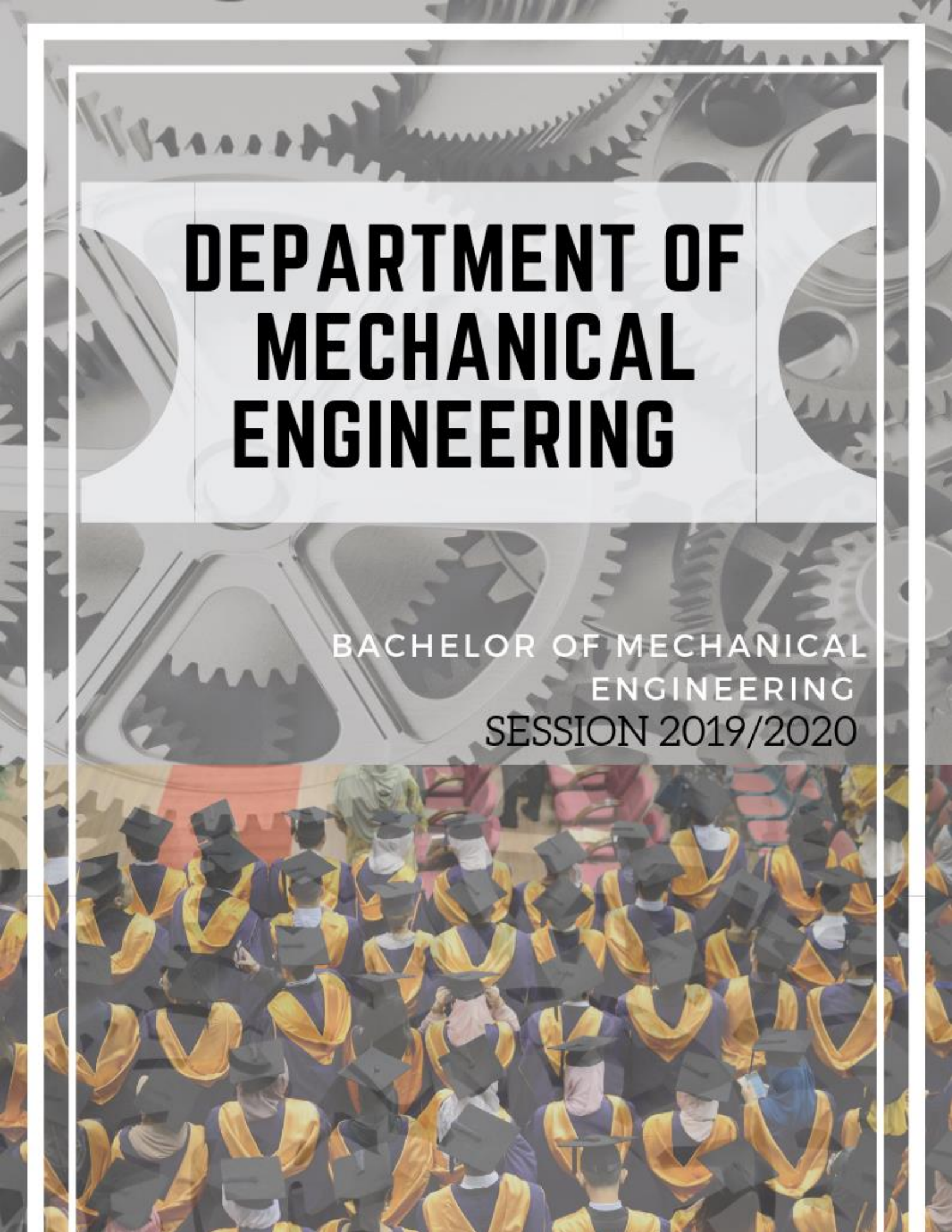




DEPARTMENT OF MECHANICAL ENGINEERING

BACHELOR OF MECHANICAL
ENGINEERING
SESSION 2019/2020

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01 VISION

To be an internationally renowned institution of higher learning in research, innovation, publication and teaching..

02 MISSION

To advance knowledge and learning through quality research and education for the nation and for humanity

03 EDUCATIONAL GOALS

Graduates of the University of Malaya will be able to:

- Demonstrate knowledge and skills in their field of study, appropriate research and professional practices, and the processes of critical thinking, creative thinking, and problem solving.
- **Use effective methods including contemporary technology to manage information, to achieve diverse professional goals aligned with professional standards and make decisions based on appropriate data and information.**
- **Engage in continuous self-improvement and professional growth support** the professional development of others, and display positive leadership and professional behaviours and disposition for effective practice.
- Communicate effectively with other professionals, and the community, and project a coherent vision of social responsibilities.
- **Appreciate and continue to be guided by the University's core values of integrity, respect, academic freedom, open-mindedness, accountability, professionalism, meritocracy, teamwork, creativity and social responsibility.**

INTRODUCTION TO *Faculty of Engineering*

“Engineering is not about what the world is, it is about what the world can be.”

Engineering is not simply an academic field that deals with technology, statistics and science. It is an exciting and rewarding discipline that has a much wider scope, ranging from basic science to applied technology. Engineers make a significant difference in the lives of millions of people. Through identifying problems and seeking new solutions, they create and design items that benefit the lives of everyone, from cars, computers and buildings, through to life-saving equipment, the generation of energy and medical procedures. Engineering is not about what the world is, it is about what the world can be.

FACULTY OF ENGINEERING

MISSION

To advance engineering knowledge and learning through quality education and research in the pursuit of the fulfilling aspirations of the University and nation.

VISION

To be an internationally renowned Faculty of Engineering in research, innovation, publication and teaching.

STUDENTS

- *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 internalize diversity.*
 - *Inculcate of social awareness and obligation values.*
 - *Develop students to have an international outlook and outreach.*
 - *Develop students to become highly competent engineers capable of identifying, formulating, and solving problems in a creative and innovative manner.*
-

ACADEMIC PROGRAMME

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

Dean's Message

Prof Dr Saad Mekhilef



CONGRATULATIONS AND WELCOME TO THE FACULTY OF ENGINEERING, UNIVERSITY OF MALAYA, FK@UM.

Thank you for choosing FK@UM to continue your dream. You are a chosen one, as many who wanted to be here did not get the opportunity as the applicants exceed the intake capacity of the Faculty. We are proud and happy to have you here.

You are now in one of the top engineering Faculty in the world and definitely the top in Malaysia.

Engineering Accreditation Council (EAC) has accredited all the programs at the Faculty. It simply means that the programs are planned and delivered with adequate resources and quality. The courses are administered to ensure students attain all the defined attributes upon graduation.

The degrees from FK@UM are mutually recognized under Washington Accord in more than 17 countries that include UK, Singapore, Taiwan, Hong Kong and others. You will be getting an internationally recognized degree from the Faculty.

You will be starting your life-changing journey in UM, where you will be acquiring new skills, competencies, knowledge and experience that will pave the way for your continued success in life and career. Be steadfast and disciplined in maximizing your stay in UM. There will be also lots of opportunities for personal development in the form of student activities, mobility programs, training activities and many others. Be proactive in seizing the opportunities. It is often said that University life is the best period of life of many people who have gone through it! Many will meet their best friends here.

**“ Scientists study the world as it
is; Engineers create the world that
never has been. “**

**THEODORE VON KARMAN –
AEROSPACE ENGINEER**

Therefore, upon your graduation, you will be technically competent as an engineer. The employers will be excited to take you for mutual benefit. Some of you may pursue a different path and may become researchers, entrepreneurs and even politicians. Whatever your ambitions are, the floor is yours to make it happen.

**I, as the Dean who represent all the staff, hereby
promise you that we will do all our utmost best to ensure
that your experience at FK@UM will be a pleasant and
memorable one. We also welcome your feedback and
testimonials to continually improve ourselves to serve
you better.**

Once again, welcome to Faculty of Engineering!

Prof Dr Saad Mekhilef

**DEAN,
FACULTY OF ENGINEERING**

The Management

Faculty of Engineering



PROF. DR. SAAD MEKHILEF
Dean



ASSOC. PROF. IR. DR. SUHANA MOHD SAID
Deputy Dean's (Undergraduates)



PROF. IR. DR. KAHARUDIN DIMYATI
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ASSOC. PROF. IR. DR. MOHD FAIZUL MOHD SABRI
Deputy Dean's (Research)



DR. RAJA ARIFFIN RAJA GHAZILLA
Deputy Dean's (Development)



ASSOC. PROF. DR. LAI SAI HIN
Head of Department
Civil Engineering



DR. JULIANA USMAN
Head of Department
Biomedical Engineering



ASSOC. PROF. IR. DR. CHOW CHEE ONN
Acting Head of Department
Electrical Engineering



ASSOC. PROF. IR. DR. NGOH GEK CHENG
Head of Department
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DR. SI TI NURMAYA MUSA
Head of Department
Mechanical Engineering



NORMUHAINI AB RONI
Senior Principal Assistant Registrar

The Officers

Faculty of Engineering



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Senior Information Technology Officer
[Information Communication and
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ALIAS ABDULLAH
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NORMUHAINI AB RONI
Senior Principal Assistant Registrar
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Assistant Registrar
[Undergraduate]



JUNAINAH JAMALUDDIN
Assistant Registrar
[Postgraduate]



HANIF SABTU
Finance Officer
[Finance Office]



ANANTHERAJ PAVARAJ
Engineer
[Sustainability]



IBRAHIM MOHD GHAZALI
Engineer
[Lab]



NOR SABRINA NORDIN
Engineer
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DEPUTY DEAN'S UNDERGRADUATE CHART

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Assistant Registrar (Undergraduate)

Zunaida Alwadood
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Assistant Administrative Officer

Janathal Karuppaya
Senior Administrative Assistant

Rahimah Abd. Rahim
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Salina Malden
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[Mechanical Engineering]

Dr. Haneef Farzana Hizaddin
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Dr. Nasrul Anuar Abd Razak
[Biomedical Engineering]
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Power System

Assoc. Prof. Ir. Dr. Harikrishnan Ramiah
Mechatronics

Dr. Mohamadarriff Othman
Telecommunication

Ir Dr. Lai Khin Wee
Biomedical

Dr. Jegalakshimi Jewaratnam
Safety, Health & Environment

TO BE APPOINTED
Materials

Ir. Dr. Ong Zhi Chao
Mechanical

Assoc Prof Ir. Dr. Siti Zawiah Md Dawal
Manufacturing

❖ ACADEMIC SCHEDULE SESSION 2019/2020

SEMESTER I

Orientation Week	1 week*	01.09.2019 – 08.09.2019
Lectures	8 weeks*	09.09.2019 – 03.11.2019
Mid-Semester I Break	1 week*	04.11.2019 – 10.11.2019
Lectures	6 weeks*	11.11.2019 – 22.12.2019
Revision Week	1 week*	23.12.2019 – 29.12.2019
Semester I Final Examination	3 weeks*	30.12.2019 – 19.01.2020
Semester Break	4 weeks*	20.01.2020 – 16.02.2020
24 weeks		

SEMESTER II

Lectures	9 weeks	17.02.2020 – 19.04.2020
Mid-Semester II Break	1 week	20.04.2020 – 26.04.2020
Lectures	5 weeks*	27.04.2020 – 31.05.2020
Revision Week	1 week*	01.06.2020 – 07.06.2020
Semester II Final Examination	3 weeks*	08.06.2020 – 28.06.2020
Semester Break	11 weeks*	29.06.2020 – 13.09.2020
30 weeks		

SPECIAL SEMESTER

Lectures	7 weeks*	29.06.2020 – 16.08.2020
Special Semester Final Examination	1 week*	17.08.2020 – 23.08.2020
Semester Break	3 weeks*	17.08.2020 – 13.09.2020
11 weeks		

*Public Holidays in Kuala Lumpur, MALAYSIA

National Day	31.08.2019	Thaipusam Day	08.02.2020
Awal Muharram	01.09.2019 – 02.09.2019	Labour Day	01.05.2020
Agong's Birthday	09.09.2019	Wesak Day	07.05.2020
Malaysia Day	16.09.2019	Nuzul Al-Qur'an	10.05.2020 – 11.05.2020
Deepavali	27.10.2019 – 28.10.2019	Eidul Fitri	24.05.2020 – 26.05.2020
Maulidur Rasul	09.11.2019	Eidul Adha	31.07.2020 – 01.08.2020
Christmas Day	25.12.2019	Awal Muharram	20.08.2020
New Year	01.01.2020	National Day	31.08.2020
Chinese New Year	25.01.2020 – 26.01.2020	Agong's Birthday	09.09.2020
Federal Territory Day	01.02.2020	Malaysia Day	16.09.2020

Please refer to <http://myum.um.edu.my/> for more details.

❖ PROHIBITION AGAINST PLAGIARISM

Extract from University of Malaya (Discipline of Students) Rules 1999

1. A student shall not plagiarize any idea/writing, data or invention belonging to another person.

2. For the purposes of this rule, plagiarism includes: -

a) The act of taking an idea, writing, data or invention of another person and claiming that the idea, writing, data or invention is the result of one's own findings or creation; or

b) An attempt to make out or the act of making out, in such a way that one is original source or the creator of an idea, writing, data or invention which has actually been taken from some other resources

3. Without prejudice to the generality of sub-rules (2) a student plagiarizes when he: -

a) Publishes, with himself as the author, an abstract, article, scientific or academic paper or book which is wholly or partly written by some other person;

b) Incorporates himself or allows himself to be incorporated as a co-author of an abstract, article, scientific or academic paper, or book, when he has not at all made any written contribution to the abstract, article, paper, or book;

c) Forces another person to include his name in the list of co-researchers for a particular research project or in the list of co-authors for a publication when he has not made any contribution which may qualify him as a co-researcher or co-author;

d) Extracts academic data which are the results of research undertaken by some other person, such as laboratory finding or field work findings or data obtained through library research, whether published or unpublished, and incorporate those data as part of his academic research without giving due acknowledgement to the actual source;

e) Uses research data obtained through collaborative work with some other person, whether or not that other person is a staff member or a student of the University, as part of another distinct personal academic, research of his, or for a publication in his own name as sole author without obtaining the consent of his personal research or prior to publishing the data;

f) Transcribes the ideas of creations of others kept in whatever form whether written, printed or available in electronic form, or in slide form, or in whatever form of teaching or research apparatus or in any other form, and claims whether directly or indirectly that he is the creator of that idea or creation;

g) Translates the writing or creation of another person from one language to another whether or not wholly or partly, and subsequently presents the translation in whatever form or manner as his own writing or creation; or

h) Extracts ideas from another person's writing or creation and makes certain modification due reference to the original source and rearranges the same in such a way that it appears as if he is the creator of those ideas.

❖ OFFICE DIRECTORY

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Department of Mechanical Engineering Tel: 603-79675204	Finance Office Faculty of Engineering Tel: 603-79675225	Library of Engineering Tel: 603-79674591 Fax: 603-79675259 adida@um.edu.my

❖ BRIEF PROFILE: DEPARTMENT OF MECHANICAL ENGINEERING

INTRODUCTION

The Department of Mechanical Engineering was established in 1958 and is one of the oldest departments in the University of Malaya. Many graduates from this department have moved on to become successful individuals in government and private sectors who have contributed to the growth of the nation. Some of them also participated actively in the professional bodies. The Department of Mechanical Engineering currently offers one undergraduate programme which is Bachelor of Mechanical Engineering.

The undergraduate intake was taken from both the students that completed the matriculation course, A-Level, IB and STPM. All degrees require a minimum of four years to complete and the students are required to undergo 10 weeks of industrial training. The undergraduate programme offered by the Department of Mechanical Engineering is accredited by Malaysian Qualification Agency (MQA) and Engineering Accreditation Council (EAC).

The first Engineering Accreditation Council (EAC) evaluation in 2004, the programme was awarded full accreditation (5 years). There are stringent staff recruitment criteria for academic staffs and their number is increasing, in order to comply with the EAC requirement. In addition to undergraduate programmes, the department also offers the degree in Master of Mechanical Engineering, Master of Engineering Science and Doctor of Philosophy in four Engineering Programmes including Mechanical, Materials, Product Design and Manufacturing.

PROGRAMME SYNOPSIS

Bachelor of Mechanical Engineering

Mechanical Engineering programme provides a strong base in the Mechanical Engineering with a well-established balance between theory and experiments during four years of study. This bachelor degree programme is designed to prepare students with understanding of fundamental theories and concepts in mechanical engineering, primarily the scientific knowledge to solve challenges and design systems in automotive, power generation, aerospace and manufacturing industries.

The curriculum consists of combination of a general courses as well as core Mechanical Engineering courses. A total of 143 credit hours were being taught in 8 semesters. The industrial training attachment is a mandatory for undergraduates of the Faculty of Engineering. The idea of this attachment is to enable students to gain firsthand experience in industry as well as to learn how theories are put into practice in the real engineering situations.

Instead of theoretical courses, the students will also involve in Project Based Learning (PBL) courses which is Integrated Design Project (IDP) and Final Year Project (FYP). These courses will provide students with in-depth knowledge and skills on project management and significant experience in developing, designing, prototyping, proving and verifying their design.

In the fourth year of the undergraduate program, each Mechanical Engineering student must select a set of 9 elective courses under 4 specialization programs (Energy, Materials, Manufacturing and Product Design). These electives are chosen based on student's interest and student's ultimate career objective after graduation.

After graduated from this programme, the students are employed in various industries such as automotive industries, manufacturing industries; industrial machines and components industries. The job involves designing of mechanical components and devices, supervising and maintaining the production operation. Mechanical engineers are also in demand in the oil and gas sector and energy related sector.

OUTCOMES-BASED EDUCATION (OBE)

Outcome-Based Education (OBE) had been implemented in the Faculty of Engineering since 2004, in accordance with the directives of the Ministry of Higher Education and the Board of Engineers, Malaysia (BEM). This is also one of the requirements for Malaysia to become a full member of the Washington Accord, an international agreement to mutually recognize Bachelor degrees in engineering. The implementation of OBE, as outlined below, is based on guidelines prescribed by the Engineering Accreditation Council (EAC) of Malaysia.

Unlike the traditional teacher-centered method, OBE is an educational approach that is more concerned about the outcome (what students can do) rather than the process (what instructors did). This is believed to enhance learning, and hence produce better graduates. For OBE to be successful, it is critical to prescribe the expected outcomes, to measure them objectively, and to take corrective actions where required.

The outcomes are prescribed at two levels:

- (a) Course Outcomes (COs) --- what students should be able to perform at the end of each course
- (b) Programme Outcomes (POs) --- a composite set of abilities after students finished all courses

All COs will contribute to some of the POs. This is to ensure that upon completion of the courses, all POs are sufficiently covered. To guide the formation and fine-tuning of these outcomes, the Department has formulated the Programme Educational Objectives (PEOs). These are aspirations for graduates to attain 3 to 5 years upon graduation. The POs are designed to produce graduates who are well-prepared to achieve these PEOs.

The PEOs and POs had been formulated in consultation with all major stakeholders (employers, alumni and students), to meet the demands of a challenging and globalized workplace. Any material changes will also require their views.

A critical component of OBE is the objective measurement of the outcomes. This is done via multiple channels and methods. At the course level, there is formative assessment via discussion, assignment, quizzes etc., in addition to the summative assessment in the final examination. Students also have the opportunity to provide feedback through course evaluation, meetings with their academic advisors, annual surveys, and student-lecturer meetings. Opinions and feedback from external parties, e.g. employers, alumni, Industrial Advisory Panel, are also routinely sought to further calibrate the outcome measurements.

Based on the input and trends received, the Department will take the necessary corrective actions, and the results monitored. In short, OBE is a dynamic, student-centered educational process which incorporates continuous improvement.

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

There are three main Programme Educational Objectives:

- (1) Graduates will establish themselves as a practicing professionals in Mechanical Engineering.
- (2) Graduates will engage in lifelong pursuit of knowledge and interdisciplinary learning appropriate for industrial and academic careers
- (3) Graduates will contribute to sustainable development and the well-being of society

 PROGRAMME OUTCOMES (POs)

Programme Outcomes (POs)		Bachelor of Mechanical Engineering
1	Engineering Knowledge	Apply knowledge of mathematics, science, engineering fundamentals and mechanical engineering specialization to solve complex engineering problems
2	Problem Analysis	Identify, formulate, research, analyse and reach substantiated conclusions along with recommendations for complex mechanical engineering problems, using principles of mathematics, natural sciences and engineering sciences.
3	Design/Development of Solutions	Design/Develop solutions for complex Mechanical engineering systems, components or processes to meet specified needs with appropriate consideration for public health and safety, culture, society and the environment.
4	Investigation	Conduct investigations using relevant research methodology including literature review, design of experiments, analysis and interpretation of results to derive scientifically sound conclusions.
5	Modern Tool Usage	Utilize systematic approach, resources, modern engineering and IT tools, with full understanding of their limitations, to complex Mechanical engineering activities.
6	The Engineer and Society	Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice
7	Environment and Sustainability	Explain the impact of professional engineering solutions towards society and the environment, and demonstrate knowledge of and the need for sustainable development.
8	Ethics	Apply ethical principles and the professional engineering code of ethics.
9	Communication	Communicate effectively on complex engineering activities with engineers and the community at large through discussions, reports and presentations.
10	Individual and Team Work	Function effectively as an individual, and as a team member or a leader in diverse teams and multi-disciplinary settings.
11	Life Long Learning	Recognise the need to undertake life-long learning and possess the capacity to do so independently.
12	Project Management and Finance	Demonstrate knowledge and understanding of engineering and management/finance principles and apply these to one's own work as an individual, team member or leader in a multi-disciplinary environment.

ACADEMIC STAFF



**PROFESSOR IR. DR. MOHD HAMDI
BIN ABD SHUKOR**

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Plates & Shells, Finite Element
Analysis, Vibrations, Fluid-Solid
Interactions, Structural Mechanics,
Wave Propagation, Viscoelasticity,
Biomechanics, Inverse Problems, Ad
joint-Based Sensitivity Analysis,
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B.Eng.(Hons) (Malaya), M.Eng.
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Specialization: Metal Forming, FEM
Simulation, Forming Of Product
Having Lightweight & High Strength,
CNC/CAM, Laser Hardening (Metal
forming, Steel Wheel, Laser
application).

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Engineering, heat exchanger, heat
transfer, thermofluids, chemical
functionalization, computational
fluid dynamic.

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PROGRAMME STRUCTURE: BACHELOR OF MECHANICAL ENGINEERING

CURRICULUM STRUCTURE BACHELOR OF MECHANICAL ENGINEERING SESSION 2019/2020

COURSE COMPONENT	CONTENT	CREDIT
University Courses	• The Islamic and Asian Civilization (TITAS)* / Basic Malay Language**	2
	• Ethnic Relations * / Introduction to Malaysia**	2
	• Basic Entrepreneurship Culture	2
	• English for Communication Programme	6
	• Information Literacy	2
	• Social Engagement	2
	• Co-Curriculum	2
	• Elective Course from Other Faculties	4
	Sub Total	22
Faculty Courses	• Faculty Core Courses	22
	• Faculty Elective Courses	2
	Sub Total	24
Programme Courses	• Programme Core Courses	79
	• Programme Elective Courses	18
	Sub Total	97
Total Credit		143

Notes:

- (1) *Compulsory for Local students.
- (2) ** Compulsory for International students.
- (3) Students are required to take a minimum of 6 credits of English course based on English Proficiency qualification (MUET/IELTS/TOEFL).

ACADEMIC PLANNER
BACHELOR OF MECHANICAL ENGINEERING
SESSION 2019/2020

YEAR 1						
CODE	COURSE	S1	S2	S3	TOTAL	PRE-REQUISITE
UNIVERSITY COURSES						
GIG1001	The Islamic and Asian Civilization (TITAS)*	2				
GLT1017	Basic Malay Language**					
GIG1002	Ethnic Relations*		2			
GIG1006	Introduction To Malaysia**					
GIG1004	Information Literacy		2			
GLT1XXX	English Communication Programme I	3				
GLT1XXX	English Communication Programme II		3			
	Sub-total	5	9		14	
FACULTY CORE COURSES						
KIX1001	Engineering Mathematics I	3				
KIX1002	Engineering Mathematics II		3			
	Sub-total	3	3		6	
PROGRAMME CORE COURSES						
KIG1001	Statics	3				
KIG1002	Fluid Mechanics I	3				
KIG1003	Mechanical Engineering Laboratory I and Communication	1				
KIG1004	Basic Materials for Mechanical Engineering		3			
KIG1005	Engineering Thermodynamics		3			
KIG1006	Engineering Design and Modelling	3				
KIG1007	Mechanics of Materials I		3			
KIG1008	Mechanical Engineering Laboratory II and Communication		1			
	Sub-total	10	10		20	
TOTAL		18	20		38	

Notes:

- (1) *Compulsory for Local students.
(2) ** Compulsory for International students.

YEAR 2						
CODE	COURSE	S1	S2	S3	TOTAL	PRE-REQUISITE
UNIVERSITY COURSES						
GIG1003	Basic Entrepreneurship Culture	2				
GIG1005	Social Engagement		2			
	Sub-total	2	2		4	
FACULTY CORE COURSES						
KIX1003	Thinking and Communication Skills		2			
	Sub-total		2		2	
PROGRAMME CORE COURSES						
KIG2001	Fundamental of Electrical Engineering	3				
KIG2002	Dynamics	3				KIG1001
KIG2003	Fluid Mechanics II	3				KIG1002
KIG2004	Mechanics of Materials II	3				KIG1007
KIG2005	Engineering Materials	3				KIG1004
KIG2006	Mechanical Engineering Laboratory III	1				
KIG2007	Computer Programming		3			
KIG2008	Manufacturing Technology		3			
KIG2009	Design of Machine Elements		3			KIG1007
KIG2010	Heat Transfer		3			KIG1005
KIG2011	Mechanical Engineering Laboratory IV		1			
	Sub-total	16	13		29	
TOTAL		18	17		35	

YEAR 3						
CODE	COURSE	S1	S2	S3	TOTAL	PRE-REQUISITE
UNIVERSITY COURSES						
	Other Faculty Elective Course	2				
	Other Faculty Elective Course		2			
	Co- Curriculum		2			
	Sub-total	2	4		6	
FACULTY CORE COURSES						
KIX2002	Engineering Economics Analysis	3				
KIX2003	Law and Ethics in Engineering	2				
KIX2004	Engineering Project Management	3				
KIX2001	Integrated Design I	2				
KIX3001	Integrated Design II		4			KIX2001
	Sub-total	10	4		14	
FACULTY ELECTIVE COURSE						
KIX30xx	Faculty Elective Course		2			
	Sub-total		2		2	
PROGRAMME CORE COURSES						
KIG3001	Instrumentation and Measurement Techniques	3				
KIG3002	Thermal Engineering Systems	3				KIG1005
KIG3003	Mechanics of Machines and Vibration		3			KIG2002
KIG3004	Mechanical Engineering Laboratory V		1			
KIG3005	Energy and Environment		3			
KIG3006	Industrial Training			5		
	Sub-total	6	7	5	18	
TOTAL		18	17	5	40	

YEAR 4						
CODE	COURSE	S1	S2	S3	TOTAL	PRE-REQUISITE
UNIVERSITY COURSES						
	-					
FACULTY CORE COURSES						
	-					
PROGRAMME CORE COURSES						
KIG4001	Control Engineering	3				
KIG4002	Final Year Project I	2				KIG3006
KIG4003	Numerical Methods in Engineering		3			KIG2007
KIG4004	Final Year Project II		4			KIG4002
	Sub-total	5	7		12	
PROGRAMME ELECTIVE COURSES						
KIG4XXX	Electives 1	2				
KIG4XXX	Electives 2	2				
KIG4XXX	Electives 3	2				
KIG4XXX	Electives 4	2				
KIG4XXX	Electives 5	2				
KIG4XXX	Electives 6		2			
KIG4XXX	Electives 7		2			
KIG4XXX	Electives 8		2			
KIG4XXX	Electives 9		2			
	Sub-total	10	8		18	
	TOTAL	15	15		30	

LIST OF FACULTY ELECTIVE COURSE [#]			
NO	CODE	COURSE	CREDIT
1	KIX3002	Engineering Entrepreneurship	2
2	KIX3003	Sustainable Engineering	2

LIST OF PROGRAMME ELECTIVE COURSE [#]			
NO	CODE	COURSE	CREDIT
1	KIG4020	Internal Combustion engine	2
2	KIG4021	Renewable and non-renewable energy	2
3	KIG4023	Tribology	2
4	KIG4029	Acoustic and Noise Control	2
5	KIG4043	Heating Ventilation and Air Conditioning	2
6	KIG4044	Plant Engineering	2
7	KIG4045	Nanotechnology in Green and sustainable energy	2
8	KIG4050	Energy Conversion and Efficiency	2
9	KIG4024	Production Technology	2
10	KIG4026	industrial Engineering	2
11	KIG4027	Principles of Metal Working	2
12	KIG4028	Manufacturing planning and control	2
13	KIG4030	Operations Management	2
14	KIG4031	Precision Engineering	2
15	KIG4040	Automation and Robotics	2
16	KIG4049	Machine Tool Engineering	2
17	KIG4022	Material and Process in Semiconductor manufacturing	2
18	KIG4032	Phase Transformation	2
19	KIG4033	Modelling of Mterials behaviour	2
20	KIG4041	Corrosion Engineering	2
21	KIG4042	Material Selection	2
22	KIG4046	Material Characterization	2
23	KIG4047	Mechanical Behaviour and failure of Materials	2
24	KIG4051	Composite Materials	2
25	KIG4025	Computer Integrated manufacturing	2
26	KIG4034	Human Factors Design	2
27	KIG4035	Design for Manufacturability	2
28	KIG4036	Reverse Engineering	2
29	KIG4037	Computational Fluid Dynamics	2
30	KIG4038	Finite Element Analysis	2
31	KIG4039	Mold and Die Design	2
32	KIG4048	Advanced innovation Design Approach	2

Important Notes:

- A student is required to complete 18 credits of elective courses comprising of 8 credits in Sem 1 Year 4 and 10 credits in Sem 2 Year 4.
- Specialization Track Option
 - Students meeting a specific combination of courses (to be determined by the Department for each intake cohort) will lead to a Specialized Study Track. Eg. Manufacturing, Energy, Material, Product Design etc. Please refer to the Specialization Track Coordinator for further details on available tracks and requirements.

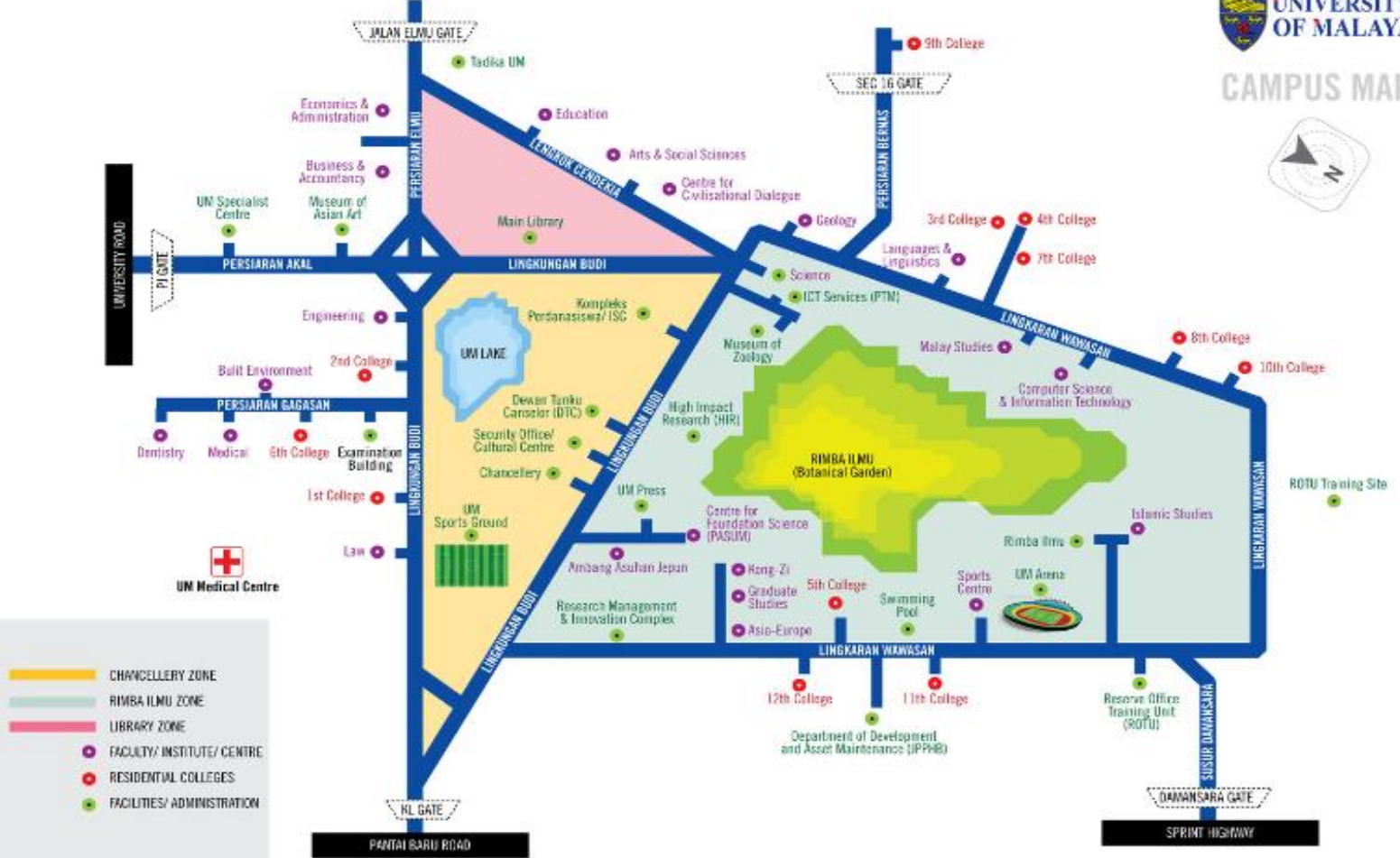
[#] The list of courses offered is subject to change.

LIST OF PROGRAMME ELECTIVE COURSE			
NO	CODE	BACHELOR OF MECHANICAL ENGINEERING	CREDIT
INTAKE SESSION 2019/2020			

CODE	COURSE	CREDIT	PASSING GRADE	MARKING SCHEME			
UNIVERSITY COURSES							
GIG 1001	The Islamic and Asian Civilizations (TITAS)*	2	C				
GLT 1017	Basic Malay Language**						
GIG 1002	Ethnic Relations*	2	C				
GIG 1006	Introduction to Malaysia**						
GIG1003	Basic of Entrepreneurship Culture	2	C				
GIG 1004	Information Literacy	2	C				
GIG1005	Social Engagement	2	C				
GLT 10XX	English for Communication Programme	6	C				
	Elective Course from Other Faculties	4	C				
	Co-Curriculum	2	c				
	Sub-total Credit Hours	24					
FACULTY CORE COURSES							
KIX 1001	Engineering Mathematics I	3	C				
KIX 1002	Engineering Mathematics II	3	C				
KIX 1003	Thinking and Communication Skills	2	C				
KIX 2001	Integrated Design I	2	C				
KIX 2002	Engineering Economic Analysis	3	C				
KIX 2003	Law and Ethics in Engineering	2	C				
KIX 2004	Engineering Project Management	3	C				
KIX 3001	Integrated Design II	4	C				
	Sub-total Credit Hours	22					
FACULTY ELECTIVE COURSES							
	List of Faculty Elective Courses#:	2	C				
	• KIX3004 – Python Programming						
	<i>#subject to change.</i>						
	Sub-total Credit Hours	2					
PROGRAMME CORE COURSES							
KIG1001	Statics	3	C				
KIG1002	Fluid Mechanics I	3	C				
KIG1003	Mechanical Engineering Laboratory I and Communication	1	C				
KIG1004	Basic Materials for Mechanical Engineering	3	C				
KIG1005	Engineering Thermodynamics	3	C				
KIG1006	Engineering Design and Modelling	3	C				
KIG1007	Mechanics of Materials I	3	C				

MARKS	GRADE	GRADE POINTS	MEANING
90-100	A+	4.00	HIGH DISTINCTION
80-89	A	4.00	DISTINCTION
75-79	A-	3.70	DISTINCTION
70-74	B+	3.30	GOOD
65-69	B	3.00	GOOD
60-64	B-	2.70	GOOD
55-59	C+	2.30	PASS
50-54	C	2.00	PASS
45-49	C-	1.70	FAIL
40-44	D+	1.30	FAIL
35-39	D	1.00	FAIL
0-34	F	0.00	FAIL

KIG1008	Mechanical Engineering Laboratory II and Communication	1	C	<table><tr><th>GRADE</th><th>REMARKS</th></tr><tr><td>P</td><td>Progressive</td></tr><tr><td>K</td><td>Transfer of credit without grade</td></tr><tr><td>K1</td><td>Exemption of course</td></tr><tr><td>I</td><td>Maybe given when: a) a student has not taken the final examination for any course in any semester due to medical reasons/compassionate grounds and/or; b) a student has not fulfill a part of the course requirement in a semester due to medical/compassionate grounds or by reasons beyond the control of the student which is acceptable to the Committee of Examiners concerned.</td></tr><tr><td>R</td><td>Given for a course which is audited that fulfils the minimum 80% attendance requirement. No credit is given for this grade</td></tr><tr><td>UR</td><td>Given for a course which is audited but does not fulfil the minimum 80% attendance requirement. No credit is given for this grade.</td></tr><tr><td>W</td><td>Given for a course from which a student has withdrawn officially during a particular semester.</td></tr><tr><td>W1</td><td>Given for all courses where a student has officially withdrawn from a semester.</td></tr><tr><td>W2</td><td>Given for all courses where a student has withdrawn officially from the University.</td></tr></table>	GRADE	REMARKS	P	Progressive	K	Transfer of credit without grade	K1	Exemption of course	I	Maybe given when: a) a student has not taken the final examination for any course in any semester due to medical reasons/compassionate grounds and/or; b) a student has not fulfill a part of the course requirement in a semester due to medical/compassionate grounds or by reasons beyond the control of the student which is acceptable to the Committee of Examiners concerned.	R	Given for a course which is audited that fulfils the minimum 80% attendance requirement. No credit is given for this grade	UR	Given for a course which is audited but does not fulfil the minimum 80% attendance requirement. No credit is given for this grade.	W	Given for a course from which a student has withdrawn officially during a particular semester.	W1	Given for all courses where a student has officially withdrawn from a semester.	W2	Given for all courses where a student has withdrawn officially from the University.
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KIG2001	Fundamental of Electrical Engineering	3	C																					
KIG2002	Dynamics	3	C																					
KIG2003	Fluid Mechanics II	3	C																					
KIG2004	Mechanics of Materials II	3	C																					
KIG2005	Engineering Materials	3	C																					
KIG2006	Mechanical Engineering Laboratory III	1	C																					
KIG2007	Computer Programming	3	C																					
KIG2008	Manufacturing Technology	3	C																					
KIG2009	Design of Machine Elements	3	C																					
KIG2010	Heat Transfer	3	C																					
KIG2011	Mechanical Engineering Laboratory IV	1	C																					
KIG3001	Instrumentation and Measurement Techniques	3	C																					
KIG3002	Thermal Engineering Systems	3	C																					
KIG3003	Mechanics of Machines and Vibration	3	C																					
KIG3004	Mechanical Engineering Laboratory V	1	C																					
KIG3005	Energy and Environment	3	C																					
KIG3006	Industrial Training	5	C																					
KIG4001	Control Engineering	3	C																					
KIG4002	Final Year Project I	2	C																					
KIG4003	Numerical Methods in Engineering	3	C																					
KIG4004	Final Year Project II	4	C																					
	Sub-total Credit Hours	79																						
PROGRAMME ELECTIVE COURSES																								
KIG4xxx	Elective Course 1	2	C																					
KIG4xxx	Elective Course 2	2	C																					
KIG4xxx	Elective Course 3	2	C																					
KIG4xxx	Elective Course 4	2	C																					
KIG4xxx	Elective Course 5	2	C																					
KIG4xxx	Elective Course 6	2	C																					
KIG4xxx	Elective Course 7	2	C																					
KIG4xxx	Elective Course 8	2	C																					
KIG4xxx	Elective Course 9	2	C																					
	Sub-total Credit Hours	18																						
TOTAL CREDIT		143																						



UNIVERSITY OF MALAYA

CAMPUS MAP



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