



School of Mechanical Engineering (SME)

Faculty of Engineering



Bachelor of Engineering (Mechanical-Automotive)

ADMINISTRATION TEAM



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BACHELOR OF ENGINEERING (MECHANICAL-AUTOMOTIVE) PROGRAMME SPECIFICATIONS

The Bachelor of Engineering (Mechanical-Automotive) is offered on a full-time basis. The full-time programme is offered only at the UTM Main Campus in Johor Bahru. The duration of study for the full-time programme is subjected to the student's entry qualifications and lasts between four (4) years to a maximum of six (6) years.

The programme is based on a 2-Semester per academic session. Generally, students are expected to undertake courses between fifteen (15) to eighteen (18) credit hours per semester. Assessment is based on course works and final examinations are given at the end of the semester.

BACHELOR OF ENGINEERING (MECHANICAL – AUTOMOTIVE) PROGRAMME SPECIFICATIONS

1.	Programme Name	Bachelor of Engineering (Mechanical – Automotive)
2.	Final Award	Bachelor of Engineering (Mechanical – Automotive)
3.	Awarding Institution	Universiti Teknologi Malaysia
4.	Teaching Institution	Universiti Teknologi Malaysia
5.	Professional or Statutory Body of Accreditation	Engineering Accreditation Council (EAC)
6.	Language(s) of Instruction	Bahasa Melayu and English
7.	Mode of Study (Conventional, distance learning, etc)	Conventional
8.	Mode of Operation (Franchise, self-govern, etc.)	Self-govern
9.	Study Scheme (Full Time / Part Time)	Full Time
10.	Study Duration	Minimum : 4 years Maximum : 6 years

Type of Semester	No of Semesters	No of Weeks/Semester
Normal	8	14
Short	1	8
11. Entry Requirements	Matriculation/STPM/Diploma or equivalent	
12. Programme Objectives (PEO):	<ul style="list-style-type: none"> (i) Demonstrate academic and technological excellence professionally and globally, particularly in areas related to mechanical – automotive engineering practices and contribute innovatively to the nation’s wealth creation. (ii) Career advancement by achieving higher levels of responsibility, leadership and acquiring professional and advanced academic qualifications. (iii) Recognize and practice professional, ethical, environmental and societal responsibilities and value different global and cultural aspects of the work and society. (iv) Adapt and communicate effectively and be successful working with multi disciplinary teams. 	
13. Programme Learning Outcomes (PLO)		
(a) Technical Knowledge and Competencies		
Intended Learning Outcomes	Teaching and Learning Methods	Assessment
PLO1		
Ability to acquire and apply fundamental knowledge of mathematics, science and engineering principles to solve complex mechanical and automotive engineering problems; Keywords: Engineering Knowledge	Lectures, tutorials, laboratory works, seminars, studio works, directed reading, final year projects and problem-based learning.	Examinations, laboratory reports, seminar presentations, problem-based exercises, individual and group project reports.
PLO2		
Ability to identify, formulate and analyse complex mechanical and automotive engineering problems; Keywords: Problem Analysis	Lectures, tutorials, laboratory works, seminars, studio works, directed reading, final year projects and problem-based learning.	Examinations, laboratory reports, seminar presentations, problem-based exercises, individual and group project reports.

PLO3		
Ability to design solutions for complex mechanical and automotive engineering problems that fulfil health, safety, societal, cultural and environmental needs; Keywords: Design/Development of Solutions	Lectures, tutorials, laboratory works, seminars, studio works, directed reading, final year projects and problem-based learning.	Examinations, laboratory reports, seminar presentations, problem-based exercises, individual and group project reports.
PLO4		
Ability to investigate complex mechanical and automotive engineering problems using research-based knowledge and methods to produce conclusive results; Keywords: Investigation	Lectures, tutorials, laboratory works, seminars, studio works, directed reading, final year projects and problem-based learning.	Examinations, laboratory reports, seminar presentations, problem-based exercises, individual and group project reports.
(b) Generic Skills		
Intended Learning Outcomes	Teaching and Learning Methods	Assessment
PLO5		
Ability to use modern engineering and information technology (IT) tools in complex mechanical and automotive engineering activities, with an understanding of limitations; Keywords: Modern Tools Usage	Lectures, tutorials, laboratory works, seminars, studio works, directed reading, final year projects and problem-based learning.	Examinations, laboratory reports, seminar presentations, problem-based exercises, individual and group project reports.
(b) Generic Skills		
PLO6		

<p>Ability to apply complex professional mechanical and automotive engineering problems related to societal, health, safety, legal and cultural issues with full responsibility and integrity</p> <p>Keywords: The Engineer and Society</p>	<p>Lectures, tutorials, seminars, group projects and industrial training.</p>	<p>Industrial training and group project reports.</p>
PLO7		
<p>Ability to identify the impact of complex mechanical and automotive engineering problems and solutions on sustainability and demonstrate the needs for sustainable development in societal and environmental contexts</p> <p>Keywords: Environment and Sustainability</p>	<p>Tutorials, laboratory works, group assignments and projects, final year project presentations and problem-based learning.</p>	<p>Group reports, learning logs/diaries and oral presentations.</p>
PLO8		
<p>Ability to apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice;</p> <p>Keywords: Ethics</p>	<p>Lectures, tutorials, seminars, group projects and industrial training.</p>	<p>Industrial training and group project reports.</p>
PLO9		
<p>Ability to communicate effectively on complex mechanical and automotive engineering activities both orally and in writing;</p> <p>Keywords: Communication</p>	<p>Seminars, assignments and final year projects.</p>	<p>Report and theses.</p>
PLO10		
<p>Ability to work productively as an individual, and as a member or leader in a team that may involve multi-disciplinary settings;</p> <p>Keywords: Team Working</p>	<p>Lectures and project assignments.</p>	<p>Demonstrations, reports, tests, examinations and presentations.</p>

PLO11		
Ability to undertake life long learning and manage information including conducting literature study; Keywords: Life Long Learning	Lectures and project assignments.	Demonstrations, reports, tests, examinations and presentations.
PLO12		
Ability to demonstrate and apply knowledge on finance and management principles and acquire entrepreneurship skill; Keywords: Project Management, Finance & Entrepreneurship	Lectures and project assignments.	Demonstrations, reports, tests, examinations and presentations.

14. Classification of Courses			
No.	Classification	Credit Hours	Percentage
i.	School Core	96	68.6
ii.	Programme Core	18	12.9
iii.	Programme Electives	3	2.1
iv	Compulsory University Courses	23	16.4
	Total	140	100
Classification of courses for engineering programme			
A	Engineering Courses	117	83.6
	Total credit hours for Part A	117	
B	Non-Engineering	23	16.40

	Total credit hours for Part B	23	
	Total credit hours for Part A and B	140	100
15.	Total Credit Hours to Graduate	140	

AREAS OF STUDY

Students pursuing minor specialization in automotive will take specific automotive related courses in their 3rd and 4th year of the programme. The area of minor specialization will include:

a) **Automotive Technology**

This area of study covers the fundamental technical know-how of the automotive main system and sub-systems which constitute a car; such as the internal combustion engine (ICE), fuel injection, clutch, transmission, differential, steering, suspension and brake system.

b) **Vehicle Structure**

Vehicle structure covers the constructions, classifications and design of the vehicle chassis taking into consideration its load path that will affect its structural rigidity with regards to bending, torsion and lateral loading.

c) **Vehicle Dynamic**

Vehicle dynamic covers the fundamental concepts of vehicle dynamics which consider the ride and comfort, handling, kinematics and kinetics behaviours of its essentials systems and subsystems.

d) **Vehicle Powertrain**

Vehicle powertrain covers the engineering aspects of the vehicle powerplant (dominant by the internal combustion engines) and transmission (also known as drivetrain). It also covers the integration of drivetrain with the powerplant to predict the essential vehicle performances such as maximum speed, acceleration, driveability and fuel consumption.

e) **Automotive Electrical and Instrumentation System**

This area of study introduces and explains the fundamental behaviours and characteristics of the automotive electrical and electronic related systems in a vehicle. Some general electrical system diagnosis methods will also be exposed.

f) Automotive Production Technology

Automotive production covers the fundamental aspects of automotive production processes which emphasize on casting, forming and the challenging issues such as Quality Lean Manufacturing and Automation.

g) Automotive Engineering Design

This area exposes students to automotive related engineering design activities; where real design project is to be undertaken in groups which require creativity, commitment, leadership and good public relation skills. Quality design tools such as QFD, DFM and DFA will be highlighted.

h) Engine Turbocharging

Engine turbocharging is one of the key technologies to improve the engine performance and increase efficiencies. This area includes analysis and evaluation of the parameters in turbocharger and supercharger engines. The study includes the processes in turbocharger-engine matching to achieve better engine performances.

i) Internal Combustion Engine

This area of study covers the fundamental and applications of internal combustion engines, mainly on transportation. Projects in this field can vary from intake system configuration to combustion study and exhaust energy recovery. The area broadly aims for higher efficiency, lower fuel consumption and lower exhaust emissions, through experimental and simulation investigations.

CAREER PROSPECTS

Graduates of this programme are essentially Mechanical Engineers with minor specialization in Automotive Engineering who can seek job opportunities in various mechanical and automotive sectors. Alternatively, they can also be known as Automotive Engineers depending on their job placements in the industries they are in.

Mechanical-Automotive graduates from UTM will be able to perform job requirements in the field of research, design, development and production of various types of vehicles. In most cases they will be working in the design and production of automotive components systems and sub-systems. They will make use of the knowledge learnt during their studies at UTM such as those mentioned earlier. A Mechanical-Automotive Engineer will always perform design or production work in accordance to quality assurance practice to fulfil the requirements of standards performance and safety.

Apart from passenger vehicles, Mechanical-Automotive graduates will also be able to find careers in the commercial vehicle industry or off-road vehicles companies such as MASTER BUILDERS and MALAYSIAN TRUCKS & BUS and even branch into locomotives companies. Furthermore, the advancement of motorsports related industry has created the need for technical expertise to support the industry; another exciting industry in which Mechanical-Automotive graduates can adapt as their career. Malaysia has been producing cars for more than 30 years with the growth of companies such as PROTON, PERODUA, MODENAS and NAZA. The rapid growth in the Malaysian automotive industry including component manufacturing and automotive-related companies has also provided many job opportunities for Mechanical-Automotive graduates.

UTM Mechanical-Automotive graduates are also capable to take a position and advance their career with international car manufacturers either locally or abroad. In short, UTM Mechanical-Automotive graduates have a wide career opportunity as they are all well trained to become competent engineers and managers, especially in the field of Mechanical-Automotive Engineering.

Award Requirements

To graduate, students must:

- Attain a total of not less than 140 credit hours with a minimum CGPA of 2.00.
- Has passed all specified courses.
- Has applied for graduation and has been approved by the University.

- Has completed all four (4) short courses and one (1) test in UTM Professional Skills Certificate Programme.
- Other condition as specified.

Entry Requirements

The minimum qualifications for candidates who intend to do a Bachelor of Engineering (Mechanical - Automotive) are as follows:

1. Minimum results based on **the Malaysian High School Certificate (STPM)** (results would be based on the general requirements as well as other conditions as the pre-requisites for the programme set by the university).

University General Requirements:

- i. Passed Malaysian Certificate Examination (SPM) or its equivalent with a credit in Bahasa Melayu/Bahasa Malaysia or a credit in Bahasa Melayu/Bahasa Malaysia, July Paper.
- ii. Passed the Malaysian High School Certificate (STPM) or its equivalent and obtained the following:
 - a) **Grade C (NGMP 2.00)** General Studies/General Paper, and
 - b) **Grade C (NGMP 2.00)** in two (2) other subjects
- iii. Passed the Malaysian University English Test (MUET) with minimum result of **Band 1**.

Programme Specific Requirements

- i. Obtained a **CGPA of 2.80**; and Passed with a minimum **Grade B- (NGMP 2.67)** in two (2) of the following subjects:
 - a) Mathematics T / Further Mathematics
 - b) Physics or Chemistry
- ii. Passed with at least a **Grade C** in Mathematics and Physics in the SPM level or equivalent.
- iii. Passed the Malaysian University English Test (MUET) with minimum

result of **Band 2**.

iv. Do not have any health problems that may affect their studies.

2. Minimum requirements for **Matriculation Certificates (KPM) / UM Science Foundation / UiTM Foundation** (fulfil the general requirements set by the university as well as other conditions of the programme).

General University Requirements

- i. Passed Malaysian Certificate Examination (SPM) or its equivalent with a credit in Bahasa Melayu/Bahasa Malaysia or a credit in Bahasa Melayu/Bahasa Malaysia, July Paper.
- ii. Passed the Matriculation Certificates (KPM) / UM Science Foundation / UiTM Foundation with a minimum **CGPA of 2.00** and passed all the core subjects.
- iii. Passed the Malaysian University English Test (MUET) with minimum result of **Band 1**.

Programme Specific Requirements

- i. Obtained a **CGPA of 2.80**; and Passed with a **Grade B- (2.67)** in two (2) of the following subjects:
 - a) Mathematics / Engineering Mathematics
 - b) Physics / Engineering Physics or Chemistry / Engineering Chemistry
- ii. Passed with at least a **Grade C** in Mathematics and Physics in the SPM level or equivalent.
- iii. Passed the Malaysian University English Test (MUET) with minimum result of **Band 2**.
- iv. Do not have any health problems that may affect their studies.

3. Minimum qualifications for students with **Certificates/Diplomas** (fulfil the general requirements set by the university as well as specific requirements of the programme).

General University Requirements

- i. Obtained a Diploma or equivalent qualification recognised by the Malaysian Government and approved by the Senate.

or

- ii. Passed STPM examination in 2016 or before and obtained at least:
 - a) **Grade C (NGMP 2.00)** General Studies/General Paper, and
 - b) **Grade C (NGMP 2.00)** in two (2) other subjects

or

- iii. Passed the Matriculation Certificates (KPM) / UM Science Foundation / UiTM Foundation in 2017 or before and obtained minimum **CGPA of 2.00**.
- iv. Passed the Malaysian University English Test (MUET) with minimum result of **Band 1**.
- v. Passed Malaysian Certificate Examination (SPM) or its equivalent with a credit in Bahasa Melayu/Bahasa Malaysia or a credit in Bahasa Melayu/Bahasa Malaysia, July Paper.

Programme Specific Requirements

- i. Obtained a Diploma in Mechanical Engineering from UTM or equivalent with minimum **CGPA of 2.75**.

or

- ii. For those who obtained a **CGPA of less than 2.75** but have at least **two (2)** years working experience in related field are eligible to apply.

or

- iii. Meet the minimum entry requirements as required for STPM holders.

or

- iv. Meet the minimum entry requirements as required for those who have completed the Matriculation Certificates (KPM) / UM Science Foundation / UiTM Foundation.

- v. Passed with at least a **Grade C** in Mathematics and Physics in the SPM level or equivalent.

or

- vi. Obtained at least a **C Grade (2.00)** in any one of the Mathematic courses at Diploma level.
- v. Passed the Malaysian University English Test (MUET) with minimum result of **Band 2**.
- vii. Do not have any health problems that may affect their studies.

Note:

Candidates are required to submit the results transcript of all their examinations taken during their Diploma study (semester one until the final semester) to UTM. A copy of the diploma or a letter of completion of study will also have to be submitted together with their applications.

Year of entry and duration of study will be based on the credit exemptions approved by the UTM.

Programme Educational Objectives (PEO)

After having exposed to 3 to 5 years working experience, our graduates should become professionals who demonstrate the following competencies:

Code	Intended Educational Objectives
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PEO1	Demonstrate academic and technological excellence professionally and globally, particularly in areas related to mechanical – automotive engineering practices and contribute innovatively to the nation’s wealth creation.
PEO2	Career advancement by achieving higher levels of responsibility, leadership and acquiring professional and advanced academic qualifications.
PEO3	Recognize and practice professional, ethical, environmental and societal responsibilities and value different global and cultural aspects of the work and society.
PEO4	Adapt and communicate effectively and be successful working with multi disciplinary teams.

Programme Learning Outcomes (PLO)

After having completed the programme, graduates should be able to demonstrate the following competencies:

Code	Intended Learning Outcomes
PLO1	Ability to acquire and apply fundamental knowledge of mathematics, science and engineering principles to solve complex mechanical and automotive engineering problems; Keywords: Engineering Knowledge
PLO2	Ability to identify, formulate and analyse complex mechanical and automotive engineering problems; Keywords: Problem Analysis
PLO3	Ability to design solutions for complex mechanical and automotive engineering problems that fulfil health, safety, societal, cultural and environmental needs; Keywords: Design/Development of solutions
PLO4	Ability to investigate complex mechanical and automotive engineering

	<p>problems using research-based knowledge and methods to produce conclusive results;</p> <p>Keywords: Investigation</p>
PLO5	<p>Ability to use modern engineering and information technology (IT) tools in complex mechanical and automotive engineering activities, with an understanding of the limitations;</p> <p>Keywords: Modern Tools Usage</p>
PLO6	<p>Ability to apply complex professional mechanical and automotive engineering problems related to societal, health, safety, legal and cultural issues with full responsibility and integrity;</p> <p>Keywords: The Engineer and Society</p>
PLO7	<p>Ability to identify the impact of complex mechanical and automotive engineering problems and solutions on sustainability and demonstrate the needs for sustainable development in societal and environmental contexts</p> <p>Keywords: Environment & Sustainability</p>
PLO8	<p>Ability to apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice.</p> <p>Keywords: Ethics</p>
PLO9	<p>Ability to communicate effectively on complex mechanical and automotive engineering activities both orally and in writing;</p> <p>Keywords: Communication</p>
PLO10	<p>Ability to work productively as an individual, and as a member or leader in a team that may involve multi-disciplinary settings;</p> <p>Keywords: Team Working</p>
PLO11	<p>Ability to undertake life long learning and manage information including conducting literature study;</p>

	Keywords: Life Long Learning
PLO12	Ability to demonstrate and apply knowledge on finance and management principles and acquire entrepreneurship skill; Keywords: Project Management, Finance & Entrepreneurship

PROFESSIONAL SKILLS CERTIFICATE (PSC)

Students are required to enrol in certificate programmes offered by the Centres of Excellence in the University and the School of Professional and Continuing Education (SPACE) during the duration of their studies in UTM. The four (4) short courses and one test are as follows:

1. How to Get Yourself Employed (HTGYE)
2. ISO 9001: 2008 Quality Management System Requirement (ISO)
3. Occupational Safety and Health Awareness (OSHA)
4. How to Manage Your Personal Finance (HTMYPF)
5. Test of English Communication Skills for Graduating Students (TECS):
 - (i) TECS 1001 (Paper I – Oral Interaction)
 - (ii) TECS 1002 (Paper II - Writing)

MOBILITY PROGRAMME (OUTBOUND)

Universiti Teknologi Malaysia (UTM) is offering five (5) types of mobility programs which allow UTM Student to go abroad and join academic programs in universities, institutions or organizations in all over the world. The opportunities offered are as below:

1. Study Abroad / Student Exchange

Study Abroad/Student Exchange programme is a programme which allow student to spend one or two semesters at universities abroad and take courses in regular semester with credit transfer opportunity.

2. Research Internship Abroad

Research Internship is a program which allow student to join research study or internship under the supervision of an academic staff at universities or industries abroad from all over the world.

3. Global Outreach Programme (GOP)

GOP is a 7 to 14 days academic based program to experience various cultures in other countries. It includes immersion elements such as research & academic activities, social responsibility and cross cultural activities.

4. International Invitation Programme

Students participate in program organised by international institutions/ organisations with the following themes:

- (i) Seminar, Conference or Paper Presentation
- (ii) Cultural Exhibition and Conference
- (iii) Student Development Activity

5. Summer School Abroad

Summer School program is a program which is designed to provide educational opportunities in 4 to 8 weeks during summer holiday abroad. It is related to environment, local community, heritage and tradition.

Details and appropriate forms and procedures can be reached at **UTM International link:** <http://www.utm.my/international/outbound-mobility-programs/>

COURSE MENU

YEAR 1 : SEMESTER 1						
CODE	COURSE	L	T	P/S	CREDIT	PRE-REQUISITE
SEMM1203	Statics*	3	1	0	3	
SEMM1503	Engineering Drawing	1	0	6	3	

SEMM1911	Experimental Methods	1	0	0	1	
SEMM1921	Introduction to Mechanical Engineering	0	0	3	1	
SKEU1002	Electrical Technology	2	1	0	2	
SSCE1693	Engineering Mathematics I	3	1	0	3	
UHLB1122	English Communication Skills	3	0	0	2	
UHS 1012	Islamic and Asian Civilization (Local student)	2	0	0	2	
UHMS 1022	Malaysian Studies 3 (International student)	2	0	0	2	
		Total			17	

YEAR 1 : SEMESTER 2						
CODE	COURSE	L	T	P/S	CREDIT	PRE-REQUISITE
SEMM1013	Programming for Engineers	3	0	3	3	
SEMM1113	Mechanics of Solids I *	3	1	0	3	SEMM1203
SEMM1213	Dynamics*	3	1	0	3	SEMM1203
SEMM1513	Introduction to Design	1	0	3	3	SEMM1503
SEEU2012	Electronics	2	0	0	2	SEEU1002
UHMT1012	Graduate Success Attributes	2	0	0	2	
UHMS 1172	Malaysian Dynamics (Local student)	2	0	0	2	
UHLM 1012	Malay Language for Communication 2 (International Student)	2	0	0	2	
		Total			18	

YEAR 2 : SEMESTER 1						
CODE	COURSE	L	T	P/S	CREDIT	PRE-REQUISITE
SEMM2123	Mechanics of Solids II*	3	1	0	3	SEMM1113
SEMM2313	Mechanics of Fluids I*	3	1	0	3	SEMM1203

SEMM2413	Thermodynamics*	3	1	0	3	
SEMM2921	Laboratory I	0	0	2	1	SEMM1911
SSCE1993	Engineering Mathematics II	3	1	0	3	SSCE1693
UHIT2302	Thinking of Science and Technology	2	0	0	2	
UHLB2122	Advanced Academic English Skills	3	0	0	2	UHLB1122
					Total	17

YEAR 2 : SEMESTER 2						
CODE	COURSE	L	T	P/S	CREDIT	PRE-REQUISITE
SEMM2223	Mechanics of Machines and Vibration*	3	1	0	3	SEMM1213
SEMM2323	Mechanics of Fluids II*	3	1	0	3	SEMM2313
SEMM2433	Applied Thermodynamics and Heat Transfer*	3	1	0	3	SEMM2413
SEMM2613	Materials Science	3	1	0	3	
SEMM2713	Manufacturing Processes	3	1	0	3	
SSCE1793	Differential Equations	3	1	0	3	SSCE1693
					Total	18

YEAR 3 : SEMESTER 1						
CODE	COURSE	L	T	P/S	CREDIT	PRE-REQUISITE
SEMM3023	Applied Numerical Methods	3	0	0	3	SEMM1013,SSCE1793
SEMM 3233	Control Engineering	3	0	0	3	SEMM1213**, SSCE1793**
SEMM3523	Components Design	2	0	3	3	SEMM2123**, SEMM1513
SEMM3931	Laboratory II	0	0	2	1	SEMM2921
SEMV3012	Automotive Technology	2	0	0	2	
UBSS 1032	Introduction to Entrepreneurship	2	0	0	2	

UKQF 2xx2	Co-curriculum and Service Learning Elective	0	0	3	2	
		Total			16	

YEAR 3 : SEMESTER 3						
CODE	COURSE	L	T	P/S	CREDIT	PRE-REQUISITE
SEMM3033	Finite Element Methods	3	0	0	3	SEMM2123**
SEMM 3183	Industrial Engineering	3	0	0	3	
SEMV3413	Internal Combustion Engines	3	0	0	3	SEMM2413,SSCE1793
SEMV 3512	Automotive Engineering Design I	2	0	0	2	
SEMV3941	Laboratory III	0	0	2	1	SEMM3931
UHLB 3132	English for Professional Purposes	3	0	0	2	UHLB 2122
SSCE2193	Engineering Statistics	3	1	0	3	
		Total			17	

SHORT SEMESTER						
CODE	COURSE	L	T	P/S	CREDIT	PRE-REQUISITE
SEMM 3915	Industrial Training				5	##, SEMM 2123**, SEMM 2223**, SEMM 2323**, SEMM 2433**
		Total			5	

YEAR 4 : SEMESTER 1						
CODE	COURSE	L	T	P/S	CREDIT	PRE-REQUISITE
SEMM3622	Materials Technology	2	0	0	2	SEMM2613**
SEMM3823	Engineering Management, Safety and Economics	3	0	0	3	
SEMM4912	Undergraduate Project I	0	0	6	2	SEMM2123**,SEMM2433**, SEMM2223**, SEMM2323**

SEMV4212	Automotive Electronics & Instrumentation	2	0	0	2	SEMV3012,SEMM3242
SEMV4213	Vehicle Dynamics	3	0	0	3	
SEMV4523	Automotive Engineering Design II	2	0	3	3	SEMV 3512
UXXX 2xx2	Generic Skills or Knowledge Expansion Cluster Elective	2	0	0	2	
		Total			17	

YEAR 4 : SEMESTER 2						
CODE	COURSE	L	T	P/S	CREDIT	PRE-REQUISITE
SEMM4902	Engineering Professional Practice	0	0	2	2	Must be a tleast 3rd year
SEMM4924	Undergraduate Project II	0	0	12	4	SEMM4912
SEMV4793	Automotive Production Technology	3	0	0	3	SEMV3012,SEMM2713
SEMV 4xx3	Elective	3	0	0	3	
UHLX 1112	Language Skills Elective (Foreign Language)	2	0	0	2	
UKQT 3001	Extra Curricular Experiential Learning	0	0	3	1	Completed three extracurricular experience programmes
		Total			15	

Subject to changes

** Minimum grade D- (30%) in the pre-requisite courses

Obtained minimum of 80 credits

Notes: L – Lecture, T – Tutorial, P/S – Practical/Studio

ELECTIVE COURSES

Choose one (1) from the elective courses:

SEMV 4123 Vehicle Structure
 SKMV 4413 Engine Turbocharging
 SEMV 4423 Vehicle Powertrain

GRADUATION CHECKLIST

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

NO	COURSE CODE	COURSE NAME	CREDIT EARNED (JKD)	CREDIT COUNTE D (JKK)	TICK (✓) IF PASSE D
MECHANICAL ENGINEERING COURSES					
1	SEMM 1013	Programming for Engineers	3	3	
2	SEMM 1113	Mechanics of Solids I	3	3	
3	SEMM 1203	Statics	3	3	
4	SEMM 1213	Dynamics	3	3	
5	SEMM 1503	Engineering Drawing	3	3	
6	SEMM 1513	Introduction to Design	3	3	
7	SEMM 1911	Experimental Methods	1	1	
8	SEMM 1921	Introduction to Mechanical Engineering	1	1	
9	SEMM 2123	Mechanics of Solids II	3	3	
10	SEMM 2223	Mechanics of Machines & Vibration	3	3	
11	SEMM 2313	Mechanics of Fluids I	3	3	
12	SEMM 2323	Mechanics of Fluids II	3	3	
13	SEMM 2413	Thermodynamics	3	3	
14	SEMM 2433	Applied Thermodynamics & Heat Transfer	3	3	
15	SEMM 2613	Materials Science	3	3	
16	SEMM 2713	Manufacturing Processes	3	3	
17	SEMM 2921	Laboratory I	1	1	
18	SEMM 3023	Applied Numerical Methods	3	3	
19	SEMM 3033	Finite Element Methods	3	3	

20	SEMM 3233	Control Engineering	3	3	
21	SEMM 3523	Component Design	3	3	
22	SEMM 3622	Materials Technology	2	2	
23	SEMM 3813	Industrial Engineering	3	3	
24	SEMM 3823	Engineering Management, Safety & Economics	3	3	
25	SEMM 3915	Industrial Training	5	HL	
26	SEMM 3931	Laboratory II	1	1	
27	SEMM 4902	Engineering Professional Practice	2	2	
28	SEMM 4912	Undergraduate Project I	2	2	
29	SEMM 4924	Undergraduate Project II	4	4	
30	SEMV 3012	Automotive Technology	2	2	
31	SEMV 3413	Internal Combustion Engines	3	3	
32	SEMV 3512	Automotive Engineering Design I	2	2	
33	SEMV 3941	Laboratory III	1	1	
34	SEMV 4212	Automotive Electronics & Instrumentation	2	2	
35	SEMV 4213	Vehicle Dynamics	3	3	
36	SEMV 4523	Automotive Engineering Design II	3	3	
37	SEMV 4793	Automotive Production Technology	3	3	
38	SEMV 4xx3	Elective	3	3	
TOTAL CREDIT FOR MECHANICAL ENGINEERING COURSES (A)			101	96	
ELECTRICAL COURSES (School of Electrical Engineering)					
1	SKEU 1002	Electrical Technology	2	2	
2	SKEU 2012	Electronics	2	2	
TOTAL CREDIT FOR ELECTRICAL COURSES (B)			4	4	
MATHEMATICS COURSES (Faculty of Science)					

1	SSCE 1693	Engineering Mathematics I	3	3	
2	SSCE 1793	Differential Equations	3	3	
3	SSCE 1993	Engineering Mathematics II	3	3	
4	SSCE 2193	Engineering Statistics	3	3	
TOTAL CREDIT FOR MATHEMATICS COURSES (C)			12	12	
UNIVERSITY GENERAL COURSES					
CLUSTER 1: APPRECIATION OF PHILOSOPHY, VALUE & HISTORY					
1	UICI 1012	Islamic & Asian Civilization (for local students only)	2	2	
	UHAK 1022	Malaysian Studies 3 (for international students only)			
2	UHAS 1172	Malaysian Dynamics (for local students only)	2	2	
	ULAM 1012	Malay Language for Communication 2 (for international students only)			
CLUSTER 2: GENERIC SKILLS					
1	UHMT 1012	Graduate Success Attributes	2	2	
2	UHMT 2012	Leadership	2	2	
3.	UHMS 2022	Critical and Creative Thinking	2	2	
4.	UHMS 2032	The Human side of Knowledge Management	2	2	
5.	UHMS 2042	Development and Global Issues	2	2	
6.	UHMT 2042	Guidance & Counselling	2	2	
7.	UHMT 2062	Psychology of Adjustment	2	2	

8.	UBSS 2072	Fundamentals of Intellectual Property Law	2	2	
9.	UBSS 2082	Law for Entrepreneurs	2	2	
10.	UBSS 2092	Entrepreneurship and Enterprise Development	2	2	
11.	UBSS 2102	Social Entrepreneurship	2	2	
12.	UHMS 2112	Engineering Communication	2	2	
13.	UHMS 2122	Human Communication	2	2	
14.	UHMT 2132	Professional Ethics	2	2	
15.	UMJT 2142	Professional Ethics, Safety and Health (Ningen Ryoku)	2	2	
CLUSTER 3: KNOWLEDGE EXPANSION					
1.	UHIT 2302	Science and Technology Thinking	2	2	
2.	UHIT 1022	Science, Technology and Mankind	2	2	
3.	UHII 2012	Al-Qur'an and Human Civilization	2	2	
4.	UHIT 2032	Life Institutions and Sustainable Development	2	2	
5.	UHIZ 2042	Future Studies	2	2	
6.	UHIT 2052	Family Law	2	2	
7.	UHIZ 2062	World Science	2	2	
8.	UHS 2072	Sustainable Economy	2	2	
9.	UHS 2082	Practice and Concept of Halal Management	2	2	
10.	UHII 2092	Philosophy of Islamic Art	2	2	
11.	UHII 2102	Islam and Health	2	2	

12.	UHII 2132	Islamic Entrepreneurship	2	2	
13.	UETS 2142	Sustainable Energy	2	2	
CLUSTER 4: CO-CURRICULUM & SERVICE LEARNING					
1	UKQX xxx2	Co-curriculum & Service Learning Elective	2	2	
2	UKQE 3001	Extra Curricular Experiential Learning	1	1	
CLUSTER 5: LANGUAGE SKILLS					
1	UHLB 1112	English Communication Skills	2	2	
2	UHLB 2122	Academic Communication Skills	2	2	
3	UHLB 3132	Professional Communication Skills	2	2	
4	UHLB 1032	Introductory Academic English	2	2	
5	UHLB 1042	Intermediate Academic English	2	2	
6	UHLA 1112	Arabic Language	2	2	
7	UHLJ 1112	Japanese Language 1	2	2	
8	UHLC 1112	Mandarin Language I	2	2	
9	UHLE 1112	French Language	2	2	
10	UHLN 1112	Persian Language	2	2	
11	UHLJ 1122	Japanese Language for Communication I	2	2	

12	UHLM 1112	Malay Language for Communication	2	2	
CLUSTER 6: ENTREPRENEURSHIP					
1	UBSS 1032	Introduction to Entrepreneurship	2	2	
TOTAL CREDIT FOR UNIVERSITY GENERAL COURSES (D)			23	23	
TOTAL CREDIT TO GRADUATE (A + B + C + D)			140	135	
Note: # Choose one elective either from Cluster 2 (Generic Skills) or Cluster 3 (Knowledge Expansion) for UxxX 2xx2					
OTHER COMPULSORY COURSES					
PROFESSIONAL SKILLS CERTIFICATE (PSC)					
1	GLL 1001	How To Get Yourself Employed			
2	GLL 1029	ISO 9001:2008 Quality Management System Requirement			
3	GLL 1040	Occupational Safety, Health and Environment			
4	GLL 1041	How to Manage Your Personal Finance			
5	Test of English Communication Skills (TECS)				
	TECS 1001	Oral Interaction			
	TECS 1002	Writing			

COURSE SYNOPSIS

COURSE SYNOPSIS FOR B. ENG (MECHANICAL – AUTOMOTIVE)

SEMV 3012 Automotive Technology

This course introduces students the fundamental knowledge of automotive areas including different modern automotive system and components such as engine, transmission, differential, clutches, brakes, steering and suspension. Students will be exposed the principle function and working mechanism of the system. The new technology associated with different systems will also be introduced to enable student to identify the advancement in the technology. Students will also have some hands-on work to be done in automotive laboratory which will give them exposure to work on real automotive components and systems.

SEMV 3413 Internal Combustion Engine

This course is intended to provide students an introduction, terminology, definition, and operating characteristics of internal combustion engines (ICE). It covers all topics needed for a basic engineering knowledge of the design, operation, analysis and performance of IC engines. Principles of all types of IC engines are covered including spark ignition (gasoline), compression ignition (diesels), four-stroke, and two-stroke engines. On top of that, students will be equipped with basic knowledge and understanding of engine heat transfer, frictions and lubrication. Moreover, an introduction on fuel-cell, hybrid and other alternative fuels are also covered.

SEMV3512 Automotive Engineering Design I

In this problem-based learning course, students will have to undertake (in group) one mechanical-automotive engineering design exercise which involves current trend in automotive technology. The main aim of this course is for the students to experience how to undertake real group design project which involves the latest automotive technology. Students will have to go through the process of applying various techniques and scientific principles (which they have learnt in this programme) in order to achieve their goals. Students will also be taught to be creative, brainstorm their ideas, discuss, design and analyze their developed design. Concurrently, students will also be given lectures related to mechanical engineering design process and engineering design method (technology-independent), based on relevant engineering design books.

SEMV 3941 Laboratory III

This course is introduced in the third year of the study of Mechanical Engineering, three hours per week and experimental based course. It is divided into two parts; experimental work at Mechanics of Machine Laboratory and problem-based-learning (PBL) based laboratory (module). Students have to produce a short report for the experimental work as same to experimental work at year 2. But for the module, it is based on PBL concept. Students have to plan and design their experimental work from beginning until the end based on the title and objective that have been given by the lecturer. Students will be grouped into 5 to 6 for each module. Generally, every group has to conduct two experimental works and two modules. At the end of the session, students have to submit two short reports and two formal reports.

SEMV 4212 Automotive Electronics and Instrumentation

This course gives students an exposure to electronic and instrumentation systems typically used in automotive vehicles. It covers the basics of transducers and their uses in automotive instrumentation systems. The interface between transducers and microcontrollers are also covered for automotive applications. Major electronic systems in automotive vehicles (e.g. starting and charging system, electric, hybrid and autonomous vehicle systems) are also introduced and discussed in the course.

SEMV 4213 Vehicle Dynamics

This course introduces students to the fundamentals of vehicle dynamics such as vehicle axis system, equation of motions, moments and products of inertia, body/chassis stiffness and vibrations. Students will be taught the knowledge to develop equation of motions of vehicle dynamics model and to analyze its performance in terms of ride, comfort & handling behavior.

SEMV4523 Automotive Engineering Design II

In this problem-based learning course, students need to develop and fabricate (in group) one mechanical-automotive engineering system which involves both mechanical and electronic system integrations, which its specifications had been determined in Automotive Engineering Design 1. The main aim of this course is for the students to experience how to deliver an automotive system project involving the latest automotive technology, which emphasizes more on detailed engineering analysis and system fabrication. Students will have to go through the process of applying various techniques and scientific principles (which they have learnt in prerequisite subjects) in order to achieve their goals. At the end of the semester, the students are required to produce one automotive system which comprises an integration between both mechanical and electronics systems.

SEMV 4793 Automotive Production Technology

This course introduces students to the advances of manufacturing processes involved in the production of selected

automotive parts. Further enhancement of basic manufacturing processes through analysis of selected critical parameters in stamping operation is also given. A brief overview on other processes such as joining, injection molding, thermoforming, etc are highlighted. The course will also highlight some of the challenging issues such as Quality improvement implementation, Lean Manufacturing and Automation.

ELECTIVE I

SEMV 4413 Engine Turbocharging

This course is designed to deliver the principles of engine boosting and its significant role towards engine downsizing. The course will emphasize on the engine air induction system, in particular the turbocharging and supercharging systems. Students will be introduced to the science governing the operation of turbochargers and superchargers – which covers aerodynamics, gas dynamics and thermodynamics. The syllabus will enable the students to have the view of a turbocharger designer, as well as enable them to recognize the common problems relating to turbocharging an internal combustion engine. Engine downsizing is one of the crucial steps undertaken by engine manufacturers towards carbon reduction and sustainable technology. However, it requires significant technology advancement in all aspects of engine sub-systems, to deliver the targeted performance. The specific contributions of engine boosting to meet these targets will be discussed and elaborated as part of the course.

ELECTIVE II

SEMV 4123 Vehicle Structure

This course is designed to expose students to the design of the modern passenger car structure. It will emphasize on the general architecture of the vehicle structure, design specifications for the body structure, methodology for evaluation of body structure performance.

SEMV 4423 Vehicle Powertrain

This course introduces students to the fundamental of vehicle powertrain engineering systems. Students will be lectured on vehicle powertrain system that employs manual and automatic transmissions that uses either dry friction clutch or hydraulic torque converter and how to predict its performances. Students will be taught on how to match engine (internal combustion engine – ICE) and the different types of transmission systems in predicting the vehicle performances. The performances prediction that will be covered in this course are how to determine vehicle gradeability, top speed, acceleration and steady state fuel consumptions. In conjunction to these, students will be thought on how to determine top, bottom and intermediate gear ratios taking into consideration overgeering and undergeering conditions; and exploiting the current new continuously variable transmission (CVT) technology capability to achieve the above vehicle performances will be highlighted.

