners

Academic Session 2026/2027

42	6	15	9	12
TOTAL CREDITS	GENERAL	PROGRAMME CORE	ELECTIVES	RESEARCH PROJECT

Master of Biomedical Engineering ODL Study Planner

Semester 1 Intake Three Study Period Pathway

This recommended pathway completes 42 credits across two regular semesters and one special semester. Read the columns from left to right according to study period, not calendar order.

STUDY PERIOD 1 SEMESTER I	STUDY PERIOD 2 SEMESTER II	STUDY PERIOD 3 SPECIAL SEMESTER
Year 1 Sem 1 entry semester	Year 1 Sem 2 study period	Year 1 final study period
GENERAL COURSES **KQX7001D** Research Methodology [3] **KQX7002D** Project Management [3] **PROGRAMME CORE** **KQB7002D** Bioinstrumentation [3] **KQB7003D** Engineering Biomechanics and Motion Analysis [3] **KQB7004D** Healthcare Technology [3] **ELECTIVE COURSES** **KQB7008D** Artificial Intelligence in Medicine [3] **PLANNED LOAD 18 CREDITS**	**PROGRAMME CORE** **KQB7005D** Medical Imaging [3] **KQB7006D** Tissue Engineering [3] **KQB7001D** Research Project 1 [6] **ELECTIVE COURSES** **KQB7009D** Rehabilitation Engineering [3] **KQB7010D** Telemedicine [3] **PLANNED LOAD 18 CREDITS**	**KQB7001D** Research Project 2 [6] **PLANNED LOAD 6 CREDITS**

Study period 1	Study period 2	Study period 3	Programme total
18 credits	18 credits	6 credits	42 credits

Master of Biomedical Engineering ODL Study Planner

Semester 2 Intake Three Study Period Pathway

This recommended pathway completes 42 credits across two regular semesters and one special semester. Read the columns from left to right according to study period, not calendar order.

STUDY PERIOD 1 SEMESTER II	STUDY PERIOD 2 SPECIAL SEMESTER	STUDY PERIOD 3 SEMESTER I
Year 1 entry semester	Year 1 second study period	Year 2 final study period
GENERAL COURSES **KQX7001D** Research Methodology [3] **KQX7002D** Project Management [3] **PROGRAMME CORE** **KQB7005D** Medical Imaging [3] **KQB7006D** Tissue Engineering [3] **ELECTIVE COURSES** **KQB7009D** Rehabilitation Engineering [3] **KQB7010D** Telemedicine [3] **PLANNED LOAD 18 CREDITS**	**KQB7001D Research** Project 1 [6] **PLANNED LOAD 6 CREDITS**	**PROGRAMME CORE** **KQB7002D** Bioinstrumentation [3] **KQB7003D** Engineering Biomechanics and Motion Analysis [3] **KQB7004D** Healthcare Technology [3] **KQB7001D** Research Project 2 [6] **ELECTIVE COURSES** **KQB7008D** Artificial Intelligence in Medicine [3] **PLANNED LOAD 18 CREDITS**

Study period 1	Study period 2	Study period 3	Programme total
18 credits	6 credits	18 credits	42 credits

UNIVERSITI MALAYA	**PRO FORMA KURSUS** ***COURSE PRO FORMA***

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Akademi/Fakulti/Institut/Pusat *Academy/Faculty/Institute/Centre*	Fakulti Kejuruteraan	*Faculty of Engineering*
Jabatan *Department*	Pejabat Timbalan Dekan (Ijazah Tinggi)	*Deputy Dean (Postgraduates) Office*
Nama Program Akademik Name of Academic *Programme*	Sarjana Kejuruteraan Bioperubatan Sarjana Kejuruteraan Mekanikal Sarjana Kejuruteraan Sistem Sarjana Kejuruteraan Keselamatan, Kesihatan dan Alam Sekitar	*Master of Biomedical Engineering* *Master of Mechanical Engineering* *Master of Systems Engineering* *Master of Safety, Health and Environment Engineering*
Kod Kursus* *Course Code**	KQX7001DL	*KQX7001DL*
Tajuk Kursus* *Course Title**	Metodologi Penyelidikan	*Research Methodology*
Kredit* *Credit**	3	*3*
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	120	*120*
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*	Tiada	*None*
Hasil Pembelajaran Kursus* *Course Learning Outcomes**	Di akhir kursus ini, pelajar dapat: 1. Menentukan masalah penyelidikan yang bersesuai	*At the end of the course, students are able to:*

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	dengan bidang kejuruteraan 2. Merekabentuk kaedah kajian untuk menyelesaikan masalah kajian 3. Menilai secara kritikal kebolehlaksanaan dan kepraktisan kaedah kajian untuk menyelesaikan masalah kajian. 4. Menyelaras maklumat penyelidikan yang relevan ke dalam laporan teknikal yang komprehensif	*1. Determine research problem or issues related to the respective engineering field.* *2. Design appropriate research methodology to solve the research problem* *3. Evaluate critically the feasibility and practicality of relevant methods and tools to solve the research problem.* *4. Coordinate relevant research information into comprehensive technical report.*
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Kursus ini mendedahkan pelajar kepada teknik – teknik bagaimana untuk menjalankan kajian. Di awal kursus pelajar di ajar dengan pelbagai teknik kajian termasuk, kaedah kajian saintifik. Kemudian, etika kajian, reka bentuk eksperimen dan teknik statistik di terangkan kepada pelajar di ikuti dengan mengenal pasti masalah kajian dan penulisan cadangan. Pelajar akan menguasai kemahiran kajian, penulisan saintifik, komunikasi lisan bagi dapatan kajian.	*This course exposes students to the techniques of how to conduct research. At the beginning of the course students are taught with various research techniques including, scientific research methods. Then, research ethics, experimental design and statistical techniques are explained to students followed by identifying research problems and writing suggestions. Students will master research skills, scientific writing, and oral communication for research findings.*
Pemberatan Penilaian* *Assessment Weightage**	Penilaian Berterusan: 100% Peperiksaan Akhir: Tiada	*Continuous Assessment: 100%* *Final Examination: None*
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	Makluman secara dalam talian.	*Online feedback*
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-Kaedah Universiti Malaya (Ijazah Sarjana) 2019. Peraturan-Peraturan Universiti Malaya (Ijazah Sarjana) 2019.	*University of Malaya Rules (Master's Degree) 2019* *University of Malaya Regulations (Master's Degree) 2019*

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Akademi/Fakulti/Institut/Pusat *Academy/Faculty/Institute/Centre*	Fakulti Kejuruteraan	*Faculty of Engineering*
Jabatan *Department*	Pejabat Timbalan Dekan (Ijazah Tinggi)	*Deputy Dean (Postgraduates) Office*
Nama Program Akademik Name of Academic *Programme*	Sarjana Kejuruteraan Bioperubatan Sarjana Kejuruteraan Mekanikal Sarjana Kejuruteraan Sistem Sarjana Kejuruteraan Keselamatan, Kesihatan dan Alam Sekitar	*Master of Biomedical Engineering* *Master of Mechanical Engineering* *Master of Systems Engineering* *Master of Safety, Health and Environment Engineering*
Kod Kursus* *Course Code**	KQX7002DL	*KQX7002DL*
Tajuk Kursus* *Course Title**	Pengurusan Projek	*Project Management*
Kredit* *Credit**	3	*3*
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	120	*120*
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*	Tiada	*None*
Hasil Pembelajaran Kursus* *Course Learning Outcomes**	Di akhir kursus ini, pelajar dapat: 1. Menganalisa prinsip komponen dan konsep	*At the end of the course, students are able to:* *1. Analyze the principle components and concepts*

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	pengurusan projek. 2. Membenarkan pelbagai pemacu perubahan yang boleh menjejaskan projek selama kitaran hidupnya. 3. Menyelesaikan segala cabaran semasa projek secara efektif. 4. Mengaplikasikan kemahiran keusahawanan dan kepimpinan dalam pengurusan sesuatu projek.	*of project management.* *2. Justify the various drivers of change which may impact a project during its life cycle.* *3. Solve every challenges faced during the project.* *4. Apply entrepreneurial and leadership skills in a project management.*
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Kursus ini memberikan pengenalan yang sistematik dan menyeluruh untuk semua aspek pengurusan projek. Projek adalah aspek yang semakin penting dalam perniagaan kejuruteraan moden. Oleh itu, kursus ini mengutarakan pentingnya memahami hubungan antara projek dan matlamat strategik organisasi. Kursus ini juga membincangkan kemahiran teknikal, budaya, dan interpersonal yang diperlukan untuk menguruskan projek dengan jayanya dari awal hingga akhir. Ia menekankan bahawa pengurusan projek adalah disiplin profesional yang merangkumi pengetahuan dan kemahirannya yang tersendiri. Konsep diperkukuhkan dengan menggunakan kajian kes yang merangkumi pelbagai jenis projek dan industri.	*This course provides a systematic and thorough introduction to all aspects of project management. Projects are an increasingly important aspect of modern engineering business. Therefore, the course underlines the importance of understanding the relation between projects and the strategic goals of the organisation. The course also discusses the technical, cultural, and interpersonal skills necessary to successfully manage projects from start to finish. It emphasises that project management is a professional discipline with its own tools, body of knowledge, and skills. Concepts are reinforced by case studies covering a wide variety of project types and industries.*
Pemberatan Penilaian* *Assessment Weightage**	Penilaian Berterusan: 100% Peperiksaan Akhir: 0%	*Continuous Assessment: 100%* *Final Examination: 0%*
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	Makluman secara dalam talian.	*Online feedback*
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-Kaedah Universiti Malaya (Ijazah Sarjana) 2019. Peraturan-Peraturan Universiti Malaya (Ijazah Sarjana) 2019.	*University of Malaya Rules (Master's Degree) 2019* *University of Malaya Regulations (Master's Degree) 2019*

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Jabatan *Department*	Jabatan Kejuruteraan Bioperubatan	*Department of Biomedical Engineering*
Nama Program Akademik Name of Academic *Programme*	Sarjana Kejuruteraan Bioperubatan	*Master of Biomedical Engineering*
Kod Kursus* *Course Code**	KQB7001DL	*KQB7001DL*
Tajuk Kursus* *Course Title**	Projek Penyelidikan	*Research Project*
Kredit* *Credit**	12	*12*
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	480	*480*
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*	KQX7001DL - Metodologi Penyelidikan	*KQX7001DL – Research Methodology*
Hasil Pembelajaran Kursus* *Course Learning Outcomes**	Di akhir kursus ini, pelajar dapat: 1. Membina ulasan kritikal dan kajian teori yang diperlukan untuk penyelidikan. 2. Mereka bentuk kaedah untuk menjalankan penyelidikan kejuruteraan yang kompleks 3. Menyelesaikan masalah penyelidikan melalui	*At the end of the course, students are able to:* *1. Construct critical review and theoretical study required for the research.* *2. Design a methodology to carry out complex engineering research.* *3. Analyse research problem through*

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	metodologi dan alat yang bersesuaian. 4. Menilai data dan penemuan penyelidikan menggunakan alat digital yang sesuai. 5. Menunjukkan hasil projek penyelidikan kepada latar belakang khalayak yang berbeza melalui pembentangan. 6. Menggunakan kemahiran pengurusan projek yang sesuai dalam menyelesaikan projek penyelidikan. 7. Menjelaskan kesan kewangan dan ekonomi daripada hasil penyelidikan. 8. Menghubungkaitkan hasil penyelidikan berkenaan dengan kesannya kepada masyarakat.	*advanced methodology and tools.* *4. Evaluate the data and findings of the research using the appropriate digital tools.* *5. Demonstrate the outcome of research project to different background of audience through presentation.* *6. Apply appropriate project management skills in completing the research project.* *7. Explain the financial and economic impacts of the research outcomes.* *8. Relate the outcomes of the research with respect to its impacts on society.*
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Projek penyelidikan akan mendedahkan pelajar dalam membuat ulangkaji risalah berkaitan dengan topik kajian spesifik, merancang kaedah kajian, mengumpul data eksperimen dan menghuraikan data, menulis laporan dan membuat pembentangan.	*Research project will expose students to carry out literature review on a specific research topic, plan a research methodology, collect experimental data and Interpret data, write a dissertation and carry out a presentation*
Pemberatan Penilaian* *Assessment Weightage**	Penilaian Berterusan: 100% Peperiksaan Akhir:0%	*Continuous Assessment: 100%* *Final Examination: 0%*
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	Makluman secara dalam talian.	*Online feedback*
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-Kaedah Universiti Malaya (Ijazah Sarjana) 2019. Peraturan-Peraturan Universiti Malaya (Ijazah Sarjana) 2019.	*University of Malaya Rules (Master's Degree) 2019* *University of Malaya Regulations (Master's Degree) 2019*

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Jabatan *Department*	Kejuruteraan Bioperubatan	*Biomedical Engineering*
Nama Program Akademik Name of Academic *Programme*	Sarjana Kejuruteraan Bioperubatan	*Master of Biomedical Engineering*
Kod Kursus* *Course Code**	KQB7002DL	*KQB7002DL*
Tajuk Kursus* *Course Title**	Bioinstrumentasi	*Bioinstrumentation*
Kredit* *Credit**	3	*3*
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	120	*120*
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*	Tiada	*None*
Hasil Pembelajaran Kursus* *Course Learning Outcomes**	Di akhir kursus ini, pelajar dapat: 1) Menggunakan prinsip-prinsip kejuruteraan untuk memilih alat yang optimum untuk mengukur pembolehubah perubatan (C3). 2) Menganalisa masalah utama sistem analog dan digital instrumentasi (C4).	*At the end of the course, students are able to:* *1) Use the principles of engineering to choose the optimal instrument for measuring medical variables (C3).* *2) Analyze the problem of analog and digital instrumentation systems (C4.)*

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	3) Merekabentuk sebuah peralatan canggih untuk mengukur pembolehubah perubatan dan dalam penyelidikan biologi dengan mengambilkira aspek inovasi baru bagi persiapan IR4.0 (P5).	*3) Design an advanced instrumentation for measurement of medical variables and in biological research by considering the new innovation aspect for IR4.0 preparation (P5).*
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Kursus ini merangkumi prinsip-prinsip, teknologi, kaedah dan aplikasi biosensor dan bioinstrumentation. Objektifnya adalah untuk menghubungkan prinsip-prinsip kejuruteraan untuk memahami biosistem pada deria dan bioelectronics. Penguat instrumentasi dan litar jambatan akan diajar secara terperinci. Sistem biosensor berasaskan prinsip transduksi juga akan diberi perhatian yang meluas. Para pelajar akan dapat merekabentuk dan memilih komponen-komponen yang sesuai terhadap masalah pengukuran.	*This course covers the principles, technologies, methods and applications of biosensor and bioinstrumentation. The objective is to link engineering principles to understanding of biosystems in sensors and bioelectronics. Instrumentation amplifier and the bridge circuit will be covered in detail. The transduction principle based biosensor systems will also be discussed extensively. The students will be able to design and select the appropriate components in response to measurement problems.*
Pemberatan Penilaian* *Assessment Weightage**	Penilaian Berterusan:50% Peperiksaan Akhir:50%	*Continuous Assessment:50%* *Final Examination:50%*
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	Maklumbalas secara dalam talian	*Online feedback*
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-Kaedah Universiti Malaya (Ijazah Sarjana) 2019. Peraturan-Peraturan Universiti Malaya (Ijazah Sarjana) 2019.	*University of Malaya Rules (Master's Degree) 2019* *University of Malaya Regulations (Master's Degree) 2019*

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Jabatan *Department*	Kejuruteraan Bioperubatan	*Biomedical Engineering*
Nama Program Akademik Name of Academic *Programme*	Sarjana Kejuruteraan Bioperubatan	*Master of Biomedical Engineering*
Kod Kursus* *Course Code**	KQB7003DL	*KQB7003DL*
Tajuk Kursus* *Course Title**	Biomekanik Kejuruteraan dan Analisis Gerakan	*Engineering Biomechanics and Motion Analysis*
Kredit* *Credit**	3	*3*
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	122	*122*
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*	Tiada	*None*
Hasil Pembelajaran Kursus* *Course Learning Outcomes**	Di akhir kursus ini, pelajar dapat: 1. Menyelesaikan persamaan-persamaan gerakan untuk sistem jasad tegar multisegmen. (C4) 2. Menjelaskan anatomi dan fungsi otot-rangka tangan kaki dan badan. (C5) 3. 3. Menggabung pengetahuan anatomi dan fungsi otot-rangka dengan dinamik mekanik untuk	*At the end of the course, students are able to:* *1. Solve equations of motion for multisegment systems of rigid bodies. (C4)* *2. 2. Explain the musculoskeletal anatomy and function of the limbs and trunk. (C5)* *3. Combine knowledge of the musculoskeletal anatomy and function with mechanical dynamics*

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	mensamagerakkan kawalan gerakan. (P4)	*to simulate the control of movement.(P4)*
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Kursus ini meliputi deskripsi kuantitatif dan kuanlitif bagi tindakan otot-otot berkaitan gerakan manusia; pengenalan kepada dinamik jasad tegar dan dinamik sistem-sistem multipaut dengan menggunakan pendekatan Newtonan dan Langrangian; model otot dengan aplikasi untuk mengawal gerakan multisendi; dinamik ke hadapan dan songsang bagi sistem-sistem terpacu multisendi dan otot.	*The course covers quantitative and qualitative descriptions of the action of muscles in relation to human movement; introduction to rigid body dynamics and dynamics of multi-link systems using Newtonian and Lagrangian approaches; muscle models with application to control of multi-joint movement; forward and inverse dynamics of multi-joint and muscle driven systems.*
Pemberatan Penilaian* *Assessment Weightage**	Penilaian Berterusan:50% Peperiksaan Akhir:50%	*Continuous Assessment:50%* *Final Examination:50%*
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	Maklumbalas secara dalam talian	*Online feedback*
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-Kaedah Universiti Malaya (Ijazah Sarjana) 2019. Peraturan-Peraturan Universiti Malaya (Ijazah Sarjana) 2019.	*University of Malaya Rules (Master's Degree) 2019* *University of Malaya Regulations (Master's Degree) 2019*

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Jabatan *Department*	Kejuruteraan Bioperubatan	*Biomedical Engineering*
Nama Program Akademik Name of Academic *Programme*	Sarjana Kejuruteraan Bioperubatan	*Master of Biomedical Engineering*
Kod Kursus* *Course Code**	KQB7004DL	*KQB7004DL*
Tajuk Kursus* *Course Title**	Teknologi Penjagaan Kesihatan	*Healthcare Technology*
Kredit* *Credit**	3	*3*
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	120	*120*
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*	Tiada	*None*
Hasil Pembelajaran Kursus* *Course Learning Outcomes**	Di akhir kursus ini, pelajar dapat: 1. Menentukan kepentingan pengurusan teknologi penjagaan kesihatan (C4) 2. Menyesuaikankepentingan Teknologi Informasi dan Komunikasi dalam sektor penjagaan kesihatan.(C5) 3. Menjelaskan teknologi terkini yang digunakan dalam industri penjagaan kesihatan. (C5)	*At the end of the course, students are able to:* *1. Determine the importance of Healthcare Technology.(C4)* *2. Accommodate the prominence of Information and Communication Technology in Healthcare Sector.(C5)* *3. Explain the current technologies used in*

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	4. Mengenalpasti kepentingan keselamatan, standard dan etika yang berkaitan penjagaan kesihatan. (C5)	*Healthcare Industry. (C5)* *4. Identify the importance of safety, standards and ethics related to Healthcare. (C5)*
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Kursus ini merangkumi topik yang berkaitan dengan Penjagaan KesihatanTeknologi. Kursus ini bertujuan untuk menerangkanPengetahuan mengenai teknologi semasa yang digunakan dalam sektor kesihatan Menguraikan keselamatan medis, piawaian Peranti dan isu etika untuk membimbing jurutera bioperubatan.	*The course covers topics related to Healthcare Technologies. The course is intended to describe knowledge of current technologies used in the health sector elaborating medical safety, Device standards and Ethicalissues to guide biomedical engineers.*
Pemberatan Penilaian* *Assessment Weightage**	Penilaian Berterusan:50% Peperiksaan Akhir:50%	*Continuous Assessment:50%* *Final Examination:50%*
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	Maklumbalas secara dalam talian	*Online feedback*
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-Kaedah Universiti Malaya (Ijazah Sarjana) 2019. Peraturan-Peraturan Universiti Malaya (Ijazah Sarjana) 2019.	*University of Malaya Rules (Master'sDegree) 2019* *University of Malaya Regulations (Master's Degree) 2019*

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Akademi/Fakulti/Institut/Pusat *Academy/Faculty/Institute/Centre*	Fakulti Kejuruteraan	*Faculty of Engineering*
Jabatan *Department*	Jabatan Kejuruteraan Bioperubatan	*Department of Biomedical Engineering*
Nama Program Akademik Name of Academic *Programme*	Sarjana Kejuruteraan Bioperubatan	*Master of Biomedical Engineering*
Kod Kursus* *Course Code**	KQB7005DL	*KQB7005DL*
Tajuk Kursus* *Course Title**	Pengimejan Perubatan	*Medical Imaging*
Kredit* *Credit**	3	*3*
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	120	*120*
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*	Tiada	*None*
Hasil Pembelajaran Kursus* *Course Learning Outcomes**	Di akhir kursus ini, pelajar dapat: 1. Mengintepretasi prinsip-prinsip kerja, reka bentuk dan aplikasi pelbagai peralatan perubatan pengimejan diagnostik dan terapeutik. (C5) 2. Menjelaskan konsep dalam perlindungan dan keselamatan sinaran. (C5)	*At the end of the course, students are able to:* *1. Interpret the working principles, designs and applications of various medical diagnostic imaging and therapeutic equipment. (C5)* *2. Explain radiation protection and safety concept. (C5)*

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	3. Membangun penilaian kualiti imej pada kaedah imej perubatan yang berbeza. (P4)	*3. 3. Develop image quality assessment on different medical image modalities (P4)*
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Kursus ini memperkenalkan prinsip-prinsip asas dan rekabentuk peralatan pengimejan perubatan diagnostik. Beberapa topik pengimejan perubatan diliputi seperti asas atom dan sifat radiasi, penghasilan x-ray dan interaksi dengan bahan, sinar gamma, radiografi projeksi, mamografi, fluroskopi, tomografi berkomputer, pengimejan resonans magnetik, sistem ultrabunyi, pengimejan perubatan nuklear, laser dan optoeletronik. Kursus ini juga mendedahkan pelajar-pelajar kepada konsep kuality imej dan keselamatan radiasi dalam pengimejan perubatan.	*The course introduces the basic principles and designs of medical diagnostic imaging equipment. Topics covered include basic atomics and nature of radiation, X-ray production and interaction with matter, gamma rays, projection radiography, mammography, fluoroscopy, computed tomography, magnetic resonance imaging, ultrasound system, nuclear medicine imaging, laser and optoelectronics. The course also exposes students to the concept of image quality and radiation safety in medical imaging.*
Pemberatan Penilaian* *Assessment Weightage**	Penilaian Berterusan:50% ePeperiksaan Akhir:50%	*Continuous Assessment:50%* *eFinal Examination:50%*
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	Maklumbalas secara dalam talian.	*Online feedback*
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-kaedah Universiti Malaya (Ijazah Sarjana) 2019. Peraturan-peraturan Universiti Malaya (Ijazah Sarjana) 2019	*University of Malaya Rules (Master's Degree) 2019* *University of Malaya Regulations (Master's Degree) 2019*

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Jabatan *Department*	Jabatan Kejuruteraan Bioperubatan	*Department of Biomedical Engineering*
Nama Program Akademik Name of Academic *Programme*	Sarjana Kejuruteraan Bioperubatan	*Master of Biomedical Engineering*
Kod Kursus* *Course Code**	KQB7006DL	*KQB7006DL*
Tajuk Kursus* *Course Title**	Kejuruteraan Tisu	*Tissue Engineering*
Kredit* *Credit**	3	*3*
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	121	*121*
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*	Tiada	*None*
Hasil Pembelajaran Kursus* *Course Learning Outcomes**	Di akhir kursus ini, pelajar dapat: 1. Menerangkan prinsip-prinsip di sebalik Kejuruteraan Tisu. (C5) 2. Menilai cabaran dan penyelesaian Kejuruteraan Tisu. (C5) 3. Menghujah isu-isu pengawalseliaan dan etika yang berkaitan dengan Kejuruteraan Tisu. (C5)	*At the end of the course, students are able to:* *1. Explain the principles behind Tissue Engineering (C5)* *2. Evaluate Tissue Engineering challenges and solutions. (C5)* *3. Justify the regulatory and ethical issues related to Tissue Engineering. (C5)*

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Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Kursus ini merangkumi prinsip- prinsip kejuruteraan tisu bertumpu kepada kombinasi sel, perancah, komponen-komponen matriks sel luar dan stimulasi sesuai. Ia juga memberi ulasan semasa mengenai strategi dan penggunaan kejuruteraan tisu serta isu-isu etika.	*This course covers the principles of tissue engineering focused upon the combination of cells, scaffolds, components of extracellular matrix and appropriate stimulation. It also reviews current strategies and usage of tissue engineering as well as ethical issues.*
Pemberatan Penilaian* *Assessment Weightage**	Penilaian Berterusan:50% Peperiksaan Akhir:50%	*Continuous Assessment:50%* *Final Examination:50%*
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	Makluman secara dalam talian.	*Online feedback*
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-kaedah Universiti Malaya (Ijazah Sarjana) 2019. Peraturan-peraturan Universiti Malaya (Ijazah Sarjana) 2019.	*University of Malay Rules (Master's Degree) 2019* *University of Malaya Regulations (Master's Degree) 2019.*

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Jabatan *Department*	Jabatan Kejuruteraan Bioperubatan	*Department of Biomedical Engineering*
Nama Program Akademik Name of Academic *Programme*	Sarjana Kejuruteraan Bioperubatan	*Master of Biomedical Engineering*
Kod Kursus* *Course Code**	KQB7008DL	*KQB7008DL*
Tajuk Kursus* *Course Title**	Kepintaran Buatan dalam Perubatan	*Artificial Intelligence in Medicine*
Kredit* *Credit**	3	*3*
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	122	*122*
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*	Tiada	*None*
Hasil Pembelajaran Kursus* *Course Learning Outcomes**	Di akhir kursus ini, pelajar dapat: 1. Mengintegrasikan teknik kecerdasan buatan ke arah pembangunan profesional dan keusahawanan dalam bidang perubatan. (C5) 2. Menentukan teori-teori teknik kecerdikan buatan	*At the end of the course, students are able to:* *1. Integrate the artificial intelligence technique towards professional development and entrepreneurship in medicine. (C5)* *2. Determine the theories of artificial intelligence*

	dalam kejuruteraan bioperubatan. (C4) 3. Mengaplikasikan teknik-teknik kecerdikan buatan kepada beberapa kegunaan dalam kejuruteraan bioperubatan. (C3)	*techniques. (C4)* *3. Apply the artificial intelligence techniques in some biomedical engineering applications. (C3)*
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Kursus ini meliputi asas-asas kefahaman tentang konsep-konsep kecerdikan buatan dan kegunaan asasnya dalam Kejuruteraan Bioperubatan.	*The course covers the fundamental understanding of the artificial intelligence concepts and its basic applications in biomedical engineering.*
Pemberatan Penilaian* *Assessment Weightage**	Penilaian Berterusan:50% Peperiksaan Akhir:50%	*Continuous Assessment: 50%* *Final Examination: 50%*
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	Makluman secara dalam talian.	*Online feedback*
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-kaedah Universiti Malaya (Ijazah Sarjana) 2019. Peraturan-peraturan Universiti Malaya (Ijazah Sarjana) 2019.	*University of Malaya Rules (Master's Degree) 2019* *University of Malaya Regulations (Master's Degree) 2019*

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Jabatan *Department*	Jabatan Kejuruteraan Bioperubatan	*Department of Biomedical Engineering*
Nama Program Akademik Name of Academic *Programme*	Sarjana Kejuruteraan Bioperubatan	*Master of Biomedical Engineering*
Kod Kursus* *Course Code**	KQB7009DL	*KQB7009DL*
Tajuk Kursus* *Course Title**	Kejuruteraan Rehabilitasi	*Rehabilitation Engineering*
Kredit* *Credit**	3	*3*
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	120	*120*
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*	Tiada	*None*
Hasil Pembelajaran Kursus* *Course Learning Outcomes**	Di akhir kursus ini, pelajar dapat: 1. Menyelesaikan masalah rehabilitasi klinikal dan yang berkaitan dengan menggunakan instrumentasi biomekanikal termaju. (C4) 2. Menggunakan konsep dan teori rehabilitasi dalam menilai pergerakan manusia yang kurang upaya.(A5).	*At the end of the course, students are able to:* *1. Solve clinical rehabilitation problems and related issues by using advanced biomechanical instrumentation.(C4)* *2. Use the concepts and theories of rehabilitation in assessing disordered human movements.*

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		(A5)
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Kursus ini meliputi teknik untuk gerakan manusia dan analisis beban dan gait patologi dan aktiviti-aktiviti lain. Aplikasi teknik kepada rekabentuk dan penilaian untuk implan ortopedik.	*The course covers techniques of human movement and load analysis in normal and pathological gait and other activities. Application of the techniques to the design and evaluation of orthopaedic implants.*
Pemberatan Penilaian* *Assessment Weightage**	Penilaian Berterusan: 50% Peperiksaan Akhir: 50%	*Continuous Assessment: 50%* *Final Examination: 50%*
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	Makluman secara dalam talian.	*Online feedback*
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-kaedah Universiti Malaya (Ijazah Sarjana) 2019. Peraturan-peraturan Universiti Malaya (Ijazah Sarjana) 2019.	*University of Malaya Rules (Master's Degree) 2019* *University of Malaya Regulations (Master's Degree) 2019.*

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Jabatan *Department*	Jabatan Kejuruteraan Bioperubatan	*Department of Biomedical Engineering*
Nama Program Akademik Name of Academic *Programme*	Sarjana Kejuruteraan Bioperubatan	*Master of Biomedical Engineering*
Kod Kursus* *Course Code**	KQB7010DL	*KQB7010DL*
Tajuk Kursus* *Course Title**	Teleperubatan	*Telemedicine*
Kredit* *Credit**	3	*3*
Masa Pembelajaran Pelajar (SLT) *Student Learning Time (SLT)*	120	*120*
Prasyarat/Keperluan Minimum Kursus *Course Pre-requisite(s)/Minimum Requirement(s)*	Tiada	*None*
Hasil Pembelajaran Kursus* *Course Learning Outcomes**	Di akhir kursus ini, pelajar dapat: 1. Menggunakan konsep perangkaian komputer dan komunikasi serta protokol dalam teleperubatan. (C3) 2. Membangun seni bina Internet dalamapplikasi kejuruteraan bioperubatan yang relevan. (P4) 3. Menyelesaikan masalah-maslah komunikasi berkaitan	*At the end of the course, students are able to:* *1. Use the concept of computer networking and communication as well as protocols in telemedicine. (C3)* *2. Develop the architecture of Internet in relevant biomedical engineering applications. (P4)* *3. 3. Propose solutions to biomedical engineering-*

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	dengan kejuruteraan bioperubatan. (C4)	*related communications problems. (C4)*
Sinopsis Kandungan Kursus *Synopsis of Course Contents*	Kursus ini meliputi teleperubatan dan pelbagai topik berkaitan perangkaian, terutamanya yang digunakan dalam bidang kejuruteraan bioperubatan. Topik termasuklah pengenalan kepada topologi perangkaian dan piawaian yang berkaitan; pengenalan kepada internet dan kegunaannya; asas-asas antaramuka komputer; dan teknologi-teknologi perangkaian komputer yang ada pada masa ini relevan kepada penyelidikan dan pembekalan perkhidmatan kejuruteraan bioperubatan.	*The course covers the telemedicine and various networking-related topics, particularly those applicable to biomedical engineering applications. Topics include an introduction to network topologies and related standards, introduction to the Internet and its applications, fundamentals of computer interface, and currently available computer networking technologies relevant to biomedical engineering research and service provision.*
Pemberatan Penilaian* *Assessment Weightage**	Penilaian Berterusan:50% Peperiksaan Akhir:50%	*Continuous Assessment:50%* *Final Examination:50%*
Kaedah Maklum Balas Tentang Prestasi *Methodologies for Feedback on Performance*	Maklumbalas secara dalam talian	*Online feedback*
Kriteria Dalam Penilaian Sumatif *Criteria in Summative Assessment*	Kaedah-Kaedah Universiti Malaya (Ijazah Sarjana) 2019. Peraturan-Peraturan Universiti Malaya (Ijazah Sarjana) 2019.	*University of Malaya Rules (Master'sDegree) 2019* *University of MalayaRegulations (Master's Degree) 2019*

RESEARCH PROGRAMME | MEngSc

07

Master of Engineering Science

COURSE TYPE	MODE OF STUDY	INDICATIVE DURATION
Research	Part-time	Minimum 2 semesters Maximum 8 semesters

PROGRAMME AT A GLANCE

This research programme supports the development of independent investigators who can define meaningful engineering problems and produce rigorous, original work. Training spans research methods and ethics, experimental design, statistical analysis, proposal development, scholarly writing and research communication, with the study timeline shaped by the discipline, project scope and guidance of the appointed supervisor.

View the official programme page

Source: Universiti Malaya Study portal | Page last updated 16 May 2026

UNIVERSITI MALAYA

FACULTY OF ENGINEERING

Master of Engineering Science

Programme Information by Research

MENGSC	RESEARCH	2 INTAKES
PROGRAMME	MODE	EACH YEAR

ACADEMIC SESSION 2026/2027

Universiti Malaya

Contents

This section explains the research programme, admission pathway, educational objectives, learning outcomes, registration obligations, candidature milestones, dissertation examination and official information for prospective and registered candidates.

01	Programme Overview
02	Admission Requirements
03	Preparing for Research Study
04	Programme Educational Objectives
05	Programme Learning Outcomes
06	Programme Structure and Registration
07	Candidature Requirements
08	Candidature Milestone Guide
09	Publication Ethics and Research Integrity
10	Dissertation Examination and Graduation
11	Career Pathways Fees and Official Sources

Programme Overview

The Master of Engineering Science is a research-intensive programme for graduates who wish to investigate a significant engineering problem under academic supervision. Candidates build advanced disciplinary knowledge, select defensible research methods, generate and interpret evidence, and communicate an original contribution through a dissertation and viva voce examination.

The dissertation is the central academic output. Prescribed supporting requirements, including Research Methodology, proposal and candidature defences, publication and progress monitoring, guide candidates from research design to successful completion.

Programme at a Glance

Programme name	Master of Engineering Science
Programme identifier	KMD
Award abbreviation	MEngSc
Qualification level	Master degree MQF Level 7
Mode of programme	By Research leading to a dissertation
Types of Study	Full Time
Normal full-time duration	Minimum 2 semesters Maximum 8 semesters
Published intakes	Semester 1 October and Semester 2 March subject to availability
Research environment	Biomedical Chemical Civil Electrical Mechanical and interdisciplinary engineering
Language requirements	Current University Bahasa Malaysia and English requirements apply

Research Journey at a Glance

Define	Design	Investigate	Communicate
Identify a significant engineering problem and research gap	Select rigorous methods and obtain the required approvals	Generate, analyse and critically evaluate evidence	Publish, defend and submit the dissertation

Admission Requirements

Applicants must hold a recognised Bachelor's Degree in Engineering, Science, Computing or a related field and satisfy the University's general and programme-specific requirements.

Academic Qualification

CGPA 3.00 or above Applicants may be considered under the general University admission requirements.

CGPA 2.50 to 2.99 Applicants must satisfy at least one of the following additional criteria:

- Graduate of Universiti Malaya.
- At least one year of work experience in a related field.
- Publication in a related field.
- Recipient of a scholarship.
- Staff member of a government agency.
- Pass an interview conducted by the Faculty.
- Pass a special evaluation conducted by the Faculty.

English Language Requirement

International applicants must satisfy the current University English-language requirement. The official programme page lists the following accepted results:

Qualification	Minimum result
Malaysia University English Test (MUET)	Band 4.0
International English Language Testing System Academic (IELTS Academic)	Band 6.0
Test of English as a Foreign Language Internet Based Centre Based (TOEFL iBT)	Score 60
Test of English as a Foreign Language Essentials Online (TOEFL Essentials Online)	Score 8.5
Pearson Test of English Academic (PTE Academic)	Score 59
Cambridge B1 Preliminary B2 First C1 Advanced or C2 Proficiency	Score 169

Possible Exemptions

The current Master Degree Regulations provide specified exemptions for eligible non-citizen applicants, including applicants from a country where English is the national language or those whose relevant qualification was taught entirely in English. Other prescribed exemptions and Faculty determinations may apply.

Language of the Thesis

Candidates must follow the current University requirements governing the approved language of the thesis. Additional English-language requirements may apply before graduation when a non-citizen candidate undertakes the programme or writes the thesis in a language other than English.

Preparing for Master by Research Study

A strong application connects a relevant engineering problem with a feasible research approach and suitable supervision. The final research area is determined through the admission and Faculty approval process.

Research Alignment

Research may align with expertise across the Faculty, including biomedical, chemical, civil, electrical and mechanical engineering. Interdisciplinary work may involve expertise from more than one field, subject to approved supervision and available facilities.

Before You Apply

- Define the engineering problem, its context, significance and intended research contribution.
- Review current literature, identify research gap and explain how the proposed study will extend knowledge or practice.
- Outline the research questions, objectives, methodology, data or experiments, analytical approach and a realistic completion plan.
- Identify relevant Faculty expertise and discuss supervision fit where appropriate.
- Assess access to the required laboratories, equipment, software, field sites, participants, data and research funding.
- Identify any ethics, safety, intellectual property, confidentiality and data-governance requirements at an early stage.

Supervision Partnership

Candidates are responsible for planning and progressing their research, maintaining active registration, keeping appropriate supervision records and responding constructively to academic feedback. Regular communication with the supervisor should begin from the first semester and continue throughout candidature. The supervisor provides academic guidance, while responsibility for completing the research and fulfilling all candidature requirements remains with the candidate.

Research Areas and Collaboration

Research may be undertaken across biomedical, chemical, civil, electrical and mechanical engineering, including interdisciplinary areas involving more than one field. Collaboration, co-supervision, external research activities and the use of specialised facilities are subject to the availability of expertise, resources and the relevant Faculty and University approvals.

Programme Educational Objectives

The Programme Educational Objectives describe the professional achievements and broader contributions expected of graduates as their careers develop after completing the Master of Engineering Science.

Objective	Graduate achievement
PEO1	Graduates hold a leading or decision-making position in engineering or related field locally or globally.
PEO2	Graduates possess high level of technical competency in Research and Development while recognizing the needs for lifelong learning for career development.
PEO3	Graduates are committed to sustainable development and well-being of the society.

How the Objectives Shape the Programme

- **Leadership and decision-making** Independent research planning, critical judgement, project leadership and scholarly communication prepare graduates to contribute to complex engineering decisions.
- **Research and Development capability** Frontier knowledge, rigorous methodology, analytical and digital tools, publication practice and reflective learning strengthen technical competence and adaptability throughout a professional career.
- **Sustainability and societal well-being** Ethical research, professional responsibility and consideration of environmental and societal implications guide candidates towards solutions that create responsible and lasting value.

Programme Learning Outcomes

On successful completion of the programme, graduates should be able to demonstrate the following outcomes aligned with the MQF 2.0 clusters.

Code	Programme learning outcome	MQF 2.0 cluster	Taxonomy
PLO1	Demonstrate in-depth and frontier knowledge and understanding in the relevant fields or practice.	CLS1 Knowledge and understanding	C
PLO2	Critically and creatively apply knowledge in one or more fields to resolve complex disciplinary and practical problems.	CLS2 Cognitive skills	C
PLO3	Conduct rigorous and independent research or investigation with minimal supervision.	CLS3a Practical skills and appropriate research methodology and design	P
PLO4	Perform research in accordance with legal ethical professional and sustainable practices.	CLS5 Ethics and professionalism	A
PLO5	Demonstrate intellectual leadership qualities and management skills.	CLS3d Leadership autonomy and responsibility	A
PLO6	Communicate effectively in the relevant fields and interact with specialist and general audiences.	CLS3b Interpersonal and communication skills	A
PLO7	Select and use suitable digital and analytical tools and techniques to address research problems.	CLS3c Digital and numeracy skills	P
PLO8	Demonstrate commitment to lifelong learning and personal development.	CLS4 Personal and entrepreneurial skills	A and P

Taxonomy key C cognitive A affective P psychomotor

Master Graduate Capability

Together, the outcomes describe a researcher who creates original knowledge, applies advanced methods, exercises responsible leadership, collaborates across boundaries and communicates a defensible contribution to specialist and wider audiences.

Programme Structure and Registration

The programme is undertaken by research leading to a dissertation. Candidates must also complete the prescribed modules and requirements that support research development and graduation.

Code	Component	Registration guidance	Status
KQX7001	Research Methodology	Register and pass not later than the second semester of candidature	3 credits
KMD7002	Dissertation	Register every semester until the dissertation is submitted for examination	Continuous
Not applicable	Publication requirement	Fulfil the Faculty requirement applicable to the admission session and provide TDIT BR02 (Checklist and Guidelines for Publications as Graduation Requirement) before graduation	Requirement
As prescribed	Additional course or training	Complete when prescribed by the Faculty supervisor or research needs	If required
As applicable	Basic Malay Language	International candidates must fulfil the University Bahasa Malaysia requirement before graduation unless exempted	Requirement

Research Methodology

KQX7001 develops competence in research problem formulation, methodology design, critical evaluation of methods and tools, technical reporting, research ethics, experimental design, statistical techniques and scholarly communication. The supplied programme document states that assessment is conducted through continuous assessment.

Registration Responsibilities

- Renew candidature and maintain active registration every semester.
- Register KMD7002 Dissertation every semester until the dissertation is formally submitted for examination.
- Register for and complete KQX7001 Research Methodology within the prescribed period.
- Check the published registration deadlines and verify the final registration record in MAYA.
- Submit the required progress report and maintain complete supervision records every semester

Important *A candidate who fails to register continuously for two normal semesters and does not register within the specified period in the following semester may cease to be a candidate and be terminated from study.*

Candidature Requirements

Candidates must complete the requirements below in addition to any conditions in the offer letter and any further requirements approved by the University or Faculty. Use the latest TDIT BR01b (Master) Candidature Requirement Checklist and obtain verification from the supervisor and Postgraduate Office before planning thesis submission or graduation.

No	Requirement	What candidate must complete	Latest point
1	Minimum candidature	Complete at least two semesters of full-time candidature or the approved minimum period applicable to the registered study status.	Before graduation
2	University language requirements	Fulfil the applicable Bahasa Malaysia and English-language requirements.	Before graduation or as directed
3	Research Methodology (KQX7001)	Register for, attend and pass at least three credits of Research Methodology.	Not later than Semester 2
4	Proposal Defence	Present the research proposal and obtain a pass result.	Not later than Semester 2
5	Candidature Defence	Present the research progress and obtain a pass result.	Not later than Semester 3
6	Publication requirement	Fulfil the publication requirement applicable to the admission session and submit the current TDIT BR02 (Checklist and Guidelines for Publications as Graduation Requirement). with the required supporting evidence	Before graduation
7	Residential requirement	Be physically present for at least one semester or fulfil an approved equivalent under the applicable Regulations.	During candidature
8	Dissertation and viva voce	Submit the dissertation, pass the examination and viva voce, complete all required corrections and make the final submission.	Final stage

Academic Residential Requirement

The Regulations require physical presence for at least one semester. With Faculty approval, the requirement may be regarded as fulfilled through specified physical activities such as passing Research Methodology, presenting an approved defence, face-to-face supervision, or participating in designated Faculty activities.

Candidature Milestone Guide

The sequence below is a planning guide. Candidates must use the dates in the current academic calendar, Faculty notice and individual candidature record.

Milestone	Candidate focus	Timing
Commencement	Confirm the research area and supervision arrangements. Register KMD7002 and plan the research activities, facilities, training and approvals.	Semester 1
Research Development	Complete KQX7001 Research Methodology and develop the literature review, research framework, methodology and research schedule.	Semester 1-2
Proposal Defence	Present the research proposal and obtain a pass result.	Not later than Semester 2
Candidature Defence	Present the research progress, obtain a pass result and complete the required follow-up actions.	Not later than Semester 3
Research Progress	Maintain active registration, meet the supervisor regularly, submit progress reports, conduct the approved research and progress the dissertation and publication.	Throughout candidature
Examination Preparation	Complete Title Approval and fulfil the applicable language, publication, candidature and submission requirements.	Before dissertation submission
Examination and Completion	Submit the dissertation, attend the viva voce, complete the required corrections and make the final submission.	Final stage

Progress Monitoring

Plan Maintain research schedule with measurable outputs, dependencies and contingency time.

Meet Hold regular supervision meetings and record decisions, actions and deadlines.

Report Submit an accurate progress report every semester and respond promptly to any unsatisfactory progress.

Escalate Seek guidance promptly when research access, supervision, ethics, safety, registration or wellbeing affects progress.

Publication Ethics and Research Integrity

Publication Requirement

For a Master candidate in the science field, the supplied programme information specifies evidence of acceptance of at least **one full-length** research article or one comprehensive review article in a journal indexed in the Web of Science (WoS) Core Collection under the Science Citation Index Expanded (SCIE) collection. Publications indexed under the Social Sciences Citation Index (SSCI) or Arts and Humanities Citation Index (AHCI) require review by the Faculty Postgraduate Office.

The applicable requirement depends on the candidate admission session and the latest Faculty guideline. Candidates should confirm journal eligibility, authorship position, affiliation and documentary evidence before submission. Do not rely only on a journal website or an indexing claim made by a publisher.

Publication Compliance

- The publication must arise from and remain relevant to the candidate's master research.
- The correct department, Faculty and Universiti Malaya affiliation must be stated.
- The candidate must satisfy the current authorship-position requirements and publish with the supervisor or supervisors
- The corresponding supervisor must be from Universiti Malaya under the current Faculty guideline.
- Acceptance must occur within the candidature period and acceptable evidence must be retained.
- Retain submission acknowledgement, review correspondence and formal proof of acceptance.
- Journals indexing and eligibility must be verified directly; blacklisted, predatory or otherwise ineligible journals are not accepted.

Research Ethics and Integrity

- Obtain research ethics and external approvals before regulated data collection.
- Protect participants, confidential information, personal data and intellectual property.
- Maintain complete and traceable research records, fieldwork, code, analysis files and source documentation.
- Use accurate citation and ensure that the dissertation and publications are original and free from plagiarism, fabrication and falsification.
- Comply with laboratory, fieldwork and occupational safety requirements throughout the research.

Dissertation Examination and Graduation

The dissertation must present a coherent, original and defensible account before the appointed examiners. Candidates should allow sufficient time to comply with the current University requirements for Dissertation formatting, title approval, supervisor review, Faculty checks, and formal submission procedures prior to submission.

Examination Pathway

Stage	Process	Candidate responsibility
1	Readiness Review	Confirm that all candidature milestones and requirements have been fulfilled. Verify candidature status, fee status, publication evidence, dissertation format and completeness of all required supporting documents.
2	Dissertation Submission	Submit the dissertation and all required documents through the current Faculty and University processes for examination by the appointed examiners.
3	Viva Voce	Defend the research design, findings, interpretation, originality and contribution before the examination committee.
4	Corrections	Complete all required amendments within the period determined by the examination authority and obtain the necessary verification.
5	Final Submission	Submit the corrected dissertation and all required records through the current Faculty and University processes.
6	Award Approval	The degree is awarded following the relevant examination recommendation and Senate approval, subject to the fulfilment of all University requirements.

Graduation Readiness

- Minimum candidature duration and all prescribed milestones completed.
- Applicable University language and Academic Residential Requirements fulfilled.
- Publication requirement verified in accordance with the applicable Faculty guideline and TDIT BR002.
- Dissertation examination and viva voce passed, with all required corrections approved.
- Final dissertation and required administrative documents submitted, with all fees and University obligations fulfilled.

Career Pathways and Official Sources

The programme develops advanced research, analysis, project leadership and scholarly communication skills relevant to research-intensive engineering roles and further doctoral study.

Career Pathways

- Research scientist or research engineer
- Engineering consultant or technical specialist
- Development engineer or systems engineer
- Engineering project or research project manager
- Academic or research professional
- Doctoral researcher in engineering or a related interdisciplinary field

Official Sources

Study at UM programme page

Faculty postgraduate programmes and guidelines

Universiti Malaya Masters Degree Rules 2024 updated 2 July 2025

Universiti Malaya Masters Degree Regulations 2024 updated 24 September 2025

Faculty candidature requirement checklist for Master by Research

Faculty publication guideline

UNIVERSITI MALAYA

FACULTY OF ENGINEERING

Master of Engineering Science

Graduate on Time Study Roadmap

MENGSC	RESEARCH	4 SEMESTERS
PROGRAMME	MODE	PLANNING TARGET

ACADEMIC SESSION 2026/2027

Universiti Malaya

Using This Roadmap

Graduate on Time Study Roadmap

Semester	Priority Activities	Expected GOT Milestones
1	Register KMD7002 Dissertation and KX7001 Research Methodology. Confirm the research scope and supervision plan, conduct the literature review, develop the proposal and identify the required facilities, ethics and safety approvals.	Research plan established, literature review in progress and proposal framework completed.
2	Complete Research Methodology, present Proposal Defence, undertake pilot work or experimental preparation, begin data collection and develop the dissertation outline. Initiate the applicable publication plan.	Research Methodology passed, Proposal Defence completed, research implementation commenced and dissertation outline prepared.
3	Conduct the main research and data analysis, present the Candidature Defence, develop the dissertation chapters, progress the publication requirement and apply for Title Approval.	Candidature Defence completed, core analysis substantially completed, dissertation chapters drafted and final title approved.
4	Complete the analysis and dissertation, fulfil the applicable publication and graduation requirements, submit the dissertation, attend the viva voce and complete the required corrections.	Dissertation submitted and examined, viva voce completed, corrections approved and final submission made.

Final Readiness Checklist and Official Sources

Before Dissertation Submission

- Active registration and prescribed fees or obligations are in order.
- Minimum candidature duration, language and residential requirements are fulfilled.
- KQX7001 Research Methodology, Proposal Defence and Candidature Defence are completed.
- Progress reports and defence actions are complete and documented.
- Publication pathway and evidence have been checked against the admission-session requirement.
- Title approval, examiner and submission procedures follow the latest Faculty instructions.
- The dissertation has passed supervisor, formatting, originality, ethics and integrity checks.

Before Graduation

- Required publication acceptance evidence has been accepted by the Faculty.
- Viva voce and dissertation examination requirements are passed.
- All required corrections are verified within the stipulated period.
- Final dissertation, repository forms and Faculty close-out documents are submitted.
- All University obligations are fulfilled and the award proceeds through the required approval process.

Official Sources

Faculty postgraduate programmes, rules, guidelines and forms

Master of Engineering Science official programme page

Universiti Malaya Master's Degree Rules 2024, updated 2 July 2025

Universiti Malaya Master's Degree Regulations 2024, updated 24 September 2025

Master by Research candidature requirement checklist

Faculty publication guideline TDIT/GP01/2024

Faculty Proposal Defence guideline TDIT/GP02/2024

RESEARCH PROGRAMME | PhD

08

Doctor of Philosophy

COURSE TYPE **Research**	MODE OF STUDY **Full-time or part-time**	INDICATIVE DURATION **FT** **Minimum 4 semesters** **Maximum 12 semesters** **PT** **Minimum 6 semesters** **Maximum 16 semesters**

PROGRAMME AT A GLANCE

Undertake advanced engineering research in a vibrant Kuala Lumpur setting, supported by expert supervision, interdisciplinary collaboration and opportunities for wider academic engagement. Candidates develop a substantial original contribution through rigorous research methodology, ethical practice, scholarly writing and presentation, while building a strong platform for careers in academia, research, innovation and technical leadership.

View the official programme page

Source: Universiti Malaya Study portal | Page last updated 16 May 2026

UNIVERSITI MALAYA

FACULTY OF ENGINEERING

Doctor of Philosophy

Programme Information by Research

PHD	RESEARCH	2 INTAKES
PROGRAMME	MODE	EACH YEAR

ACADEMIC SESSION 2026/2027

Universiti Malaya

Contents

This section explains the Doctor of Philosophy programme, admission pathways, educational objectives, learning outcomes, registration obligations, candidature milestones, publication requirements, thesis examination and graduation process for prospective and registered candidates.

01	Programme Overview
02	Admission Requirements
03	English Language Requirements
04	Preparing for Doctoral Research
05	Programme Educational Objectives
06	Programme Learning Outcomes
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08	Candidature Requirements
09	Candidature Milestone Guide
10	Publication and Research Integrity
11	Thesis Examination and Graduation
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Programme Overview

The Doctor of Philosophy at the Faculty of Engineering is an advanced research programme that develops independent researchers capable of producing a substantial and original contribution to engineering knowledge or practice. Candidates work under approved supervision, use rigorous methods, communicate their findings through scholarly publication, and present a coherent thesis for examination and viva voce.

The programme combines sustained doctoral research with prescribed research training and formal progress milestones. Its structure supports research across engineering disciplines while allowing interdisciplinary collaboration, subject to approved supervision, facilities, ethics and governance requirements.

Programme at a Glance

Programme name	Doctor of Philosophy
Programme identifier	KVA
Award abbreviation	PhD
Qualification level	Doctoral degree MQF Level 8
Mode of programme	By Research leading to a thesis
Types of Study	Full Time | Part Time for local candidate
Normal full-time duration	Minimum 4 semesters, Maximum 12 semesters
Normal part time duration	Minimum 4 semesters, Maximum 12 semesters
Candidature range	Minimum 6 semesters Maximum 16 semesters
Published intakes	Semester 1 October and Semester 2 March subject to availability
Research environment	Biomedical Chemical Civil Electrical Mechanical and interdisciplinary engineering
Language Requirements	Current University Bahasa Malaysia and English requirements apply

Research Journey at a Glance

Define	Design	Investigate	Communicate
Establish a significant research problem and intended original contribution.	Develop advanced methods and obtain the required approvals	Generate, analyse and synthesise original evidence	Publish, present the Thesis Seminar, defend and submit the thesis

Admission Requirements

Applicants must satisfy the University admission requirements and the Faculty specific requirement of a recognised Master's Degree in Engineering, Science, Computing or a related field, or an equivalent qualification approved through the applicable University process.

Recognised Academic Routes

Master's Degree by Research A recognised research-mode Master's Degree in a field relevant to the proposed doctoral research.

Clinical Master's Degree A recognised Clinical Master's Degree, subject to the proposed field and Faculty approval.

Coursework or Mixed Mode CGPA 3.00 and above A recognised Master's Degree by Coursework or Mixed Mode with a CGPA of at least 3.00.

Coursework or Mixed Mode CGPA 2.50 to 2.99 Consideration is possible when at least one approved supplementary criterion is fulfilled.

Other Senate approved route APEL.A or another qualification may be considered only where permitted and approved under the current University and Faculty requirements.

Supplementary Criteria for CGPA 2.50 to 2.99

- At least one year of relevant work experience under the current Doctoral Degree Regulations.
- Publication in a relevant field.
- Recipient of a scholarship.
- Graduate of Universiti Malaya.
- Employee of a government agency.
- Pass an interview conducted by the Faculty.
- Pass a special assessment conducted by the Faculty.

Special Admission Through Prior or Retrospective Publications

The official programme page provides a specialised route for eligible applicants with a recognised body of publications that contributes to scholarship in the relevant field. Additional eligibility and evaluation conditions apply, and the applicant must not already hold a doctoral degree by research from Universiti Malaya or another university.

Fast Track Candidates

Candidates admitted through an approved direct-entry Fast Track pathway are subject to an additional Confirmation Defence not later than the third semester. The Confirmation Defence does not replace the Proposal Defence, Candidature Defence or other doctoral requirements.

English Language Requirements

A non-citizen applicant whose relevant degree was awarded by an institution that did not use English as the medium of instruction must satisfy the current University English-language competency requirement. The official programme page publishes the minimum results below.

Accepted qualification	Minimum result
Malaysian University English Test (MUET)	Band 4.0
International English Language Testing System Academic (IELTS Academic)	Band 6.0
Test of English as a Foreign Language Internet Based Centre Based (TOEFL iBT)	Score 60
Test of English as a Foreign Language Essentials Online (TOEFL Essentials)	Score 8.5
Pearson Test of English Academic (PTE Academic)	Score 59
Cambridge B1 Preliminary B2 First C1 Advanced or C2 Proficiency (Cambridge English)	Score 169
Occupational English Test Conventional or Online (OET)	Score 250

Possible Exemptions

The current Doctoral Degree Regulations provide specified exemptions for eligible non-citizen applicants, including applicants from a country where English is the national language or those whose relevant qualification was taught entirely in English. Other prescribed exemptions and Faculty determinations may apply.

Language of the Thesis

Candidates must follow the current University requirements governing the approved language of the thesis. Additional English-language requirements may apply before graduation when a non-citizen candidate undertakes the programme or writes the thesis in a language other than English.

Preparing for Doctoral Research

A competitive doctoral application demonstrates a significant research problem, a credible path to originality, methodological readiness and a strong fit with available expertise. The final research area is determined through admission and Faculty approval.

Research Alignment

Research may align with expertise across the Faculty, including biomedical, chemical, civil, electrical and mechanical engineering. Interdisciplinary work may involve expertise from more than one field, subject to approved supervision and available facilities.

Before You Apply

- Define the engineering problem, its context, significance and intended research contribution.
- Review current literature, identify research gap and explain how the proposed study will extend knowledge or practice.
- Outline the research questions, objectives, methodology, data or experiments, analytical approach and a realistic completion plan.
- Identify relevant Faculty expertise and discuss supervision fit where appropriate.
- Assess access to the required laboratories, equipment, software, field sites, participants, data and research funding.
- Identify any ethics, safety, intellectual property, confidentiality and data-governance requirements at an early stage.

Supervision Partnership

Candidates are responsible for planning and progressing their research, maintaining active registration, keeping appropriate supervision records and responding constructively to academic feedback. Regular communication with the supervisor should begin from the first semester and continue throughout candidature. The supervisor provides academic guidance, while responsibility for completing the research and fulfilling all candidature requirements remains with the candidate.

Research Areas and Collaboration

Doctoral research may align with biomedical, chemical, civil, electrical or mechanical engineering and may involve interdisciplinary questions across departments, institutions or industry. Any collaboration, co-supervision, external research placement or facility use remains subject to the required approvals.

Programme Educational Objectives

The Programme Educational Objectives describe the professional and research capabilities expected of graduates as they advance in their careers. The wording below has been refined from the supplied approved programme material for clarity while preserving its intended meaning.

Objective	Graduate achievement
PEO1	Advance innovation in research and work practices.
PEO2	Lead research as researcher and / or practitioners with national and / or international expertise.
PEO3	Disseminate research results and/or provide expert advice in an ethical and professional conduct.

How the Objectives Shape the Programme

- **Multidisciplinary judgement** Candidates integrate disciplinary evidence with wider scientific, societal and professional considerations.
- **Research leadership** Candidates progress from supervised doctoral training towards independent research and specialist practice.
- **Responsible impact** Candidates communicate their contribution through the thesis, scholarly publication and engagement with relevant audiences.

Programme Learning Outcomes

On successful completion of the programme, graduates should be able to demonstrate the following outcomes aligned with the MQF 2.0 clusters.

Code	Programme learning outcome	MQF 2.0 cluster	Taxonomy
PLO1	Demonstrate a critical and in-depth understanding of frontier knowledge by generating substantial and original contributions to the field of engineering.	CLS1 Knowledge and understanding	C
PLO2	Synthesize and integrate existing and new knowledge in one or more discipline areas to address challenges and concerns in the field of engineering.	CLS2 Cognitive skills	C
PLO3	Design and implement advanced methodologies to resolve complex and emerging problems.	CLS3a Practical skills	C, P
PLO4	Communicate information, insights, ideas, problems and solutions cogently with experts in the field and general audience.	CLS3b Interpersonal and communication skills	A
PLO5	Build rapport to work effectively as part of a team to achieve decided outcomes.	CLS3b Interpersonal and communication skills	A
PLO6	Use suitable digital and analytical techniques to research problems.	CLS3c Digital and numeracy skills	P
PLO7	Demonstrate intellectual leadership qualities and management skills to effectively collaborate with diverse partners.	CLS3d Leadership autonomy and responsibility	A
PLO8	Demonstrate commitment to lifelong learning and professional development with entrepreneurial mindset.	CLS4 Personal and entrepreneurial skills	A
PLO9	Perform research adhering to legal, ethical, professional and sustainable practices.	CLS5 Ethics and professionalism	A

Taxonomy key C cognitive A affective P psychomotor

Doctoral Graduate Capability

Together, the outcomes describe a researcher who creates original knowledge, applies advanced methods, exercises responsible leadership, collaborates across boundaries and communicates a defensible contribution to specialist and wider audiences.

Programme Structure and Registration

The programme is undertaken by research leading to a thesis. Candidates must also complete the prescribed research training, registration and graduation requirements.

Code	Component	Registration guidance	Status
KVX8001	Research Methodology	Register and pass not later than the second semester of candidature	3 credits
KVX8002	Thesis	Register every semester until the thesis is submitted for examination	Continuous
Not a course	Publication requirement	Fulfil the Faculty criteria applicable to the admission session and provide TDIT BR02 (Checklist and Guidelines for Publications as Graduation Requirement) before graduation	Requirement
As required	Additional course or training	Complete when prescribed by the Faculty supervisor or research needs	If required
As applicable	Basic Malay Language	International candidates must fulfil the University Bahasa Malaysia requirement before graduation unless exempted	Requirement

Research Methodology

KVX8001 develops competence in research problem formulation, literature review, advanced methodology, experimental design, research ethics, statistical techniques, proposal development, thesis and scholarly writing, and oral communication. Current Faculty timetables should be consulted for the semester of offering and delivery details.

Registration Responsibilities

- Renew candidature and maintain active status every semester.
- Register KVX8002 Thesis every semester until the thesis is formally submitted for examination.
- Register for and complete KVX8001 Research Methodology within the prescribed period.
- Check the published registration deadlines and verify the final registration record in MAYA.
- Submit the required progress report and maintain supervision records every semester.

Registration risk *A candidate who fails to register continuously for two normal semesters and does not register within the specified period in the following semester may cease to be a candidate and be terminated from study.*

Candidature Requirements

The current Faculty checklist requires doctoral candidates by research to complete the requirements below, together with any additional Faculty or admission-session conditions. Use the latest TDIT BR01a (PhD) Candidature Requirement Checklist and obtain verification from the supervisor and Postgraduate Office before planning thesis submission or graduation.

No	Requirement	Candidate responsibility	Latest point
1	Minimum candidature	Complete at least four semesters of candidature.	Before graduation
2	University language requirements	Fulfil the applicable Bahasa Malaysia and English-language requirements.	Before graduation or as directed
3	Research Methodology (KVX8001)	Register for, attend and pass at least three credits of Research Methodology.	Not later than Semester 2
4	Proposal Defence	Present the research proposal and obtain a pass result.	Not later than Semester 2
5	Confirmation Defence	Present and pass the Confirmation Defence, where applicable to an approved direct-entry Fast Track candidate.	Not later than Semester 3
6	Candidature Defence	Present the research progress and obtain a pass result.	Not later than Semester 5
7	Title Approval and Thesis Seminar	Obtain approval for the final thesis title and present the research at the Thesis Seminar.	Before thesis submission
8	Publication requirement	Fulfil the publication requirement applicable to the admission session and submit the current TDIT BR02 (Checklist and Guidelines for Publications as Graduation Requirement) with the required supporting evidence.	Before graduation
9	Residential requirement	Be physically present for at least one semester or fulfil an approved equivalent under the applicable Regulations.	During candidature
10	Thesis and viva voce	Submit the thesis, pass the examination and viva voce, complete all required corrections and make the final submission.	Final stage

Academic Residential Requirement

The Regulations require physical presence for at least one semester. With Faculty approval, the requirement may be regarded as fulfilled through specified physical activities such as passing Research Methodology, presenting an approved defence or Thesis Seminar, face-to-face supervision, or participating in designated Faculty activities.

Candidature Milestone Guide

The sequence below is a planning guide. Candidates must use the dates in the current academic calendar, Faculty notices and their individual candidature record.

Milestone	Candidate focus	Timing
Commencement	Confirm the doctoral research field and supervision arrangements. Register KVX8002 and plan the research activities, facilities, training and approvals.	Semester 1
Research Development	Complete KVX8001 Research Methodology and develop the literature review, research questions, originality claim, methodology and research schedule.	Semester 1-2
Proposal Defence	Present the research proposal and obtain a pass result.	Not later than Semester 2
Confirmation Defence	Present the required doctoral progress and obtain the prescribed outcome. Applicable only to approved direct-entry Fast Track candidates.	Not later than Semester 3
Candidature Defence	Present the research progress, obtain a pass result and complete the required follow-up actions.	Not later than Semester 5
Research Progress	Maintain active registration, meet the supervisor regularly, submit progress reports, conduct original research and progress the thesis and publications.	Throughout candidature
Thesis Seminar	Obtain Title Approval, fulfil the applicable candidature requirements and present the final research at the Thesis Seminar.	Before thesis submission
Examination and Completion	Submit the thesis, attend the viva voce, complete the required corrections and make the final submission.	Final stage

Progress Monitoring

Plan Maintain a research schedule with measurable outputs, dependencies and contingency time.

Meet Hold regular supervision meetings and record decisions, actions and deadlines.

Report Submit an accurate progress report every semester and respond promptly to any unsatisfactory progress.

Escalate Seek guidance promptly when research access, supervision, ethics, safety, registration or wellbeing affects progress.

Publication and Research Integrity

Publication Requirement

The current Faculty guideline requires a Doctor of Philosophy candidate in the science field to produce either **two full-length** research articles, or one full-length research article and one comprehensive review article, in journals indexed in the Web of Science (WoS) Core Collection under the Science Citation Index Expanded (SCIE) collection. Publications indexed under Social Sciences Citation Index (SSCI) or Arts and Humanities Citation Index (AHCI) require review by the Faculty Postgraduate Office.

The requirement may vary according to the admission session. Candidates must use the latest TDIT GP01 (Guidelines Student Publication) guideline and provide the current TDIT BR02 (Checklist and Guidelines for Publications as Graduation Requirement) checklist with the supporting publication and Journal Citation Reports required by the Faculty.

Publication Compliance

- The publication must arise from and remain relevant to the candidate's doctoral research.
- The candidate must satisfy the current authorship-position requirements and publish with the supervisor or supervisors.
- The corresponding supervisor must be from Universiti Malaya under the current Faculty guideline.
- The correct department, Faculty and Universiti Malaya affiliation must be stated.
- Acceptance must occur within the candidature period and acceptable evidence must be retained.
- Journal indexing and eligibility must be verified directly; blacklisted, predatory or otherwise ineligible journals are not accepted.

Research Ethics and Integrity

- Obtain research ethics and external approvals before regulated data collection.
- Protect participants, confidential information, personal data and intellectual property.
- Maintain complete and traceable research records, fieldwork, code, analysis files and source documentation.
- Use accurate citation and ensure that the thesis and publications are original and free from plagiarism, fabrication and falsification.
- Comply with laboratory, fieldwork and occupational safety requirements throughout the research.

Thesis Examination and Graduation

The thesis must present a coherent, original and defensible account that can be defended before the appointed examiners. Candidates should allow sufficient time to comply with the current University requirements for Thesis formatting, title approval, Thesis Seminar, supervisor review, Faculty checks, and formal submission procedures prior to submission.

Examination Pathway

Stage	Process	Candidate responsibility
1	Readiness review	Confirm that all candidature milestones and requirements have been fulfilled. Verify candidature status, fee status, publication evidence, thesis format and completeness of all required supporting documents.
2	Title Approval and Thesis Seminar	Obtain approval for the final thesis title and present the research at the Thesis Seminar before submitting the thesis for examination.
3	Thesis submission	Submit the thesis and all required documents through the current Faculty and University processes for examination by the appointed examiners.
4	Viva Voce	Defend the research design, findings, interpretation, originality and contribution before the examination committee.
5	Corrections	Complete all required amendments within the period determined by the examination authority and obtain the necessary verification.
6	Final Submission	Submit the corrected thesis and all required records through the current Faculty and University processes.
7	Award Approval	The degree is awarded following the relevant examination recommendation and Senate approval, subject to the fulfilment of all University requirements.

Graduation Readiness

- Minimum candidature duration and all prescribed milestones, including Title Approval and the Thesis Seminar, completed.
- Applicable University language and Academic Residential Requirements fulfilled.
- Publication requirement verified in accordance with the applicable Faculty guideline and TDIT BR02.
- Thesis examination and viva voce passed, with all required corrections approved.
- Final thesis and required administrative documents submitted, with all fees and University obligations fulfilled.

Careers Pathways and Official Sources

The programme develops the originality, advanced analytical capability, scholarly communication and research leadership expected in senior research, academic and specialist engineering roles.

Career Pathways

- University professor or academic researcher
- Research scientist or senior research engineer
- Engineering consultant or technical specialist
- Research and development director or manager
- Senior systems or development engineer
- Policy, innovation or technology leadership professional

Official Sources

Study at UM Doctor of Philosophy programme page

Faculty Doctor of Philosophy programme page

Faculty postgraduate rules guidelines forms and notices

Universiti Malaya Doctoral Degree Rules 2024 Version 4 updated 11 September 2025

Universiti Malaya Doctoral Degree Regulations 2024 Version 6 updated 24 September 2025

Faculty doctoral candidature requirement checklist TDIT BR01a

Faculty publication guideline TDIT GP01

Faculty publication verification checklist TDIT BR02

UNIVERSITI MALAYA

FACULTY OF ENGINEERING

Doctor of Philosophy

Graduate-on-Time (GOT) & Conversion Roadmaps

CONVENTIONAL	FAST TRACK	MENGSC → PHD
PhD ROUTE	SCIENCES	CONVERSION

ACADEMIC SESSION 2026/2027
Universiti Malaya

Using This Roadmap

Graduate on Time Roadmap for Conventional Candidates

Semester	Priority Activities	Expected GOT Milestones
1	Register KVX8002 Thesis and KVX8001 Research Methodology. Confirm the doctoral research scope and supervision plan, begin the literature review and develop the proposal, methodology and originality claim.	Doctoral research plan established, literature review in progress and proposal framework completed.
2	Complete Research Methodology, present Proposal Defence, undertake pilot work or experimental preparation, begin data collection and develop the thesis outline. Initiate the applicable publication plan.	Research Methodology passed, Proposal Defence completed, research implementation commenced and thesis outline prepared.
3	Conduct the main investigation and data analysis, develop the Candidature Defence report and progress the required publication outputs.	Substantive research evidence generated and Candidature Defence completed as the recommended GOT target.
4	Continue experimentation or data analysis, refine the research contribution, prepare thesis chapters and progress the applicable publication requirement.	Core research substantially completed, major findings established and key thesis chapters drafted.
5	Complete the remaining research and thesis chapters. Complete the Candidature Defence if not previously passed, obtain Title Approval and prepare for the Thesis Seminar and submission.	Complete thesis draft, prescribed candidature milestones fulfilled and Thesis Seminar completed.
6	Finalise and submit the thesis, attend the viva voce, complete the required corrections and make the final submission.	Thesis submitted and examined, viva voce completed, corrections approved and final submission made.

Graduate on Time Roadmap for Fast Track Candidates

Semester	Priority Activities	Expected GOT Milestones
1	Register KVX8002 Thesis and KVX8001 Research Methodology. Establish the doctoral research scope, develop the literature review, methodology, proposal and originality claim.	Research Methodology progressing, doctoral research plan established and proposal prepared.
2	Complete Research Methodology and Proposal Defence. Undertake pilot work or initial data collection, develop the thesis outline and prepare for the Confirmation Defence.	Research Methodology and Proposal Defence completed, research implementation commenced and Confirmation Defence undertaken as the recommended GOT target.
3	Complete the Confirmation Defence if not previously concluded, conduct the main investigation and data analysis, prepare the Candidature Defence report and progress publication outputs.	Fast Track status confirmed and Candidature Defence completed as the recommended GOT target.
4	Continue advanced investigation and analysis, refine the original contribution, prepare thesis chapters and progress the applicable publication requirement.	Core research substantially completed, major findings established and key thesis chapters drafted.
5	Complete the thesis draft, fulfil any outstanding candidature and publication requirements, obtain Title Approval and present the Thesis Seminar.	Complete thesis draft, prescribed milestones fulfilled and Thesis Seminar completed.
6	Finalise and submit the thesis, attend the viva voce, complete the required corrections and make the final submission.	Thesis submitted and examined, viva voce completed, corrections approved and final submission made.

Conversion from Master of Engineering Science to Doctor of Philosophy

Semester	Priority Activities	Expected GOT Milestones
1	Maintain registration in the Master of Engineering Science programme, register the prescribed research components, complete or progress Research Methodology, conduct the literature review and prepare the research proposal.	Research direction established, methodology developed and proposal prepared.
2	Complete Research Methodology and Proposal Defence, undertake pilot work or initial data collection, develop the thesis plan and fulfil the publication evidence required under the current conversion criteria.	Proposal Defence completed, preliminary research evidence generated and conversion eligibility developed.
3	Conduct further investigation and analysis, prepare the conversion report and present the Conversion Seminar or Defence.	Conversion assessment completed and recommendation submitted for the required University approval.
4	Following approval, register in the Doctor of Philosophy programme, undertake advanced research, prepare thesis chapters, progress publications and prepare for the Candidature Defence.	Doctoral registration activated, research contribution strengthened and key thesis chapters drafted. Candidature Defence completed, complete thesis draft prepared and submission requirements substantially fulfilled.
5	Complete the Candidature Defence, remaining research and thesis writing. Fulfil the applicable publication requirements, obtain Title Approval and prepare for the Thesis Seminar.	Candidature Defence completed, complete thesis draft prepared and submission requirements substantially fulfilled.
6	Present the Thesis Seminar, finalise and submit the thesis, attend the viva voce, complete the required corrections and make the final submission.	Thesis Seminar, submission and viva voce completed, corrections approved and final thesis submitted.

Common Expectations Throughout Candidature

- Maintain active candidature and register the prescribed research component every semester.
- Meet the supervisor regularly and maintain complete supervision records.
- Submit an accurate progress report every semester.
- Comply with research ethics, safety, integrity and data-governance requirements.
- Use appropriate reference-management, originality-checking, analytical and research tools.
- Participate in relevant research skills, academic writing and GOT activities where available.
- Progress the applicable publication requirement throughout candidature.
- Fulfil the University language and Academic Residential Requirements.

Important Notes

- The roadmaps are intended as GOT planning guide and do not replace the official candidature requirements or University regulations.
- Earlier completion of a milestone is encouraged, but every candidate must observe the latest completion point stated in the Candidature Requirements.
- For Fast Track candidates, the Confirmation Defence must be completed within the prescribed period. An unsuccessful outcome may result in continuation under the applicable Master by Research pathway, subject to the approved decision.
- Conversion from MEngSc to PhD is not automatic. It remains subject to satisfactory research progress, fulfilment of the current conversion criteria, the Conversion Seminar or Defence outcome and formal University approval.
- If conversion is not approved, the candidate continues under the Master of Engineering Science pathway.

Candidate Control Checklist

Control point	Evidence / target date	Status
Registration active every semester	_____	☐
Supervision schedule and six-semester Gantt agreed	_____	☐
Research Methodology completed by Semester 2	_____	☐
Proposal Defence completed by Semester 2	_____	☐
Fast Track Confirmation Defence completed by Semester 3, if applicable	_____	☐
Conversion application submitted within approved window, if applicable	_____	☐
Candidature Defence completed by Semester 5	_____	☐
Language and residential requirements verified	_____	☐
Publication requirement formally accepted and verified	_____	☐
Title approval and Thesis Seminar completed	_____	☐
Thesis submission, viva and corrections completed	_____	☐
Final corrected thesis and records submitted	_____	☐

Monthly Supervision Questions

- What evidence was completed since the last meeting, and where is it recorded?
- Which milestone is now on the critical path, and who owns the next action?
- What threatens the six-semester target, and what approved contingency will be activated?
- Are publication and thesis chapters progressing alongside the research—not after it?

Official References

The following sources informed this 2026/2027 handbook draft. Use the live Faculty page to locate any subsequently revised form or guideline.

Faculty of Engineering postgraduate resources

UM Doctor of Philosophy — Faculty of Engineering

UM Rules (Doctoral Degree) 2024, Version 4

UM Doctoral Degree Regulations 2024, Version 6

TDIT BR01a — PhD Candidature Requirement Checklist

TDIT GP01 — Student Publication Guideline

TDIT BR02 — Publication Graduation Requirement Checklist

Faculty Proposal Defence Guideline

Faculty Fast Track Confirmation Defence Guideline

Faculty Candidature Defence Guideline

UM Conversion Guideline 2025, Version 2

Conversion Appendix 1 / supporting form

UNIVERSITI MALAYA

FACULTY OF ENGINEERING

Marking Scheme and Grade Point Average

Postgraduate Academic Guide

4.00	B	3.00
MAXIMUM GRADE POINT	MINIMUM PASSING GRADE	MINIMUM GPA AND CGPA

A+ A A- B+ B

CREDIT EARNED TOWARDS DEGREE

ACADEMIC SESSION 2026/2027

Universiti Malaya

Postgraduate Grading Scheme

The coursework component of postgraduate programmes is assessed using the University grading scheme below. For the purpose of completing a postgraduate degree, grade B is the minimum passing grade for a course. Grades B- to F are failed grades and do not earn credit towards completion of the degree.

Marks	Grade	Grade Point	Meaning	Degree Credit
90.00 - 100.00	A+	4.00	High Distinction	PASS
80.00 - 89.99	A	4.00	Distinction	PASS
75.00 - 79.99	A-	3.70	Distinction	PASS
70.00 - 74.99	B+	3.30	Pass	PASS
65.00 - 69.99	B	3.00	Pass	PASS
60.00 - 64.99	B-	2.70	Fail	FAIL
55.00 - 59.99	C+	2.30	Fail	FAIL
50.00 - 54.99	C	2.00	Fail	FAIL
45.00 - 49.99	C-	1.70	Fail	FAIL
40.00 - 44.99	D+	1.50	Fail	FAIL
35.00 - 39.99	D	1.00	Fail	FAIL
0.00 - 34.99	F	0.00	Fail	FAIL

Official References

Faculty of Engineering postgraduate resources

Universiti Malaya Master's Degree Rules 2024 Version 3

Universiti Malaya Master's Degree Regulations 2024 Version 6

Universiti Malaya Doctoral Degree Rules 2024 Version 4

Universiti Malaya Doctoral Degree Regulations 2024 Version 6

Research Guidelines & References

Use this page as a starting point for planning, completing and documenting your research candidature. Candidates should consult the latest official guidelines before each milestone, as requirements, forms and document versions may be updated from time to time.

CURRENT UNIVERSITY RULES AND REGULATIONS

MASTER'S DEGREE Rules 2024 — updated 2 July 2025	**MASTER'S DEGREE** Regulations 2024 — updated 24 September 2025
DOCTORAL DEGREE Rules 2024 — updated 11 September 2025	**DOCTORAL DEGREE** Regulations 2024 — updated 24 September 2025

GUIDELINES AND REFERENCE MAP

AREA	AVAILABLE RESOURCES	WHEN TO REFER
Governance & progress	Progress reporting; postgraduate supervision policy	Every semester and at supervisory reviews
Research milestones	Proposal Defence; Confirmation Defence (Fast Track); Candidature Defence; Thesis Seminar	Before registration, presentation and formal assessment
Publication	Student publication requirements and related guidance	Plan early; verify before thesis submission and graduation
Writing & format	Research project, dissertation and thesis preparation; APA 7th; approved formats	During writing and before submitting any formal document
Ethics & integrity	Research ethics; avoiding plagiarism; intellectual property	Before data collection, publication or external disclosure
Pathway & planning	Master-to-Doctoral conversion; coursework and research planners	When considering conversion or planning each candidature stage
Submission & viva	What to do after thesis submission; viva presentation guidance; current checklists and forms	Before first submission, viva, corrections and final submission

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ACCESS THE CURRENT RESOURCES

For full details, current document versions and downloadable links, please visit the Faculty of Engineering Postgraduate Programmes webpage. The official Guidelines and References are maintained there for further consultation.

engine.um.edu.my/postgraduate-programmes

The webpage also provides current application forms, confirmation-letter guidance and submission resources. Where this handbook differs from a subsequently updated official document, the latest University-approved requirement applies.

UNIVERSITI MALAYA

Laboratory Safety and Facilities

Essential guidance for students and research candidates

Safe laboratory work begins with authorisation, appropriate training and careful housekeeping. These general rules apply across Faculty laboratories and workshops. Users must also follow the risk assessment, signage, standard operating procedure and instructions issued by the laboratory supervisor, person in charge or technical staff.

General Safety Rules

- **Authorised access.** Do not enter a laboratory, workshop or store without permission. Use these areas only for approved research, teaching or practical activities.
- **Training and supervision.** Complete the required induction and task-specific training before starting work. Do not operate equipment or conduct procedures unless trained and authorised.
- **Personal protection.** Wear the PPE specified for the activity and laboratory, including suitable clothing and closed footwear. Secure long hair and loose clothing. Remove laboratory coats before leaving the laboratory or workshop.
- **Safe conduct.** Walk at all times. Running in corridors, laboratories, workshops or on staircases is prohibited.
- **Personal belongings.** Keep coats, bags, laptops and other belongings in the designated area. Never obstruct benches, walkways, landings, staircases, exits or emergency equipment.
- **Food and personal care.** Eating, drinking, storing food and applying cosmetics are strictly prohibited in laboratories and workshops.
- **Equipment shutdown.** At the end of a class or work session, switch off electrical and electronic equipment unless the person in charge has instructed otherwise.
- **Hazard control.** Before leaving, make hazardous materials and apparatus safe and follow the approved procedure for storage, decontamination or disposal.
- **Emergencies and incidents.** Know the nearest exit, alarm, first-aid equipment and other emergency facilities. Report spills, injuries, unsafe conditions and defective equipment immediately to the person in charge.

Housekeeping Chemicals and Waste

- **Work areas.** Keep benches and sinks clean and clear of spills, waste, unused apparatus, glassware and chemicals. Leave the work area tidy after every session.
- **Dust and particulates.** Use an appropriate vacuum or approved collection method for fine particles. Do not sweep materials where this could disperse hazardous dust.
- **Clearances and stacking.** Stack materials securely. Maintain at least 60 cm clear space between machines and keep access routes unobstructed.
- **Bench storage.** Do not place bottles, plastic containers or experimental materials under benches, on the floor or within 15 cm of a bench edge. Do not use benches, fume hoods or biosafety cabinets as general storage.
- **Waste disposal.** Segregate and dispose of waste promptly in designated, correctly labelled containers. Obtain guidance from the responsible technician or staff member when required.
- **Controlled materials.** Label radioactive, chemical and biological materials correctly and store them in designated cabinets. Chemicals must never be stored in student lockers or cupboards.
- **Approval and records.** Obtain permission from the laboratory person in charge before purchasing, receiving, moving or transferring chemicals. Keep the inventory and Chemical Register current and maintain only the minimum necessary quantities of hazardous or combustible materials.
- **Chemical compatibility.** Follow the relevant Safety Data Sheet. Segregate incompatible materials, keep combustible chemicals away from heat and ignition sources, use the required storage temperature, and keep containers properly closed when not in use.

Faculty Facilities

The Faculty provides laboratories for Biomedical, Chemical, Civil, Electrical and Mechanical Engineering, together with research laboratories, computer laboratories, a student workshop, postgraduate rooms, lecture spaces and collaborative learning areas. The First Aid Room is located on Level 1, Block L, next to the Faculty Gallery. The Engineering Library is located on Level 6 of the Laboratory Wing, Engineering Tower.

CURRENT FACILITY INFORMATION

For the latest laboratory directory, staff-in-charge information, locations, room capacities and facility details, please visit:
engine.um.edu.my/facilities

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