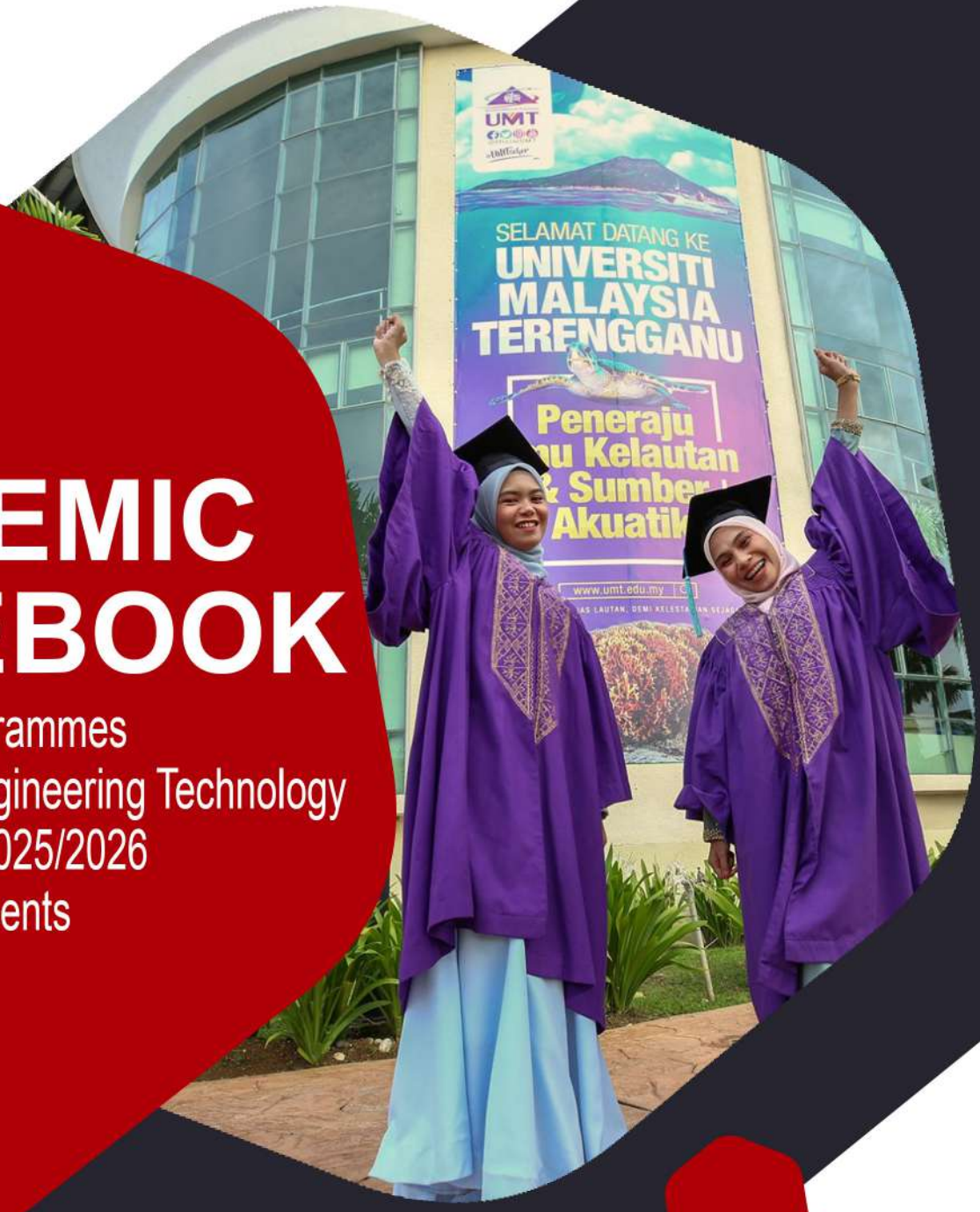

ACADEMIC GUIDEBOOK

Undergraduate Programmes
Faculty of Ocean Engineering Technology
Academic Session 2025/2026
for International Students

ENGLISH
FOR INTERNATIONAL STUDENTS
VERSION

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Penerbit UMT
Universiti Malaysia Terengganu
21030 Kuala Nerus,
Terengganu
2025

ACADEMIC GUIDEBOOK Undergraduate Programmes Faculty of Ocean Engineering Technology
Academic Session 2025/2026 for International Students

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Table of Contents

		Page
Editorial Committee		v
Remarks from the Dean		ix
Academic Calendar		xii
Section A	**Information on Faculty of Ocean Engineering Technology**	**1**
Section B	**General Information, Dress Code and Student Appearances**	**23**
Section C	**Academic Programmes Offered**	**31**
	Bachelor of Applied Science (Maritime Technology) with Honours	**33**
	Bachelor of Applied Science (Maritime Technology) with Honours (Dual Degree)	**49**
	Bachelor of Mechanical Engineering Technology (Naval Architecture) with Honours	**67**
	Bachelor of Applied Science (Electronics and Instrumentation) with Honours	**85**
	Bachelor of Electrical Technology (Energy and Power) with Honours	**103**
	Bachelor of Technology (Environment) with Honours	**117**
	Bachelor of Renewable Energy Technology with Honours	**141**

Remarks from the Dean

اَلسَّلَامُ عَلَيْكُمْ وَرَحْمَةُ اللهِ وَبَرَكَاتُهُ

My gratitude and congratulations to the editors who have successfully prepared the 8th edition of the FTKK 2025 Academic Guidebook for Undergraduate Programmes. This book is published digitally every year and distributed specifically to new students as a reference and guide throughout their studies at FTKK.

I would also like to take this opportunity to welcome our new students to the Faculty of Ocean Engineering Technology (FTKK), Universiti Malaysia Terengganu (UMT). With the motto Technology to Lead, you are truly fortunate to be part of the FTKK family this is a garden of knowledge where you will gain valuable experiences that can change the destiny and future of your family and your own life.

Dear students,

The rapidly changing educational landscape has created new challenges in the era of higher education. Therefore, the role of universities is getting bigger in order to improve the quality of higher education in Malaysia in order to maintain the trust of the stakeholders to continue sending their children to universities to become knowledgeable graduates, mature thinkers, leaders and able to find the real truth to develop residents into a civilized country.

Universities in today's era are no longer limited to providing skilled graduates for the sake of a job market but focus more on providing future-proof skilled students with technological competence. With that determination, the prepared graduates will be able to meet the three (3) world trends that lead to High Art, High Tech and High Touch.

Therefore, I and the management committee of FTKK always strive to ensure that the study program and student talent development are organized and updated to prepare competitive students to meet current and future job requirements. The academic programmes offered by FTKK not only provides students with intellectual knowledge and skills but also connects theory, practice and soft skills to prepare graduates for the global arena. The latest teaching and learning facilities are provided in the faculty to guarantee the quality of teaching in addition to ensuring that teaching and learning meet the standards of the Malaysian Quality Agency (MQA) and recognized professional bodies.

Therefore, I expect you to appreciate the huge open space and opportunity to build your identity, professional ethics and the latest technology skills. Make today's step a start to continue to achieve more sweet and meaningful success in the future with the commitment to become an excellent graduate that parents are proud of as well as a competitive human capital for the country.

Finally, I pray that you continue to study enthusiastically, practice a healthy lifestyle both physically and spiritually and prove to your family that you will be an outstanding holistic graduate in another 3.5 or 4 years. Increase self-excellence and always protect the good name of UMT. Let's all of you develop each other's potential as human beings so that this beloved country can be prospered with noble and good moral citizens.

Thank you and I wish you best of luck to all students.

Thank you and all the best.

Prof. Ir. Dr. Mohammad Fadhli Ahmad
Dean
Faculty of Ocean Engineering Technology

Academic Calendar (Degree)
Semester I : Session 2025/2026

ACADEMIC CALENDAR (DEGREE)
SEMESTER I: SESSION 2025/2026

DATE/WEEK	ACTIVITY	PUBLIC HOLIDAYS
28/9/2025 – 4/10/2025	REGISTRATION AND ORIENTATION FOR NEW STUDENTS	
WEEK 1-4 5/10/2025 – 1/11/2025	CLASSES/ LECTURES - Course Registration (Add & Drop) - Application for Credit Transfer (First Year Student) - Application for Deferment of Study	**Deepavali** 20/10/2025 (Monday)
WEEK 5-7 2 – 22/11/2025	CLASSES/ LECTURES - Course Registration (Drop)	
23/11/2025 – 29/11/2025	MID SEMESTER BREAK	
WEEK 8 30/11/2025 – 6/12/2025	CLASSES/ LECTURES - Course Registration (Drop)	
WEEK 9 7 – 13/12/2025	CLASSES/ LECTURES - Course Review and Confirmation	
WEEK 10-13 14/12/2025 – 10/1/2026	CLASSES/ LECTURES	**Christmas Day** 25/12/2025 (Thursday)
WEEK 14 11 – 17/1/2026	CLASSES/ LECTURES - Issuance of Examination Slip - Online Teaching Evaluation (e-SPP/TEP)	**Israj Mikraj** 17/1/2026 (Saturday)
18/1/2025 – 24/1/2026	STUDY WEEK	**Israj Mikraj Holiday** 18/1/2026 (Sunday)
WEEK 15-16 25/1/2026 – 14/2/2026	FINAL EXAMINATION - Online Teaching Evaluation (e-SPP/TEP)	
15/2/2026 – 14/3/2026	SEMESTER BREAK	

REMINDER

- Students may check all academic information through the student's portal at https://mynemo.umt.edu.my
- Students are required to verify the courses that have been registered by week-9 of the current semester'
- For the final year students, please refer to Graduating Module *(Modul Layak Bergraduat)* in the student's portal.
- Students are required to refer to Academic Rules And Regulations, Latest Edition through the student's portal for detailed Course Registration Regulation.

Visit Pusat Pembangunan & Pengurusan Akademik (PPPA), UMT Facebook at https://www.facebook.com/AkademikUMT/ for the latest news and update.

Note: All the above dates are subject to change.

Center for Academic Development and Management, UMT

Academic Calendar (Degree)
Semester II : Session 2025/2026

ACADEMIC CALENDAR (DEGREE)
SEMESTER II: SESSION 2025/2026

DATE/WEEK	ACTIVITY	PUBLIC HOLIDAYS
WEEK 1-2 15 – 28/3/2026	**CLASSES/ LECTURES** - Course Registration (Add & Drop) - Application for Credit Transfer (First Year Student) - Application for Deferment of Study ** (Lectures will be held Face to face/ On-line/ hybridly from 15 – 28 March 2026)*	**Hari Raya Aidilfitri** 21 - 22/3/2026 (Saturday - Sunday) **Hari Raya Aidilfitri Holiday** 23/3/2026 (Monday)
WEEK 3-4 29/3/2026 – 11/4/2026	**CLASSES/ LECTURES** - Course Registration (Add & Drop) - Application for Credit Transfer (First Year Student) - Application for Deferment of Study ** (Normal lecture from week 4 onwards)*	
WEEK 5-7 12/4/2026 – 2/5/2026	**CLASSES/ LECTURES** - Course Registration (Drop)	**Birthday of Sultan Terengganu** 26/4/2026 (Sunday) **Labour Day** 1/5/2026 (Friday)
3 – 9/5/2026	**MID SEMESTER BREAK**	
WEEK 8 10 – 16/5/2026	**CLASSES/ LECTURES** - Course Registration (Drop)	
WEEK 9 17 – 23/5/2026	**CLASSES/ LECTURES** - Course Review and Confirmation	
WEEK 10-13 24/5/2026 – 20/6/2026	**CLASSES/ LECTURES**	**Arafah Day & Hari Raya Aidiladha** 26 - 28/5/2026 (Tuesday -Thursday) **Wesak Day** 31/5/2026 (Sunday) **Birthday Of YDP Agong** 1/6/2026 (Monday) **Awal Muharam** 17/6/2026 (Wednesday)
WEEK 14 21 – 27/6/2026	**CLASSES/ LECTURES** - Issuance of Examination Slip - Online Teaching Evaluation (e-SPP/TEP)	
28/6/2026 – 4/7/2026	**STUDY WEEK**	
WEEK 15-17 5 – 25/7/2026	**FINAL EXAMINATION** - Online Teaching Evaluation (e-SPP/TEP)	

REMINDER

- Students may check all academic information through the student's portal at https://mynemo.umt.edu.my
- Students are required to verify the courses that have been registered by week-9 of the current semester'
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Note: All the above dates are subject to change.

Center for Academic Development and Management, UMT

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Reminder

- Students may check all academic information through the student's portal at https://mynemo.umt.edu.my
- Students are required to verify the courses that have been registered by week-9 of the current semester.
- Registration of courses for the next semester can be completed from week-12 to week-17 in the current semester.
- For the final year students, please refer to Graduating Module (*Modul Layak Bergraduat*) in the student's portal.
- Course Grade Review Appeals and Failed and Discontinued Appeals must be made within two weeks after the official results of the final examination are issued.
- Applications for credit transfer can only be made up to the second week of Semester 1 and Semester 2 in the first year of study.

Nota : The above information is subject to current amendments. Students must always alert to announcements issued by the Center for Academic Development and Management (PPPA) and faculty from time to time.

Section A

Information on Faculty of Ocean Engineering Technology

Background

Faculty of Ocean Engineering Technology was formally founded on 1st January 2024 through the rebranding of Faculty of Ocean Engineering Technology and Informatics (FTKKI).

This faculty was established to pool the experts in technology and engineering such as maritime engineering, mechanical, civil, electrical and electronic engineering, chemistry and environment under one organization with the aim to empower the knowledge and research disciple in a niche area related to ocean engineering which are parallel with the mission and vision of UMT.

The main aim of FTKK is to produce competitive graduates, as well as implementing teaching and learning activities, research and consultation work related to science, mathematics, technology and ocean engineering. The programmes offered in this field is a pragmatic step towards producing skilled human resources, competitive and have integrity to fulfill the needs of the country.

FTKK offers 7 undergraduate study programmes and 2 postgraduate study programmes.

Undergraduate Programme

No.	Field	Program Name	Duration of Study
1.	Maritime Technology and Naval Architecture	Bachelor Of Applied Science (Maritime Technology) with Honours	8 semesters
2.		Bachelor Of Applied Science (Maritime Technology) with Honours (Dual Degree)	8 semesters
3.		Bachelor of Mechanical Engineering Technology (Naval Architecture) with Honours	8 semesters
4.	Electrical and Electronic Technology	Bachelor Of Mechanical Engineering Technology (Naval Architecture) with Honours	7 semesters
5.		Bachelor Of Applied Science (Electronics And Instrumentation) with Honours	8 semesters
6.	Environmental and Renewable Energy Technology	Bachelor Of Technology (Environment) with Honours	8 semesters
7.		Bachelor of Renewable Energy Technology with Honours	8 semesters

Postgraduate Programme

1. Master of Science (Research)
2. Doctor of Philosophy (Research)

UMT Vision, Mission, Functions and Slogan

UMT Vision

Becoming the Country's Leading and Globally Respected Marine-Focused University

UMT Mission

Generating Knowledge for the Community's Affluence and Environmental Sustainability

UMT Functions

1. Supports the mission of the university to become the premier centre of learning and research by contributing to the progress of humankind and exploration of knowledge and also to the creation of wealth and national development.
2. Provides trained manpower with professional skills, high self-discipline and positive work ethics.
3. Produces graduates who are sensitive to management ideas, responsive to change and become a role model for students and the community.
4. Serves society through the dissemination of ideas and new practices and seek solutions to current problems in society.
5. Establishes relationships with other universities, institutions and the industry for mutual benefit and the national development.
6. Supports the mission of the university to become an organised centre of research and learning as well as providing good services and exploring new technologies.

UMT Slogan

Ocean of Discoveries, for Global Sustainability.

FTKK Vision, Mission, Slogan & Objectives

FTKK Vision

Becoming a superior academic center of global engineering technology with universal sustainability

FTKK Mission

Driving the development and advancement of engineering technology by producing innovative and holistic high-performing graduates

FTKK Slogan

Technology to Lead

FTKK Objectives

1. Offer academic programmes that meet the needs of the industry.
2. Produce graduates who are holistic, versatile, innovative and highly competitive in the job market.
3. Conduct research in the field of engineering technology that supports the development of knowledge and economy of the country.
4. Provide qualified academic talent and globally recognized expertise.
5. To be a reference center in addressing current issues and implementing knowledge transfer programmes for community sustainability.
6. Fostering an entrepreneurial culture through the commercialization of expertise.

www.umt.edu.my

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Section B

General Information, Dress Code and Student Appearances

General Information

Studying System

UMT practices semester-based system. There are two common semesters for each academic year and the duration for each semester is 19 weeks, the breakdown is as follows:

Activity	Semester I	Semester II
Lecture	7 weeks	7 weeks
Mid semester break	1 week	1 week
Lecture	7 weeks	7 weeks
Revision break	1 week	1 week
Final examination	3 weeks	3 weeks

Programme Curriculum Structure

The curriculum structure for undergraduate students is designed in accordance to the UMT philosophy and vision, which is to produce knowledgeable graduates, competent with multiple skills including entrepreneurship and leadership. There are three course components in the programme curriculum namely University Core, Programme Core and University Elective.

University Core

The university core components comprise several courses which are compulsory for all UMT undergraduates to enroll and pass the courses. These courses aim to provide general knowledge to students.

Core Programme

Core programme components comprise courses related to the majoring programme and determined by the corresponding faculty which is offering the respective programme. The students are compulsory to undertake their respective core programme courses.

University Elective

University Elective components comprise selected courses chosen by students after discussing with their academic advisor/mentor/head of programme. The credit hours for elective courses are counted and the score point is given.

Mentor-mentee System

Mentor-mentee system is introduced in UMT to replace the academic advisor system. A mentor is an academician who is responsible to provide consultation on academic matters to the students (mentees) and also to advise the students if the students encounter any problem pertaining to their studies or personal issues. Each student is obliged to meet their mentor for consultation and the appointment can be set in advance, depending on the availability of the mentor.

Implementation

Faculty will assign a lecturer as a mentor for each student who enrolls the programme. The students can meet their mentor to seek advice on academic matters or any other matter.

Mentor Roles

- Assisting students to understand curriculum, semester system, registration system, examination system and course exemption.
- Assisting students to plan their studies structure, to select courses and giving advice on academic issues faced by students.
- Identify problems which may affect the academic progress of the student and directly refer to an expert who has the skill to solve the encountered problems.
- Sign and certify certificates and any documents regarding student academics.
- Become a mentor and motivate students.
- Hold meetings with students at least twice each semester.
- Keep and update student records and files.

Grading System, Grade and Grade Point Average

Grading scheme, Alphabetical Grade, Grade Point Value and Grade Description are as shown in the following table.

Marks	Alphabet Grade	Grade Point Value	Grade Description
80 - 100	A	4.00	Excellent
75 - 79	A-	3.75	
70 - 74	B+	3.50	Good
65 - 69	B	3.00	
60 - 64	B-	2.75	
55 - 59	C+	2.50	Satisfactory
50 - 54	C	2.00	
45 - 49	C-	1.75	Poor
40 - 44	D	1.00	
Less than 39	F	0.00	Fail

CGPA	Degree Classification	
	In Bahasa Melayu	In English
3.67 - 4.00	Cemerlang	Distinction
2.00 - 3.66	Kepujian	Honours

General Admission Requirements

Senior High School/Senior Secondary School/ Other Certificates from the government schools (with the period of at least 11 to 12 years of study from primary to higher secondary); **OR**

GCE 'A' Level examination obtained at one sitting; **OR**

Any other certificate that is recognized by the Senate of the University as equivalent to the above.

AND

Languange Requirements:

English Competency Test	Name of Component	Minimum Score
MUET	MUET	Band 3.5
IELTS	IELTS	5.0
TOEFL	TOEFL IBT	40
	TOEFL Essentials (Online)	7.5
Pearson Test of English	PTE Academic/PTE Academic (Online)	47
Cambridge English Qualifications and Tests	i) B1 Preliminary, B2 First, C1 Advanced, C2 Proficiency	154
	ii) Linguaskill online	
	iii) Occupational English Test (OET) (Conventional/ Online)	200
Common European Framework of References (CEFR)	Common European Framework of References (CEFR)	High Band 1

General Graduation Requirements for Degree Students Intake Session 2025/2026

Graduation Requirements:

- Has registered for a programme of study and has passed all compulsory courses required for the programme or equivalent replacement courses.
- Has fulfilled all other requirements prescribed for the programme.
- Has obtained a CGPA of not less than 2.00.
- Has completed the Survival and Water Safety Programme.
- Has completed the Artificial Intelligence for Beginners course (MCBS10017).
- Has achieved the minimum MUET Band level through one of the following two (2) methods:

Method 1:

The student takes the MUET examination before graduating and achieves the prescribed Band level as follows:

Stream	Minimum Muet Band Requirement for Graduating
Arts and Social Sciences	Band 3.0
Science, Technology, Engineering, and Mathematics (STEM)	Band 4.0

OR

Method 1:

The student obtains the minimum grade for the course BBB3033 (English for Occupational Purposes), which has been standardised with the MUET-CEFR Band as follows:

Stream	Minimum Grade BBB3033 (EOP)
Arts and Social Sciences	Must obtain at least Grade B- (equivalent to Band 3.0)
Science, Technology, Engineering, and Mathematics (STEM)	Must obtain at least Grade B (equivalent to Band 4.0)

NOTES:

a) Exemption from this requirement is granted to students who have achieved the minimum MUET Band level at the point of admission. This is because the student is considered to have fulfilled the graduation requirement for MUET level achievement.

Examples:

i. A student has obtained MUET Band 3.0 or higher at admission for Arts and Social Sciences stream.

ii. A student has obtained MUET Band 4.0 or higher at admission for STEM stream.

b) However, students who have been granted exemption as mentioned in (a) are still required to take and pass the EOP course as stipulated in the study scheme.

c) Students who fail to achieve the minimum grade for the EOP course or students who do not take the EOP course (because it is not included in their study scheme) are given the following options to qualify for graduation:

i. The student may sit for the MUET examination according to the schedule set by the Malaysian Examinations Council. The student may also sit for the MUET on Demand examination. However, the student must ensure that the results are obtained before graduation.

ii. Students who do not take the EOP course because it is not included in their study scheme may take the EOP course as an elective.

iii. Non-final year students who have passed the EOP course but failed to achieve the minimum grade required for graduation may retake the EOP course to improve their grade under the Grade Improvement Repeat (ULT) status in the following semester.

iv. Final year students who have passed all required courses for graduation but failed the EOP course are allowed to sit for a Special Resit Examination (ULK). Since this course has no final examination, students are granted special permission to take the ULK in the form of a final assessment. If the student still fails to pass the EOP course after the ULK, the student must repeat the course in the following semester (ULF). Students who pass the EOP course after the ULK but still fail to achieve the minimum grade required for graduation may retake the course to improve their grade under the Grade Improvement Repeat (ULT) status in the following semester.

v. Final year students who have passed all required courses for graduation but failed to achieve the minimum grade for the EOP course are allowed to sit for a Minimum Grade Resit Examination (ULM). Students who still fail to achieve the minimum grade for the EOP course after the ULM may retake the course under the Grade Improvement Repeat (ULT) status in the following semester.

General Rules for Dress Code and Student Appearances

Universiti Malaysia Terengganu

General Rules

- It is mandatory for all students to show their matric card while on campus.
- All students are prohibited from wearing clothing or accessories that signifies certain groups or association that might cause disharmony in campus.
- All students are prohibited from showcasing any elements that might contradict with ethics and morale or wearing any attire that might contain designs of words or phrase that is not parallel with good norms or values.
- All students are restricted with dress code rules as specified by laboratory guidelines or any other place on campus with its own specified guidelines.

Example of Appearances of Students with Matric Card

Hair

- Students hair must always be smart not sloppy.
- Male students are not allowed to have long hair or brandishing ponytails the front or the back. Hair must not reach the shirt collar.
- Excessive hair fashion for male and female students are prohibited.
- Dyed hair is not allowed at all.

Faculty Policy

Appropriate Attire While In Campus and Attending Formal Events

Examples of Appropriate Students' Attire

- All students must wear proper attire befitting as a university student.
- Students must wear appropriate attire (shirt, collared T-shirt, shoes, long pants, skirts below the knee level) while in class/ laboratory/library/office or cafeteria and outside of the residential room.
- Students are not allowed to wear clothing that is tight or sheer, body-revealing (from the chest to knee) or basically inappropriate clothing. Students are not allowed to wear such clothing listed below during classes or at any formal event:
    - Skirts above the knee level
    - Jeans
    - Slippers
    - Tight, form-fitting skirts or pants
    - Sleeveless

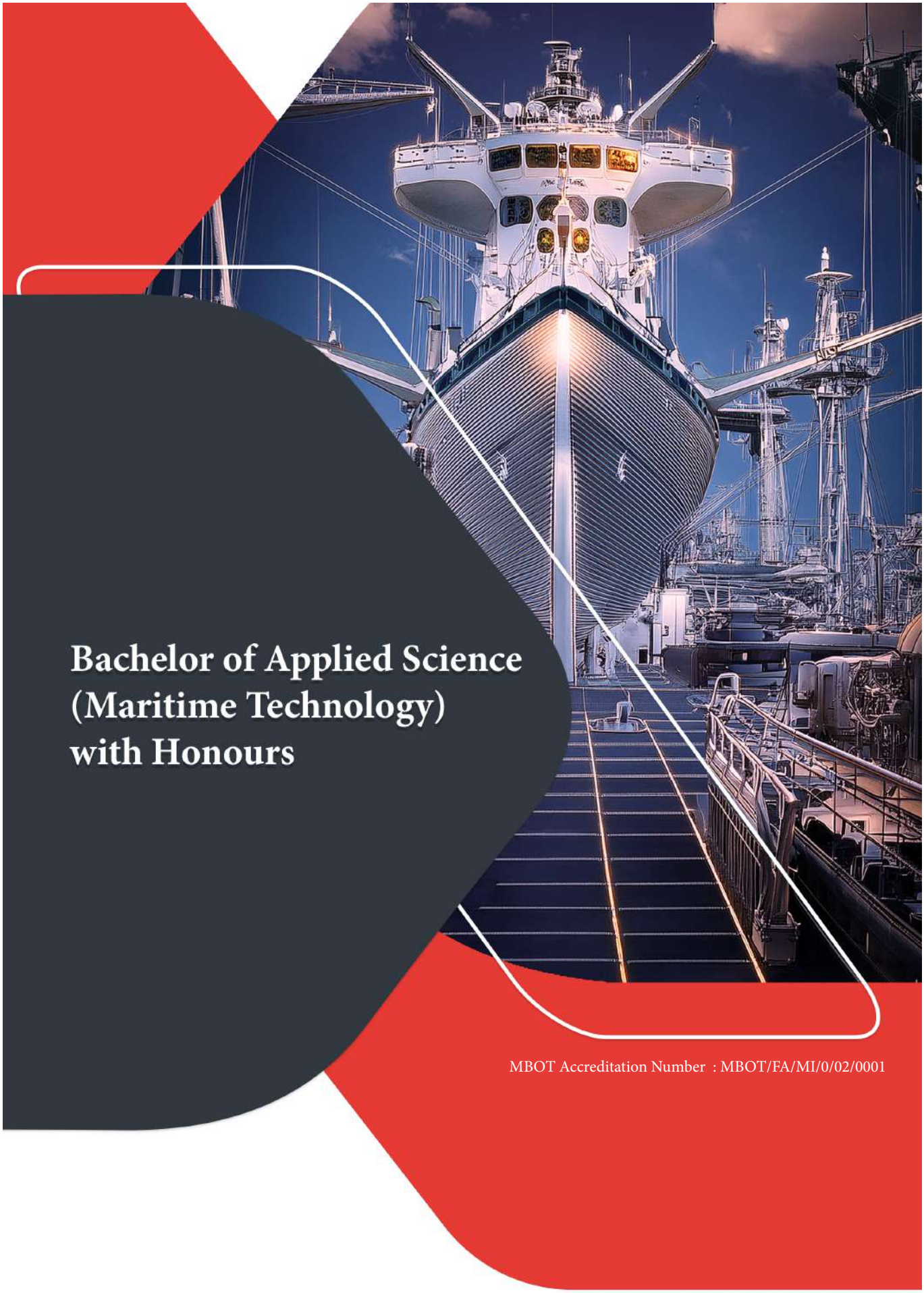
    (The above list is not final and subjected to current University rules)

    Due to security reason, the use of niqab or face mask during examination/academic evaluation or at any formal events is prohibited.

- In any formal event, it is compulsory for male students to wear formal attire which includes a long-sleeved shirt, tie, long pants and formal shoes. Female students must wear *baju kurung* or any decent attire with the blouse surpassing the hip level, skirt below the knee level or loose long pants and formal shoes.
- Students must also abide by the dress code as dictated by the University or the organizer from time to time depending on the events being organized.
- While on official business with any of the offices in the University or in the lecture hall, students are not allowed to wear hats or bandanas.
- Students are prohibited from getting a tattoo for any parts of the body. Body piercing for male students is strictly prohibited as well as excessive body piercing for female students. Male students are also not allowed to wear hand bangles or dress in a manner resembling females.

Section C

Academic Programmes Offered



Bachelor of Applied Science (Maritime Technology) with Honours

MBOT Accreditation Number : MBOT/FA/MI/0/02/0001

Bachelor of Applied Science (Maritime Technology) with Honours

Introduction

The Bachelor of Applied Science (Maritime Technology) with Honours program was first offered in the July 2006/2007 academic session by the Department of Maritime Technology, Faculty of Maritime Studies and Marine Science. This full-time program spans four (4) years or eight (8) semesters, comprising a minimum of 137 credit hours required for graduation.

Maritime Technology is a field focused on the study and application of technologies, operations, processes, and systems used within the maritime industry. This program is specifically designed to produce graduates who will advance knowledge and contribute their expertise to serve and lead shipping companies, shipyards, vessel construction firms, and government agencies related to the maritime sector both locally and internationally.

Programme Educational Objectives (PEO)

Graduates who undertake this program will be able to achieve the following objectives:

PEO1: Graduates who are knowledgeable and capable of applying scientific, numerical, and leadership skills to propose sound ideas and strategically build careers in the field of Maritime Technology at both local and global levels.

PEO2: Graduates who lead in technical and digital competencies and embrace lifelong learning within the maritime domain.

PEO3: Graduates who are competitive, entrepreneurial, and able to identify business opportunities while contributing their expertise to the maritime sector and related fields across academia, industry, professional bodies, and society.

PEO4: Graduates who are well-prepared, able to communicate effectively and competently, and consistently perform both individually and in teams as professionals in Maritime Technology.

Programme Learning Outcomes (PLO)

At the end of this programme, students will be able to:

PLO1: Acquire and apply foundational knowledge in science, mathematics, and management sciences within the field of maritime technology.

PLO2: Adapt and integrate old and new technologies to create new possibilities for solving problems and advancing the maritime industry.

PLO3: Apply and manipulate knowledge in science and technology to solve problems in design, construction, repair of marine structures, and marine operations while minimizing environmental impacts.

PLO4: Possess contemporary knowledge of current issues in maritime technology.

PLO5: Convey ideas clearly and effectively, understanding concepts to solve both technical and non-technical problems.

PLO6: Adapt and demonstrate digital skills, including the use of software applications relevant to maritime technology.

PLO7: Solve numerical problems within the field of maritime technology.

PLO8: Function effectively both individually and in teams as a leader and manager.

PLO9: Recognize the importance of continuous lifelong learning for personal development and advancement of the maritime industry.

PLO10: Identify business opportunities and consulting services in the current market.

PLO11: Demonstrates professionalism, morality, and ethics in accordance with professional codes of conduct, and understands the impact of science in economic, environmental, and sociocultural contexts.

Career Prospects

This program is highly relevant and timely, given the rapid development within the maritime industry. Career opportunities for graduates span both government and private sectors, particularly those directly or indirectly involved in maritime activities. Graduates can serve as marine technologists, naval architects, technologists, marine surveyors, port officers, project planners, technical/sales executives, QA/QC officers, application technology engineers, lecturers at universities, polytechnics, matriculation centers, private colleges or as teachers, research officers/scientific officers (Research Institutes), and many others.

Programme Graduation Requirements

1. Students must register for and pass all compulsory courses in the programme or equivalent replacement courses, as well as fulfill the minimum credit requirement for graduation. Students must also achieve a CGPA of not less than 2.00.

2. Students are required to undertake the Survival and Water Safety Program (SKA) and the Artificial Intelligence for Beginners (MCBS10017) as a condition to graduate.

3. The number of elective course credit hours that must be taken by students in the program of study is subject to the number of elective credit hours set by the program of study to meet graduate qualifications and is not subject to the number of elective courses taken.

4. The list of elective courses that can be taken by students in the program of study refers to the course offerings listed in the handbook of the study program of the faculty and other faculties.

5. Students must achieve the minimum grade requirement for English language proficiency as follows:

Stream	Minimum English Proficiency Requirement
Science, Technology, Engineering, and Mathematics (STEM)	EOP Grade B or MUET Band 4.0

*If, at the time of admission, a student has already achieved the minimum MUET Band required for graduation, the student is considered to have fulfilled the graduation requirement for MUET proficiency.

Total Credit for Graduation

The minimum number of credits to graduate is 137 credit hours. The distribution of credit hours by course category is as follows:

Categories	Credit	Percentages
University Core	18	13
Programme Core	84	61
University Elective	35	26
Total	**137**	**100**

University Core (18 Credit Hours)

Code Course	Name Course	Credit Hours	Prerequisite
BBB3013	Academic Writing Skills	3 (3+0)	None
BBB3023	Public Speaking	3 (3+0)	None
BBB3033	English for Occupational Purposes	3 (3+0)	None
MPU3132	Appreciation of Ethics and Civilizations	2 (2+0)	None
MPU3143	Communicative Malay Language	3 (3+0)	None
MPU3352	Integrity and Anti-Corruption	2 (2+0)	None
CCXXXXX	Co-Curriculum	2 (0+2)	None

Programme Core (84 Credit Hours)

Code Course	Name Course	Credit Hours
EDI3303	Fundamental Physics	3 (3+0)
EDI3313	Engineering Mathematics I	3 (3+0)
EDI3323	Engineering Mathematics II	3 (3+0)
EDI3333	Basic Programming for Technologists	3 (2+1)
MMT3013	Engineering Mechanics	3 (2+1)
MMT3023	Fluid Mechanics	3 (2+1)
MMT3033	Design and Graphics	3 (0+3)
MMT3043	Materials Engineering	3 (2+1)
MMT3053	Thermodynamics	3 (2+1)

MMT3063	Marine Fluid Power	3 (2+1)
MMT3073	Shipping and Port Technology	3 (3+0)
MMT3082	Machining and Welding Workshop	2 (0+2)
MMT3093	Dynamic Mechanics	3(3+0)
MMT3112	Marine Technology Laboratory	2 (0+2)
MMT3123	Strength of Materials	3 (2+1)
MMT3133	Marine Engineering Systems	3 (2+1)
MMT3144	Marine Electronics and Instrumentation	4 (2+2)
MMT3154	Naval Architecture and Ship Construction	4 (3+1)
MMT4163	Marine Technology and Environmental	3 (3+0)
MMT4223	Technology Research Methods	3 (2+1)
MMT4333	Maritime and Coastal Engineering	3 (2+1)
MMT4982	Final Year Project I	2 (0+2)
MMT4994	Final Year Project II	4 (0+4)
MMT49712	Industrial Training	12 (0+12)
MMM3763	Principles of Maritime Management	3 (3+0)

University Elective (35 Credit Hours)

Students are required to register for and pass any elective courses totaling 35 credit hours as listed throughout the duration of the program, subject to the approval and consent of the Head of Programme.

Code Course	Name Course	Credit Hours
MMT4173	Marine Automation and Control	3 (2+1)
MMT4183	Advanced Ship Architecture	3 (2+1)
MMT4193	Maritime Engineering Design	3 (2+1)
MMT4213	Diesel Engines	3 (2+1)
MMT4223	Technology Research Methods	3 (3+0)
MMT4233	Ship Power Plant and Machinery	3 (2+1)
MMT4244	Ship Maintenance and Repair Systems	4 (3+1)
MMT4253	Marine Corrosion	3 (2+1)
MMT4263	Offshore Structures	3 (3+0)
MMT4273	Marine Hydrodynamics	3 (3+0)
MMT4283	Marine Cooling and Refrigeration Systems	3 (2+1)
MMT4293	Ship Structures	3 (3+0)
MMT4313	Offshore Mooring and Riser Systems	3 (3+0)
MMT4323	Offshore Pipeline Systems	3 (3+0)
MMT4343	Design of Floating Structures	3 (3+0)
MMT4353	Computer Aided Marine Design	3 (1+2)
MMT4363	Marine Computer Aided Modelling	3 (1+2)
MMT4373	Computer Fluid Dynamic	3 (1+2)

Course Scheme
Bachelor of Applied Science (Maritime Technology) with Honours

Code	Course Name	Credit Hour	Pre-requisite	Code	Course Name	Credit Hour	Pre-requisite
Semester 1				**Semester 2**			
EDI3303	Fundamental Physics	3(3+0)	-	EDI3323	Engineering Mathematics II	3(3+0)	-
EDI3313	Engineering Mathematics I	3(3+0)	-	MMT3023	Fluid Mechanics	3(2+1)	-
MMT3013	Engineering Mechanics	3(3+0)	-	MPU3132	Appreciation of Ethics and Civilization	2(2+0)	-
MMT3033	Design and Graphics	3(0+3)	-	BBB3013	Academic Writing Skills	3(3+0)	-
MPU3143	Communicative Malay Language	3(3+0)	-	BBB3023	Public Speaking	3(3+0)	-
MPU3352	Integrity and Anticorruption	2(2+0)	-	CCXXXXX	Co-Curriculum	2(0+2)	-
Total Credit		**17**		**Total Credit**		**16**	
Semester 3				**Semester 4**			
MMT3043	Materials Engineering	3(2+1)	-	EDI3333	Basic Programming for Technologists	3(2+1)	-
MMT3063	Marine Fluid Power	3(2+1)	-	MMT3053	Thermodynamics	3(2+1)	-
MMT3073	Shipping and Port Technology	3(3+0)	-	MMT3112	Marine Technology Laboratory	2(0+2)	-
MMT3082	Machining and Welding Workshop	2(0+2)	-	MMT3123	Strength of Materials	3(2+1)	-
MMT3093	Mechanic Dynamics	3(3+0)	-	MMT4163	Marine Technology and Environment	3(3+0)	-
MMM3763	Principles of Maritime Management	3(3+0)	-		Elective 2	3	-
	Elective 1	3	-		Elective 3	3	-
Total Credit		**20**		**Total Credit**		**20**	
Semester 5				**Semester 6**			
MMT3133	Marine Engineering Systems	3(2+1)	-	MMT4982	Final Year Project I	2(0+2)	-
MMT3144	Marine Electronics and Instrumentation	4(2+2)	-		Elektif 4	2	-
MMT3154	Naval Architecture and Ship Construction	4(3+1)	-		Elektif 5	3	-
MMT4223	Research Methods in Technology	3(2+1)	-		Elektif 6	3	-
MMT4333	Maritime and Coastal Engineering	3(2+1)	-		Elektif 7	3	-
BBB3033	English for Occupational Purposes	3(3+0)	-		Elektif 8	3	-
Total Credit		**20**		**Total Credit**		**16**	
Semester 7				**Semester 8**			
MMT4994	Final Year Project II	4(0+4)	MMT4982	MMT49712	Industrial Training	12(0+12)	-
	Elektif 9	3	-				
	Elektif 10	3	-				
	Elektif 11	3	-				
	Elektif 12	3	-				
Total Credit		**16**		**Total Credit**		**12**	
Total Credit to Graduate : 137							

Notes:

1. Students are required to undertake the Survival and Water Safety Program and Artificial Intelligence for Beginner (MCBS10017) as a condition to graduate.
2. The number of elective course credit hours that must be taken by students in the program of study is subject to the number of elective credit hours set by the program of study to meet graduate qualifications and is not subject to the number of elective courses taken.
3. The list of elective courses that can be taken by students in the program of study refers to the course offerings listed in the handbook of the study program of the faculty and other faculties.

(Reference: UMT Senate Approval-199th Meeting, Year 2025)

Course Synopsis
Bachelor of Applied Science (Maritime Technology) with Honours

MMT3013 : Engineering Mechanics
Credit : 3 (3+0)
Prerequisite : None
This course introduces the fundamental principles of mechanical equilibrium, focusing on the analysis of forces and their effects on stationary bodies. Students will explore the concepts of force, torque, and equilibrium, with an emphasis on static systems in engineering applications. The course will cover essential methods for solving problems in both particle and rigid body mechanics, incorporating tools such as free body diagrams, centroid calculations, distributed load analysis, and the moment of inertia.

MMT3023 : Fluid Mechanics
Credit : 3 (2+1)
Prerequisite : None
This course aims to provide students with fundamental knowledge of fluid mechanics in static and dynamic conditions, which is essential in marine and mechanical engineering. Topics include pressure, buoyancy, fluid flow, energy loss, and Bernoulli's principle. Laboratory sessions are included to reinforce theoretical understanding and develop hands-on skills in experimentation and data analysis. Students will gain a strong technical foundation to apply in designing fluid-related systems and be well-prepared for advanced engineering courses and future professional careers.

MMT3033 : Design and Graphics
Credit : 3 (0+3)
Prerequisite : None
This course is designed to equip students with fundamental knowledge and practical skills in engineering drawing, which is essential for effective communication in the engineering field. The course emphasizes the importance of technical drawing in supporting the design and construction processes within various engineering industries. Topics covered include basic engineering drawing, orthographic and isometric drawings, 3D modelling and surface development using Computer-Aided Design (CAD) software. Through this course, students will develop the ability to interpret and produce accurate engineering drawings, enabling them to contribute effectively to design projects.

MMT3043 : Materials Engineering
Credit : 3 (2+1)
Prerequisite : None
This course provides students with foundational knowledge on the relationship between material structure and properties, essential for understanding material behavior in engineering applications. It covers atomic structure, bonding, crystalline and molecular imperfections, and their relation to mechanical and engineering properties. Additional topics include material failure modes, phase diagrams, compositions, applications, and fabrication of materials such as metals, polymers, composites, and ceramics. This course equips students with a strong technical base for effectively analyzing and selecting materials in engineering contexts.

MMT3053 : Thermodynamics
Credit : 3 (2+1)
Prerequisite : None
The study of energy, its transformations, and interactions within systems. This course introduces the core principles of thermodynamics, exploring fundamental concepts, various forms of energy, energy transfer mechanisms, and pure substances' properties. The energy conservation principle applies to both closed and open systems. The Second Law of Thermodynamics is introduced, with a focus on its applications to thermodynamic cycles, cyclic devices, and processes. Experiments with Marcet boilers, air conditioning, and heat exchangers are included in the laboratory sessions.

MMT3063 : Marine Fluid Power
Credit : 3 (2+1)
Prerequisite : None
This course discusses fundamentals of fluid power with emphasis on marine/naval equipment. It covers hydraulic power transmission in marine machinery. This includes the introduction to fluid power, positive displacement pumps, directional, flow and pressure control valves, linear and rotary actuators, hydraulic oil,marine applications, hydraulic system design, servo and proportional control system, air breather and water removal equipment, pneumatic system, inspection and maintenance of marine fluid power system.

MMT3073 : Shipping and Port Technology
Credit : 3 (3+0)
Prerequisite : None
This course explores the environmental factors influencing technology choices in the maritime industry. It covers specialization in cargo forms, containment, handling methods, transport modes, and efficient intermodal interfaces. Students will examine the selection of ship and port technologies, as well as contemporary issues in technology development.

MMT3082 : Machining and Welding Workshop
Credit : 2 (0+2)
Prerequisite : None
The course introduces basic knowledge in handling machinery and equipment in metal cutting, using lathe and milling, welding and practicing basic principles of safety at work and in workshops. Laboratory work covers sheet metal fabrication, cutting, bending, welding, basic machining, measuring techniques using proper tools and using hand power tools. Understanding specifications, scale, engineering design. Workshop safety and writing technical reports.

MMT3093 : Dynamic Mechanics
Credit : 3 (3+0)
Prerequisite : None
This course introduces the fundamental concepts of dynamics in mechanical engineering. It covers linear and curved motion, conservation of work and energy, velocity and acceleration in horizontal systems, motion relative to rotating frames, and mass moment of inertia. Emphasis is placed on conceptual understanding and analytical problem-solving. The course aims to equip students with a strong foundation in dynamics for practical application in mechanical system design and analysis.

MMT3112 : Marine Technology Laboratory
Credit : 2 (0+2)
Prerequisite : None
This subject introduces students to the principles and practices of computer-aided manufacturing (CAM). CAM involves the use of computer software to control the manufacturing process, including the design, planning, and execution of production. Students will learn how CAM systems integrate with computer-aided design (CAD) software to automate the manufacturing process of products, including parts, assemblies, and finished products. Carried out a group project assembling a solar panel.

MMT3123 : Strength of Materials
Credit : 3 (2+1)
Prerequisite : None
The course discusses the strength of materials, which is a fundamental branch of engineering mechanics that focuses on the behavior of solid objects subject to various forces and moments. This field is essential for the design and analysis of structures and mechanical components, ensuring they can withstand applied loads without failure.

MMT3133 : Marine Engineering Systems
Credit : 3 (2+1)
Prerequisite : None
This subject introduces students to basic marine engineering terminology, control systems, and the operating principles of main and auxiliary ship machinery. It includes marine boilers, freshwater generators, air compressors, and pumping systems. Emphasis is placed on understanding the functions and efficiency of real marine equipment. The course is designed to equip students with essential theoretical knowledge and practical skills needed for careers in the shipping and marine engineering industries.

MMT3144 : Marine Electronics and Instrumentation
Credit : 4 (2+2)
Prerequisite : None
The objective of this subject is to expose the knowledge of electronics and instrumentation in marine application to the students. The contents of this subject are basic electrical and electronics; symbols in electrical and electronic circuits; electronic instrumentation on board ships; principles of operations of RADAR, echo-sounder, RDF, GPS, gyro-compass; specifications and selection of electronic equipment; boat electrical specification; laboratory. The rational of this subject is the students must have knowledge of electrical and electronic for the operations of marine instrumentation and systems, to become an expert mariner.

MMT3154 : Naval Architecture and Ship Construction
Credit : 4 (3+1)
Prerequisite : None
This subject will introduce students to several basic terms of naval architecture and several types of ships such as merchant ships, military ships and special ship design etc. This subject is also introduced to calculate ship's form coefficient and apply the Simpson rule to find the ship properties such as hydrostatic particulars, sectional area curve and bonjean curve, which is related ship's stability. It allows students to perform calculations to estimate ship stability in all conditions, particularly the longitudinal and transverse stability caused by loading, discharging, and transferring cargo on board ships. The need to comply with the role of ship's classification (e.g. American Bureau of Shipping - ABS etc.) and maritime regulations (i.e., International Maritime Organization - IMO) on safety at sea especially related to ship design is explained. Features of modern building materials include material strength, limitations and factors affecting the construction materials as appropriate. This subject also includes assignments and projects individually.

MMT3763 : Principle of Maritime Management
Credit : 3 (3+0)
Prerequisite : None
This course introduces students to the elements of basic management in maritime sectors. Topics include the theories, principles, analytical techniques, processes and functions of management. Emphasis will also be given on basic management with the example within maritime context.

MMT4163 : Marine Technology and Environment
Credit : 3 (2+1)
Prerequisite : None
This course introduces students to current developments and issues in coastal and marine environments involving the application of technologies related to erosion, pollution, and resource exploration. Students will explore bottom sampling, seabed mapping using acoustic techniques, and resource surveys. The course also covers chemical and biological methods for rehabilitating marine resources and monitoring water quality. It equips students with the knowledge to evaluate marine environmental impacts, including resource exploitation, alternative energy, and pollution caused by shipping and sound activities.

MMT4173 : Marine Automation and Control
Credit : 3 (2+1)
Prerequisite : None
The objective of this subject is to expose the knowledge of automation and control systems in marine application to the students. The contents of this subject are: control system terminology; subsystems and processes; input-output; open-loop; close loop systems; manipulation of block diagram; computer-controlled systems; modeling in frequency and time domain; time responses; stability analysis; digital control system; sensors and transducers; Laplace transform; transfer function; sensors for automation; control software packages; case studies and computer simulation. The rationale of this subject is the students must have knowledge of automation and control for the operations of marine systems, to become an expert mariner.

MMT4183 : Advanced Ship Architecture
Credit : 3 (2+1)
Prerequisite : None
This course introduces students to have continuous understanding on longitudinal stability of ship (trim) in various ship's conditions involving loading, discharging and shifting of cargo on board, with reference to transverse static stability. Furthermore, it also takes a fundamental approach to several components of ship resistance, namely frictional, wave, and other resistance components; dimensional analysis; bulbous bow and hull form effects; shallow water effects; additional resistance; ship model testing and resistance data presentation, including theoretical methods for predicting resistance at the concept design stage and the application of computational fluid dynamics (CFD) approaches. In addition, this module also discusses propulsion components and efficiency; screw propeller geometry; propeller theory; dimensional analysis; hull–propeller interaction; propeller model testing; cavitation; propeller design; as well as other propulsion systems and applications.

MMT4193 : Maritime Engineering Design
Credit : 3 (2+1)
Prerequisite : None
This subject focuses on the factors that affect design and operations in maritime engineering design. The scope of the subject shall be focusing on design philosophy,design process, requirement and analysis. Students are required to select a topic, prepare a proposal, analysis, write reports and make presentations. The design processes in this subject shall be within the scope of coastal and offshore structures (ship, offshore structure, marine infrastructure, marine components and systems).

MMT4213 : Diesel Engines
Credit : 3 (2+1)
Prerequisite : None
This course covers basic components, function, operation and systems of diesel engine such as mechanical structure, cooling, lubricating, fuel, trouble shooting and maintenance. The student will be able to describe the history of diesel engines and diesel systems and their evolution; demonstrate knowledge of the basic principles of diesel systems and engines and how they function; and utilize precision instruments to diagnose and repair basic systems and engines.

MMT4223 : Research Method in Technology
Credit : 3 (2+1)
Prerequisite : None
Students select a research topic, prepare a research proposal, a summary about sources of error in surveys. Survey design, research questions and hypotheses, sampling, data collection, data analysis, data management, quantitative methods, qualitative procedures, basic research statistics, software for statistics.

MMT4233 : Power Plant and Ship Machinery
Credit : 3 (2+1)
Prerequisite : None
This subject is designed to fulfill the knowledge requirements related to ship machinery and operations. It covers ship bunkering, sewage treatment plants, marine pumps, and marine valves.

MMT4244 : Ship Repair and Maintenance Systems
Credit : 3 (2+1)
Prerequisite : None
This course discusses the basics of the maintenance and repair process of a ship involving the types of work in the shipyard. The syllabus of this course discusses the introduction to the activities in the maintenance and repair process of a ship including work planning, docking type, price estimate, type of repair work, safety aspects, job inspection and the requirements of classification society.

MMT4253 : Marine Corrosion
Credit : 3 (2+1)
Prerequisite : None
This course provides an introduction to the theory and practices in marine corrosion, covering the natural processes of corrosion formation and the environmental factors affecting it. Students will learn basic methods for preventing marine corrosion and will be exposed to current techniques for corrosion control and prevention.

MMT4263 : Offshore Structure
Credit : 3 (3+0)
Prerequisite : None
This course provides an introduction to engineering offshore structures associated with oil and gas industry , environmental load , load effects of the environment on offshore structures , analysis and design of offshore facilities, analysis and design of topside modules , Load - out , installation, hook-up, and the operation, inspection, maintenance , and repair , assessment of existing structures , installation and inspection of pipelines , offshore structures and other relevant piping structure.

MMT4273 : Marine Hydrodynamics
Credit : 3 (2+1)
Prerequisite : None
This course introduces students to the fundamentals of dynamics in mechanical engineering. It covers topics such as straight-line motion, curved-line motion, conservation of work and energy, velocity and acceleration in horizontal motion, general motion relative to rotating frames, and mass moment of inertia. The aim is to provide students with valuable engineering knowledge for practical technological applications.

MMT4283 : Marine Cooling and Refrigeration Systems
Credit : 3 (2+1)
Prerequisite : None
Each vessel has a cooling system forthe confort of crew, passengers and for cooling certain cargoes. The air conditioning system, and cooling is needed and requires expert knowledge in handling the air conditioning systems, including knowledge of the main components of the cooling system as well as methods of operation and maintenance.

MMT4293 : Ship Structure
Credit : 3 (3+0)
Prerequisite : None
This course requires basic engineering mechanics and an extension of material strength. It covers the introduction to ship structural, ship loading, hull girder moment, hull girder bending stress and deflection, hull girder shear stress, stress analysis and struts and columns. This course emphasis on the student ability to identify and solve the structural design problem by carrying the necessary calculation and analysis.

MMT4313 : Offshore Mooring and Riser
Credit : 3 (3+0)
Prerequisite : None
This course provides an introduction to the offshore structural engineering related to mooring and riser system. Loading mechanism, mooring and riser system design, components, standards used, top tension risers, SCR, involved analysis of the mooring and riser system, and method of installation. Structure evaluation methods are also among the topics to be included in the subject.

MMT4323 : Offshore Pipeline
Credit : 3 (3+0)
Prerequisite : None
This course introduces piping systems and engineering covering principles of underwater offshore piping, piping types, methods of protecting pipes, different aspects to students. It also covers the processes of constructing and installation of pipes and piping system, the design concepts, selection of suitable materials, pipe inspection.

MMT4333 : Maritime and Coastal Engineering
Credit : 3 (3+0)
Prerequisite : None
This course is an introduction to the maritime field that focuses on coastal engineering. In this course, students will be exposed to the introduction of coastal engineering in general, wave events and related theories, water level rise and tides, coastal erosion prevention structure, introduction to estuary and sediment movement on the coastal area. With the knowledge in this course students will be able to help to solve the problems of the coastal environment and how it gives importance to the environment.

MMT4343 : Design of Floating Structures
Credit : 3 (3+0)
Prerequisite : None
This subject gives students an introduction to the engineering of offshore floating structures that may be used for marine operations. This subject would be to expose students to design concepts for floating structures such as semi-submersible, TLP, FPSO and SPAR. It also would add to student knowledge in the process of construction and installation of floating offshore structures. This subject also gives an overview of the system and concept design to stability and structure hull. Lessons on stabilization and the system are also included in this subject other than design.

MMT4353 : Computer Aided Marine Design
Credit : 3 (1+2)
Prerequisite : None
This course introduces students to industry-standard software for generating complex 3D hull form modeling for various marine structures. It covers stability analysis, motion and resistance prediction, structural modeling, structural analysis, and export for vessel detailing. Designed for degree programs in Applied Science, Technology, and Engineering Technology, this course equips students with a versatile tool for marine design. Students will learn to optimize vessel performance, safety, and regulatory compliance, making it particularly valuable for those in naval architecture programs.

MMT4363 : Marine Computer Aided Modelling
Credit : 3 (1+2)
Prerequisite : None
This course introduces students to the fundamental principles and applications of Computer-Aided Ship Design (CASD) with a focus on 3D modeling and Finite Element Analysis (FEA). Students will learn to design and analyze complex mechanical components using industry-standard software tools. The course covers essential topics such as parametric and non-parametric modeling, part and assembly design, and the theoretical and practical aspects of FEA, including meshing, boundary conditions, and load simulations. Through project-based learning, students will apply these techniques to real-world engineering problems, optimizing designs for performance, durability, and safety. The course aims to equip future engineers with the knowledge and hands-on experience necessary for modern engineering design and analysis, fostering innovation and problem-solving skills in a computer-aided engineering environment.

MMT4373 : Computer Fluid Dynamic
Credit : 3 (1+2)
Prerequisite : None
The course is designed for Students with no or little CFD (Computational Fluid Dynamics) knowledge who want to learn CFD application to solve engineering problems. The course will provide a general perspective to the CFD and its application to fluid flow and heat transfer and it will teach the use of some of the popular CFD packages and provides Students will learn basics of CFD and will use that basic knowledge of CFD software such as meshing, boundaries, intial condition, numerical physic, turbulent etc. However, it should be emphasized that software learning is not the objective of this class, and it only will be used as a tool to teach students the concepts in a practical framework. Most CFD packages have a variety of modules to deal with a specific type of flow. Students will be introduced to different modules and their specific applications. They will then be able to utilize the CFD package to simulate any particular problem.

MMT4982 : Final Year Project I
Credit : 2 (0+2)
Prerequisite : None
The Final Year Project I is designed to train students to conduct scientific research, write reports and make scientific presentations. Final-year students are required to perform a research project under the guidance of one or more supervisors/lecturers in Maritime Technology and related studies. Students are required to submit a title, prepare a research proposal and prepare a research pre-thesis to be evaluated each semester when this subject is registered. Students must also present a research proposal in the final year project 1 seminar.

MMT4994 : Final Year Project II
Credit : 4 (0+4)
Prerequisite : MMT4982
Final Year Project II (PITA II) is a continuation of PITA I. Students are required to carry out the research proposed in their research proposal, analyze the data, and complete the thesis, which will be evaluated by the supervisor for each registered semester subject. In addition, students must present their work in a Final Year Project Seminar and submit the final thesis, technical report, and logbook to the PITA coordinator.

MMT49712 : Industrial Training
Credit : 12 (0+12)
Prerequisite : None
Students will be placed in government or private organisations related to the environment for a period of 24 weeks. Students will carry out current duties appropriate to the Maritime Technology program under the supervision of both industrial and university supervisors. This course incorporates elements of peeragogy (collaborative teaching and learning) between students and supervisors in the industry, as well as unconventional learning and teaching elements (situation learning and inquiries) in completing the miniprojects entrusted. Combining elements of cognitive, communication, interpersonal, ethics and professionalism, and leadership, autonomy and responsibility skills, these will be translated through final reports, presentations and feedback from both industrial and UMT supervisors.

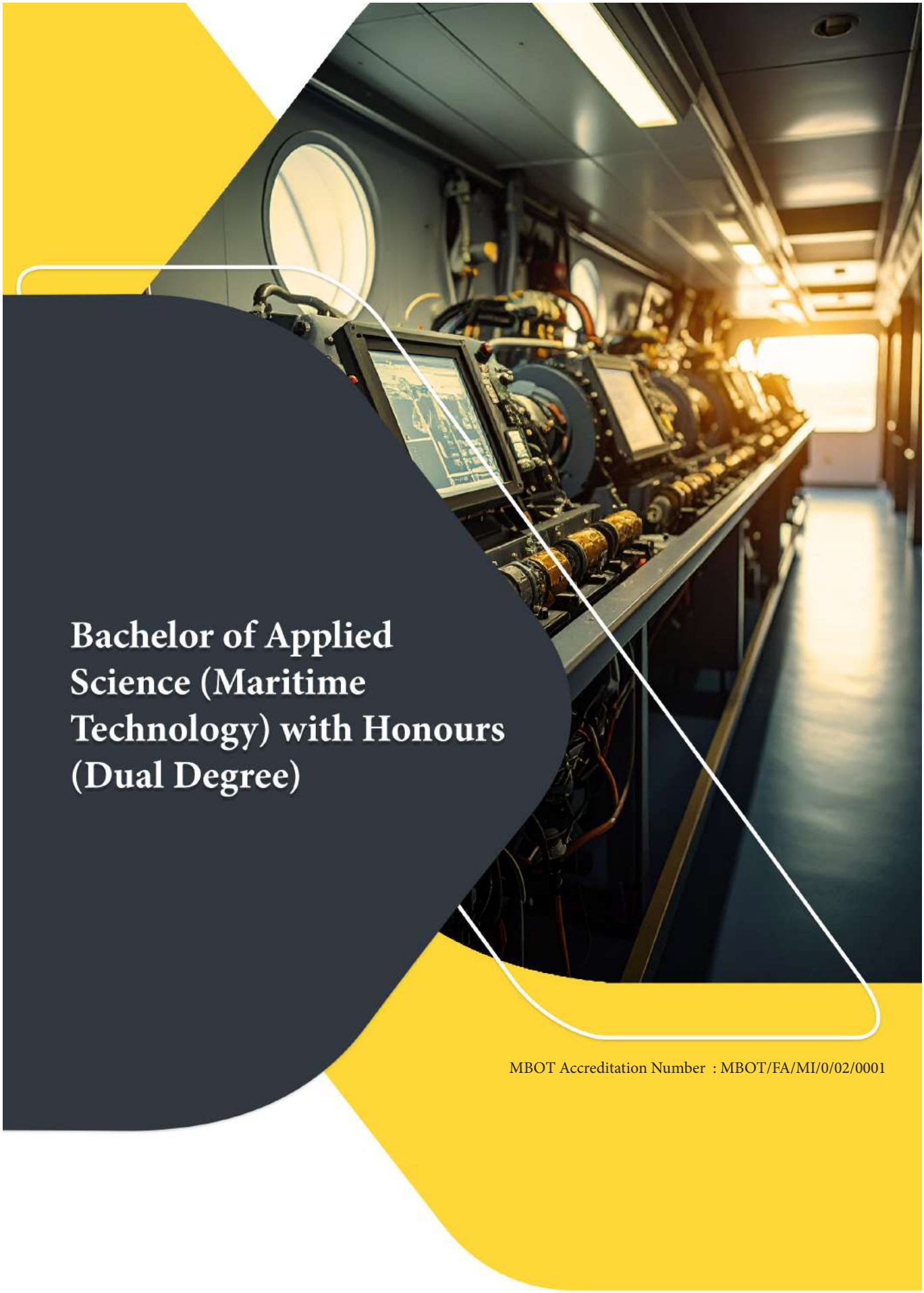
EDI3303 : Fundamental Physics
Credit : 3 (3+0)
Prerequisite : None
This course is offered to non-physics major students. This course focuses on understanding common physics principles and its application in daily life. The course's lecture covers the topics on kinematics and dynamics, work and energy, fluids and thermodynamics. Students will be exposed to problems solving by using mathematics skill.

EDI3313 : Engineering Mathematics I
Credit : 3 (3+0)
Prerequisite : None
This course discusses matrix and emphasizes the important concepts in mathematical engineering including limit,differentiation, integration,differential equation and vector system.

EDI3323 : Engineering Mathematics II
Credit : 3 (3+0)
Prerequisite : None
This course introduces some methods of mathematical analysis and applications to solve problems in technology. Topics involved are the determinant matrix and eigenvalues, the solution of first and second degree of ordinary differential equations, Laplace Transforms, Fourier Series and Fourier Transforms, partial differential equations and numerical methods for solving common first-order ordinary differential equations.

EDI3333 : Basic Programming for Technologists
Credit : 3 (2+1)
Prerequisite : None

This course contains basic programming and programming language, problem solving techniques, flow diagrams and structured algorithms, program coding techniques and instructions to solve formal problems. Hands-on programming exercises will be given to strengthen students' programming language.



Bachelor of Applied Science (Maritime Technology) with Honours (Dual Degree)

MBOT Accreditation Number : MBOT/FA/MI/0/02/0001

Bachelor of Applied Science (Maritime Technology) with Honours (Dual Degree)

Introduction

Universiti Malaysia Terengganu (UMT) and Institut Teknologi Sepuluh Nopember (ITS), Indonesia, have established a collaborative program (Dual Degree) focusing on marine technology and engineering. The Dual Degree Program – Bachelor of Applied Science (Maritime Technology) with Honours and Bachelor of Marine Engineering is offered by the Faculty of Ocean Engineering Technology, Universiti Malaysia Terengganu, in collaboration with the Faculty of Marine Technology, Institut Teknologi Sepuluh Nopember, Surabaya, Indonesia, starting from the 2024/2025 academic session.

This dual degree program enables students to obtain two (2) academic scrolls within four (4) years or eight (8) semesters of study. The program requires a minimum of 137 credit hours for graduation. UMT students will undertake three years of study at UMT and one year at ITS, while ITS students will undertake three years at ITS and one year at UMT.

The field of Maritime Technology focuses on the study of technology, operations, processes, and systems used in the maritime industry. This program is specifically designed to produce graduates who will advance knowledge and contribute expertise to serve and lead shipping companies, shipyards, shipbuilding industries, as well as government agencies related to the maritime sector, both locally and internationally.

Programme Educational Objectives (PEO)

Graduates who undertake this program will be able to achieve the following objectives:

PEO1: Graduates who are knowledgeable and capable of applying scientific, numerical, and leadership skills to propose sound ideas and strategically build careers in the field of Maritime Technology at both local and global levels.

PEO2: Graduates who lead in technical and digital competencies and embrace lifelong learning within the maritime domain.

PEO3: Graduates who are competitive, entrepreneurial, and able to identify business opportunities while contributing their expertise to the maritime sector and related fields across academia, industry, professional bodies, and society.

PEO4: Graduates who are well-prepared, able to communicate effectively and competently, and consistently perform both individually and in teams as professionals in Maritime Technology.

Programme Learning Outcomes (PLO)

At the end of this programme, students will be able to:

PLO1: Acquire and apply foundational knowledge in science, mathematics, and management sciences within the field of maritime technology.

PLO2: Adapt and integrate old and new technologies to create new possibilities for solving problems and advancing the maritime industry.

PLO3: Apply and manipulate knowledge in science and technology to solve problems in design, construction, repair of marine structures, and marine operations while minimizing environmental impacts.

PLO4: Possess contemporary knowledge of current issues in maritime technology.

PLO5: Convey ideas clearly and effectively, understanding concepts to solve both technical and non-technical problems.

PLO6: Adapt and demonstrate digital skills, including the use of software applications relevant to maritime technology.

PLO7: Solve numerical problems within the field of maritime technology.

PLO8: Function effectively both individually and in teams as a leader and manager.

PLO9: Recognize the importance of continuous lifelong learning for personal development and advancement of the maritime industry.

PLO10: Identify business opportunities and consulting services in the current market.

PLO11: Demonstrates professionalism, morality, and ethics in accordance with professional codes of conduct, and understands the impact of science in economic, environmental, and sociocultural contexts.

Career Prospects

This program is highly relevant and timely, given the rapid development within the maritime industry. Career opportunities for graduates span both government and private sectors, particularly those directly or indirectly involved in maritime activities. Graduates can serve as marine technologists, naval architects, technologists, marine surveyors, port officers, project planners, technical/sales executives, QA/QC officers, application technology engineers, lecturers at universities, polytechnics, matriculation centers, private colleges or as teachers, research officers/scientific officers (Research Institutes), and many others.

Programme Graduation Requirements

1. Students must register for and pass all compulsory courses in the programme or their equivalent replacement courses and fulfill the minimum credit hours required for graduation. Students must also achieve a minimum Cumulative Grade Point Average (CGPA) of 2.00.

2. Students are required to complete the Survival and Water Safety Program (SKA) and the Artificial Intelligence for Beginners course (MCBS10017) as graduation requirements.

3. The total credit hours for elective courses that students must complete are subject to the credit hour requirements set by the respective academic program for graduation eligibility and not based on the number of elective courses taken.

4. The list of elective courses available to students in the academic program refers to the course offerings stated in the program handbook of the faculty and other faculties.

5. Students must achieve the minimum grade requirement for English language proficiency as specified below:

Stream	Minimum English Proficiency Requirement
Science, Technology, Engineering, and Mathematics (STEM)	EOP Grade B or MUET Band 4.0

* If, at the time of admission, a student has already attained the minimum MUET Band required for graduation, the student shall be considered to have fulfilled the graduation requirement for MUET proficiency.

Total Credit for Graduation

The minimum number of credits to graduate is 137 credit hours. The distribution of credit hours by course category is as follows:

Categories	Credits	Percentages
University Core	18	13
Programme Core	81	59
University Elective	38	28
Total	**137**	**100**

University Core (18 Credit Hours)

Course Code	Course Name	Credit Hours	Prerequisite
BBB3013	Academic Writing Skills	3 (3+0)	None
BBB3023	Public Speaking	3 (3+0)	None
BBB3033	English for Occupational Purposes	3 (3+0)	None
MPU3132	Appreciation of Ethics and Civilizations	2 (2+0)	None
MPU3143	Communicative Malay Language	3 (3+0)	None
MPU3352	Integrity and Anti-Corruption	2 (2+0)	None
CCXXXXX	Co-Curriculum	2 (0+2)	None

Programme Core (81 Credit Hours)

Course Code	Course Name	Credit Hours
EDI3303	Fundamental Physics	3 (3+0)
EDI3313	Engineering Mathematics I	3 (3+0)
EDI3323	Engineering Mathematics II	3 (3+0)
EDI3333	Basic Programming for Technologists	3 (2+1)
MMT3013	Engineering Mechanics	3 (2+1)
MMT3023	Fluid Mechanics	3 (2+1)
MMT3033	Design and Graphics	3 (0+3)
MMT3043	Materials Engineering	3 (2+1)
MMT3053	Thermodynamics	3 (2+1)
MMT3063	Marine Fluid Power	3 (2+1)
MMT3073	Shipping and Port Technology	3 (3+0)
MMT3082	Machining and Welding Workshop	2 (0+2)
MMT3093	Dynamic Mechanics	3 (3+0)
MMT3112	Marine Technology Laboratory	2 (0+2)
MMT3123	Strength of Materials	3 (2+1)
MMT3133	Marine Engineering Systems	3 (2+1)
MMT3144	Marine Electronics and Instrumentation	4 (2+2)
MMT3154	Naval Architecture and Ship Construction	4 (3+1)
MMT4163	Marine Technology and Environmental	3 (3+0)
MMT4333	Maritime and Coastal Engineering	3 (2+1)
MMT49712	Industrial Training	12 (0+12)
MMM3763	Principles of Maritime Management	3 (3+0)
MO234801-M	Undergraduate Thesis	6 (0+6)

University Elective (38 Credit Hours)

Students are required to register for and pass any elective courses totaling 38 credit hours as listed throughout the duration of the program, subject to the approval and consent of the Head of Programme.

Elective courses at Universiti Malaysia Terengganu

Course Code	Course Name	Credit Hours
MMT4173	Marine Automation and Control	3 (2+1)
MMT4183	Advanced Ship Architecture	3 (2+1)
MMT4193	Maritime Engineering Design	3 (2+1)
MMT4213	Diesel Engines	3 (2+1)
MMT4223	Research Method in Technology	3 (3+0)
MMT4233	Ship Power Plant and Machinery	3 (2+1)
MMT4244	Ship Maintenance and Repair Systems	4 (3+1)
MMT4253	Marine Corrosion	3 (2+1)
MMT4263	Offshore Structures	3 (3+0)
MMT4273	Marine Hydrodynamics	3 (3+0)
MMT4283	Marine Cooling and Refrigeration Systems	3 (2+1)
MMT4293	Ship Structures	3 (3+0)
MMT4313	Offshore Mooring and Riser Systems	3 (3+0)
MMT4323	Offshore Pipeline Systems	3 (3+0)
MMT4343	Design of Floating Structures	3 (3+0)
MMT4353	Computer Aided Marine Design	3 (1+2)
MMT4363	Marine Computer Aided Modelling	3 (1+2)
MMT4373	Computer Fluid Dynamic	3 (1+2)

Elective courses at Institut Teknologi Sepuluh Nopember (ITS)

Course Code	Course Name	Credit Hours
MO234403-M	Oil, Gas and Marine Resource Technology	3
MO234406-M	Risk Analysis & Reliability	3
MO234502-M	Production Technology and Ocean Structure Maintenance	3
MO234503-M	Integrated Coastal Zone and Small Islands Management	3
MO234504-M	Ocean Energy Conversion System	3
MO234506-M	Ocean Pipeline Design	3
MO234601-M	Research Methodology	3
MO234602-M	Marine Operations and HSE System	3
MO234604-M	Operations Research and Optimization	3

Course Scheme
Bachelor of Applied Science (Maritime Technology) with Honours
Dual Degree Program

Code	Course Name	Credit Hours	Pre-requisite	Code	Course Name	Credit Hours	Pre-requisite
Semester 1				**Semester 2**			
EDI3303	Fundamental Physics	3(3+0)	-	BBB3023	Public Speaking	3(3+0)	-
EDI3313	Engineering Mathematics I	3(3+0)	-	EDI3323	Engineering Mathematics II	3(3+0)	-
MMT3033	Design and Graphics	3(0+3)	-	MMT3023	Fluid Mechanics	3(2+1)	-
MMT3013	Engineering Mechanics	3(3+0)	-	MPU3132	Appreciation of Ethics and Civilizations	2(2+0)	-
MPU3352	Integrity and Anti-Corruption	2(2+0)	-	BBB3013	Academic Writing Skills	3(3+0)	-
MPU3143	Communicative Malay Language	3(3+0)	-	CCXXXXX	Co-Curriculum	2(0+2)	-
MPU3352	Integrity and Anti-Corruption	2(2+0)					-
Total Credit		**17**		**Total Credit**		**16**	
Semester 3				**Semester 4**			
MMT3043	Materials Engineering	3(2+1)	-	EDI3333	Basic Programming for Technologist	3(2+1)	-
MMT3063	Marine Fluid Power	3(2+1)	-	MMT3053	Thermodynamics	3(2+1)	-
MMT3073	Shipping and Port Technology	3(3+0)	-	MMT3112	Marine Technology Laboratory	2(0+2)	-
MMT3082	Machining and Welding Workshop	2(0+2)	-	MMT3123	Strength of Materials	3(2+1)	-
MMT3093	Mechanics Dynamics	3(3+0)	-	MMT4163	Marine Technology and Environmental	3(3+0)	-
MMM3763	Principle of Maritime Management	3(3+0)	-		Elective 2	3	-
	Elective 1	3	-		Elective 2	3	
Total Credit		**20**		**Total Credit**		**20**	
Semester 5				**Semester 6**			
MMT3133	Marine Engineering System	3(2+1)	-	MMT49712	Industrial Training	12(0+12)	-
MMT3144	Marine Electronics and Instrumentation	4(2+2)	-				
MMT3154	Naval Architecture and Ship Construction	4(3+1)	-				
MMT4333	Maritime and Coastal Engineering	3(2+1)	-				
BBB3033	English for Occupational Purposes	3(3+0)	-				
	Elective 3	4	-				
Total Credit		**20**		**Total Credit**		**12**	
Semester 7				**Semester 8**			
MO234403-M	Oil, Gas and Marine Resource Technology	3	-	MO234504-M	Ocean Energy Conservation System	3	-
MO234406-M	Risk Analysis & Reliability	2	-	MO234602-M	Marine Operations and HSE System	3	-
MO234502-M	Production Technology and Ocean Structure Maintenance	3	-	MO234604-M	Operations Research and Optimization	3	-
MO234503-M	Integrated Coastal Zone and Small Islands Management	3	-	MO234801-M	Undergraduate Thesis	6	-
MO234506-M	Ocean Pipeline Design	3	-				
MO234601-M	Research Methodology	3	-				
Total Credit		**17**		**Total Credit**		**15**	
Total Credit to Graduate : 137							

Notes:

1. Students are required to undertake the Survival and Water Safety Program and Artificial Intelligence for Beginner (MCBS10017) as a condition to graduate.
2. The number of elective course credit hours that must be taken by students in the program of study is subject to the number of elective credit hours set by the program of study to meet graduate qualifications and is not subject to the number of elective courses taken.
3. Subject MO234801-M Undergraduate Thesis is equivalent to MMT4982 Final Year Project I (2 Credit) and MMT4994 Final Year Project II (4 Credit).
4. The list of elective courses that can be taken by students in the program of study refers to the course offerings listed in the handbook of the study program of the faculty and other faculties.

*Courses offered in Sem 7 and Sem 8 will be taken by UMT Students (Outbound) at ITS as Elective Courses. These courses have been registered in UMT Course Bank using Mobility Course Code and approved by the Senate.

(Reference: UMT Senate Approval-199th Meeting, Year 2025)

Course Synopsis
Bachelor of Applied Science (Maritime Technology) with Honours
(Dual Degree)

MMT3013 : Engineering Mechanics
Credit : 3 (3+0)
Prerequisite : None
This course introduces the fundamental principles of mechanical equilibrium, focusing on the analysis of forces and their effects on stationary bodies. Students will explore the concepts of force, torque, and equilibrium, with an emphasis on static systems in engineering applications. The course will cover essential methods for solving problems in both particle and rigid body mechanics, incorporating tools such as free body diagrams, centroid calculations, distributed load analysis, and the moment of inertia.

MMT3023 : Fluid Mechanics
Credit : 3 (2+1)
Prerequisite : None
This course aims to provide students with fundamental knowledge of fluid mechanics in static and dynamic conditions, which is essential in marine and mechanical engineering. Topics include pressure, buoyancy, fluid flow, energy loss, and Bernoulli's principle. Laboratory sessions are included to reinforce theoretical understanding and develop hands-on skills in experimentation and data analysis. Students will gain a strong technical foundation to apply in designing fluid-related systems and be well-prepared for advanced engineering courses and future professional careers.

MMT3033 : Design and Graphic
Credit : 3 (0+3)
Prerequisite : None
This course is designed to equip students with fundamental knowledge and practical skills in engineering drawing, which is essential for effective communication in the engineering field. The course emphasizes the importance of technical drawing in supporting the design and construction processes within various engineering industries. Topics covered include basic engineering drawing, orthographic and isometric drawings, 3D modelling and surface development using Computer-Aided Design (CAD) software. Through this course, students will develop the ability to interpret and produce accurate engineering drawings, enabling them to contribute effectively to design projects.

MMT3043 : Materials Engineering
Credit : 3 (2+1)
Prerequisite : None
This course provides students with foundational knowledge on the relationship between material structure and properties, essential for understanding material behavior in engineering applications. It covers atomic structure, bonding, crystalline and molecular imperfections, and their relation to mechanical and engineering properties. Additional topics include material failure modes, phase diagrams, compositions, applications, and fabrication of materials such as metals, polymers, composites, and ceramics. This course equips students with a strong technical base for effectively analyzing and selecting materials in engineering contexts.

MMT3053 : Thermodynamics
Credit : 3 (2+1)
Prerequisite : None
The study of energy, its transformations, and interactions within systems. This course introduces the core principles of thermodynamics, exploring fundamental concepts, various forms of energy, energy transfer mechanisms, and pure substances' properties. The energy conservation principle applies to both closed and open systems. The Second Law of Thermodynamics is introduced, with a focus on its applications to thermodynamic cycles, cyclic devices, and processes. Experiments with Marcet boilers, air conditioning, and heat exchangers are included in the laboratory sessions.

MMT3063 : Marine Fluid Power
Credit : 3 (2+1)
Prerequisite : None
This course discusses fundamentals of fluid power with emphasis on marine/naval equipment. It covers hydraulic power transmission in marine machinery. This includes the introduction to fluid power, positive displacement pumps, directional, flow and pressure control valves, linear and rotary actuators, hydraulic oil,marine applications, hydraulic system design, servo and proportional control system, air breather and water removal equipment, pneumatic system, inspection and maintenance of marine fluid power system.

MMT3073 : Shipping and Port Technology
Credit : 3 (3+0)
Prerequisite : None
This course explores the environmental factors influencing technology choices in the maritime industry. It covers specialization in cargo forms, containment, handling methods, transport modes, and efficient intermodal interfaces. Students will examine the selection of ship and port technologies, as well as contemporary issues in technology development.

MMT3082 : Machining Workshop and Welding
Credit : 2 (0+2)
Prerequisite : None
The course introduces basic knowledge in handling machinery and equipment in metal cutting, using lathe and milling, welding and practicing basic principles of safety at work and in workshops. Laboratory work covers sheet metal fabrication, cutting, bending, welding, basic machining, measuring techniques using proper tools and using hand power tools. Understanding specifications, scale, engineering design. Workshop safety and writing technical reports.

MMT3093 : Mechanic Dynamics
Credit : 3 (3+0)
Prerequisite : None
This course introduces the fundamental concepts of dynamics in mechanical engineering. It covers linear and curved motion, conservation of work and energy, velocity and acceleration in horizontal systems, motion relative to rotating frames, and mass moment of inertia. Emphasis is placed on conceptual understanding and analytical problem-solving. The course aims to equip students with a strong foundation in dynamics for practical application in mechanical system design and analysis.

MMT3112 : Marine Technology Laboratory
Credit : 2 (0+2)
Prerequisite : None
This subject introduces students to the principles and practices of computer-aided manufacturing (CAM). CAM involves the use of computer software to control the manufacturing process, including the design, planning, and execution of production. Students will learn how CAM systems integrate with computer-aided design (CAD) software to automate the manufacturing process of products, including parts, assemblies, and finished products. Carried out a group project assembling a solar panel.

MMT3123 : Strength of Materials
Credit : 3 (2+1)
Prerequisite : None
The course discusses the strength of materials, which is a fundamental branch of engineering mechanics that focuses on the behavior of solid objects subject to various forces and moments. This field is essential for the design and analysis of structures and mechanical components, ensuring they can withstand applied loads without failure.

MMT3133 : Marine Engineering System
Credit : 3 (2+1)
Prerequisite : None
This subject introduces students to basic marine engineering terminology, control systems, and the operating principles of main and auxiliary ship machinery. It includes marine boilers, freshwater generators, air compressors, and pumping systems. Emphasis is placed on understanding the functions and efficiency of real marine equipment. The course is designed to equip students with essential theoretical knowledge and practical skills needed for careers in the shipping and marine engineering industries.

MMT3144 : Marine Electronics and Instrumentation
Credit : 4 (2+2)
Prerequisite : None
The objective of this subject is to expose the knowledge of electronics and instrumentation in marine application to the students. The contents of this subject are basic electrical and electronics; symbols in electrical and electronic circuits; electronic instrumentation on board ships; principles of operations of RADAR, echo-sounder, RDF, GPS, gyro-compass; specifications and selection of electronic equipment; boat electrical specification; laboratory. The rational of this subject is the students must have knowledge of electrical and electronic for the operations of marine instrumentation and systems, to become an expert mariner.

MMT3154 : Naval Architecture and Ship Construction
Credit : 4 (3+1)
Prerequisite : None
This subject will introduce students to several basic terms of naval architecture and several types of ships such as merchant ships, military ships and special ship design etc. This subject is also introduced to calculate ship's form coefficient and apply the Simpson rule to find the ship properties such as hydrostatic particulars, sectional area curve and bonjean curve, which is related ship's stability. It allows students to perform calculations to estimate ship stability in all conditions, particularly the longitudinal and transverse stability caused by loading, discharging, and transferring cargo on board ships. The need to comply with the role of ship's classification (e.g. American Bureau of Shipping - ABS etc.) and maritime regulations (i.e., International Maritime Organization - IMO) on safety at sea especially related to ship design is explained. Features of modern building materials include material strength, limitations and factors affecting the construction materials as appropriate. This subject also includes assignments and projects individually.

MMT3763 : Principle of Maritime Management
Credit : 3 (3+0)
Prerequisite : None
This course introduces students to the elements of basic management in maritime sectors. Topics include the theories, principles, analytical techniques, processes and functions of management. Emphasis will also be given on basic management with the example within maritime context.

MMT4163 : Marine Technology and Environmental
Credit : 3 (3+0)
Prerequisite : None
This course introduces students to current developments and issues in coastal and marine environments involving the application of technologies related to erosion, pollution, and resource exploration. Students will explore bottom sampling, seabed mapping using acoustic techniques, and resource surveys. The course also covers chemical and biological methods for rehabilitating marine resources and monitoring water quality. It equips students with the knowledge to evaluate marine environmental impacts, including resource exploitation, alternative energy, and pollution caused by shipping and sound activities.

MMT4173 : Marine Automation and Control
Credit : 3 (2+1)
Prerequisite : None
The objective of this subject is to expose the knowledge of automation and control systems in marine application to the students. The contents of this subject are: control system terminology; subsystems and processes; input-output; open-loop; close loop systems; manipulation of block diagram; computer-controlled systems; modeling in frequency and time domain; time responses; stability analysis; digital control system; sensors and transducers; Laplace transform; transfer function; sensors for automation; control software packages; case studies and computer simulation. The rationale of this subject is the students must have knowledge of automation and control for the operations of marine systems, to become an expert mariner.

MMT4183 : Advanced Naval Architecture
Credit : 3 (2+1)
Prerequisite : None
This course introduces students to have continuous understanding on longitudinal stability of ship (trim) in various ship's conditions involving loading, discharging and shifting of cargo on board, with reference to transverse static stability. Furthermore, it also takes a fundamental approach to several components of ship resistance, namely frictional, wave, and other resistance components; dimensional analysis; bulbous bow and hull form effects; shallow water effects; additional resistance; ship model testing and resistance data presentation, including theoretical methods for predicting resistance at the concept design stage and the application of computational fluid dynamics (CFD) approaches. In addition, this module also discusses propulsion components and efficiency; screw propeller geometry; propeller theory; dimensional analysis; hull–propeller interaction; propeller model testing; cavitation; propeller design; as well as other propulsion systems and applications.

MMT4193 : Maritime Engineering Design
Credit : 3 (2+1)
Prerequisite : None
This subject focuses on the factors that affect design and operations in maritime engineering design. The scope of the subject shall be focusing on design philosophy,design process, requirement and analysis. Students are required to select a topic, prepare a proposal, analysis, write reports and make presentations. The design processes in this subject shall be within the scope of coastal and offshore structures (ship, offshore structure, marine infrastructure, marine components and systems).

MMT4213 : Diesel Engines
Credit : 3 (2+1)
Prerequisite : None
This course covers basic components, function, operation and systems of diesel engine such as mechanical structure, cooling, lubricating, fuel, trouble shooting and maintenance. The student will be able to describe the history of diesel engines and diesel systems and their evolution; demonstrate knowledge of the basic principles of diesel systems and engines and how they function; and utilize precision instruments to diagnose and repair basic systems and engines.

MMT4223 : Research Method in Technology
Credit : 3 (2+1)
Prerequisite : None
Students select a research topic, prepare a research proposal, a summary about sources of error in surveys. Survey design, research questions and hypotheses, sampling, data collection, data analysis, data management, quantitative methods, qualitative procedures, basic research statistics, software for statistics.

MMT4233 : Power Plant and Ship Machinery
Credit : 3 (2+1)
Prerequisite : None
This subject is designed to fulfill the knowledge requirements related to ship machinery and operations. It covers ship bunkering, sewage treatment plants, marine pumps, and marine valves.

MMT4244 : Ship Repair and Maintenance Systems
Credit : 4 (3+1)
Prerequisite : None
This course discusses the basics of the maintenance and repair process of a ship involving the types of work in the shipyard. The syllabus of this course discusses the introduction to the activities in the maintenance and repair process of a ship including work planning, docking type, price estimate, type of repair work, safety aspects, job inspection and the requirements of classification society.

MMT4253 : Marine Corrosion
Credit : 3 (2+1)
Prerequisite : None
This course provides an introduction to the theory and practices in marine corrosion, covering the natural processes of corrosion formation and the environmental factors affecting it. Students will learn basic methods for preventing marine corrosion and will be exposed to current techniques for corrosion control and prevention.

MMT4263 : Offshore Structure
Credit : 3 (3+0)
Prerequisite : None
This course provides an introduction to engineering offshore structures associated with oil and gas industry , environmental load , load effects of the environment on offshore structures , analysis and design of offshore facilities, analysis and design of topside modules , Load - out , installation, hook-up, and the operation, inspection, maintenance , and repair , assessment of existing structures , installation and inspection of pipelines , offshore structures and other relevant piping structure.

MMT4273 : Marine Hydrodynamics
Credit : 3 (2+1)
Prerequisite : None
This course introduces students to the fundamentals of dynamics in mechanical engineering. It covers topics such as straight-line motion, curved-line motion, conservation of work and energy, velocity and acceleration in horizontal motion, general motion relative to rotating frames, and mass moment of inertia. The aim is to provide students with valuable engineering knowledge for practical technological applications.

MMT4283 : Marine Conditioning and Refrigeration System
Credit : 3 (2+1)
Prerequisite : None
Each vessel has a cooling system forthe confort of crew, passengers and for cooling certain cargoes. The air conditioning system, and cooling is needed and requires expert knowledge in handling the air conditioning systems, including knowledge of the main components of the cooling system as well as methods of operation and maintenance.

MMT4293 : Ship Structure
Credit : 3 (3+0)
Prerequisite : None
This course requires basic engineering mechanics and an extension of material strength. It covers the introduction to ship structural, ship loading, hull girder moment, hull girder bending stress and deflection, hull girder shear stress, stress analysis and struts and columns. This course emphasis on the student ability to identify and solve the structural design problem by carrying the necessary calculation and analysis.

MMT4313 : Offshore Mooring and Riser
Credit : 3 (3+0)
Prerequisite : None
This course provides an introduction to the offshore structural engineering related to mooring and riser system. Loading mechanism, mooring and riser system design, components, standards used, top tension risers, SCR, involved analysis of the mooring and riser system, and method of installation. Structure evaluation methods are also among the topics to be included in the subject.

MMT4323 : Offshore Pipeline
Credit : 3 (3+0)
Prerequisite : None
This course introduces piping systems and engineering covering principles of underwater offshore piping, piping types, methods of protecting pipes, and different aspects to students. It also covers the processes of constructing and installation of pipes and piping system, the design concepts, selection of suitable materials, pipe inspection.

MMT4333 : Maritime and Coastal Engineering
Credit : 3 (2+1)
Prerequisite : None
This course is an introduction to the maritime field that focuses on coastal engineering. In this course, students will be exposed to the introduction of coastal engineering in general, wave events and related theories, water level rise and tides, coastal erosion prevention structure, introduction to estuary and sediment movement on the coastal area. With the knowledge in this course students will be able to help to solve the problems of the coastal environment and how it gives importance to the environment.

MMT4343 : Design of Floating Structures
Credit : 3 (3+0)
Prerequisite : None
This subject gives students an introduction to the engineering of offshore floating structures that may be used for marine operations. This subject would be to expose students to design concepts for floating structures such as semi-submersible, TLP, FPSO and SPAR. It also would add to student knowledge in the process of construction and installation of floating offshore structures. This subject also gives an overview of the system and concept design to stability and structure hull. Lessons on stabilization and the system are also included in this subject other than design.

MMT4353 : Computer Aided Marine Design
Credit : 3 (1+2)
Prerequisite : None
This course introduces students to industry-standard software for generating complex 3D hull form modeling for various marine structures. It covers stability analysis, motion and resistance prediction, structural modeling, structural analysis, and export for vessel detailing. Designed for degree programs in Applied Science, Technology, and Engineering Technology, this course equips students with a versatile tool for marine design. Students will learn to optimize vessel performance, safety, and regulatory compliance, making it particularly valuable for those in naval architecture programs.

MMT4363 : Marine Computer Aided Modelling
Credit : 3 (1+2)
Prerequisite : None
This course introduces students to the fundamental principles and applications of Computer-Aided Ship Design (CASD) with a focus on 3D modeling and Finite Element Analysis (FEA). Students will learn to design and analyze complex mechanical components using industry-standard software tools. The course covers essential topics such as parametric and non-parametric modeling, part and assembly design, and the theoretical and practical aspects of FEA, including meshing, boundary conditions, and load simulations. Through project-based learning, students will apply these techniques to real-world engineering problems, optimizing designs for performance, durability, and safety. The course aims to equip future engineers with the knowledge and hands-on experience necessary for modern engineering design and analysis, fostering innovation and problem-solving skills in a computer-aided engineering environment.

MMT4373 : Computer Fluid Dynamic
Credit : 3 (1+2)
Prerequisite : None
The course is designed for Students with no or little CFD (Computational Fluid Dynamics) knowledge who want to learn CFD application to solve engineering problems. The course will provide a general perspective to the CFD and its application to fluid flow and heat transfer and it will teach the use of some of the popular CFD packages and provides Students will learn basics of CFD and will use that basic knowledge of CFD software such as meshing, boundaries, intial condition, numerical physic, turbulent etc. However, it should be emphasized that software learning is not the objective of this class, and it only will be used as a tool to teach students the concepts in a practical framework. Most CFD packages have a variety of modules to deal with a specific type of flow. Students will be introduced to different modules and their specific applications. They will then be able to utilize the CFD package to simulate any particular problem.

MMT49712 : Industrial Training
Credit : 12 (0+12)
Prerequisite : None
Students will be placed in government or private organisations related to the environment for a period of 24 weeks. Students will carry out current duties appropriate to the Maritime Technology program under the supervision of both industrial and university supervisors. This course incorporates elements of peeragogy (collaborative teaching and learning) between students and supervisors in the industry, as well as unconventional learning and teaching elements (situation learning and inquiries) in completing the miniprojects entrusted. Combining elements of cognitive, communication, interpersonal, ethics and professionalism, and leadership, autonomy and responsibility skills, these will be translated through final reports, presentations and feedback from both industrial and UMT supervisors.

EDI3303 : Fundamental Physics
Credit : 3 (3+0)
Prerequisite : None
This course is offered to non-physics major students. This course focuses on understanding common physics principles and its application in daily life. The course's lecture covers the topics on kinematics and dynamics, work and energy, fluids and thermodynamics. Students will be exposed to problems solving by using mathematics skill.

EDI3313 : Engineering Mathematics I
Credit : 3 (3+0)
Prerequisite : None
This course discusses matrix and emphasizes the important concepts in mathematical engineering including limit,differentiation, integration,differential equation and vector system.

EDI3323 : Engineering Mathematics II
Credit : 3 (3+0)
Prerequisite : None
This course introduces some methods of mathematical analysis and applications to solve problems in technology. Topics involved are the determinant matrix and eigenvalues, the solution of first and second degree of ordinary differential equations, Laplace Transforms, Fourier Series and Fourier Transforms, partial differential equations and numerical methods for solving common first-order ordinary differential equations.

EDI3333 : Basic Programming for Technologist
Credit : 3 (2+1)
Prerequisite : None
This course contains basic programming and programming language, problem solving techniques, flow diagrams and structured algorithms, program coding techniques and instructions to solve formal problems. Hands-on programming exercises will be given to strengthen students' programming language.

MO234403-M : Oil, Gas and Marine Resource Technology
Credit : 3
Prerequisite : None
This course provides students with a thorough understanding of marine and petroleum resources, covering the properties and technologies related to oil and gas, as well as the management of biological and non-biological marine resources. Students will learn about exploration, production, waste management, and the use of ocean minerals, along with salt production, desalination, and marine biotechnology. Additionally, the course includes principles of maritime archaeology and underwater agriculture, equipping students with the knowledge to manage and utilize marine resources effectively.

MO234406-M : Risk Analysis & Reliability
Credit : 2
Prerequisite : None
This course equips students with a comprehensive understanding of structural reliability and design. They will learn about the uncertainty concept in structures, Mean Time to Failure (MTTF) data, and Load and Resistance Factor Design (LRFD). Additionally, students will develop skills to calculate both structural and system reliability.

MO234502-M : Production Technology and Ocean Structure Maintenance
Credit : 3
Prerequisite : None
This course provides students with a comprehensive understanding of ocean structure concepts, enabling them to compare various alternatives for ocean structures. Additionally, students will gain insights into the maintenance and inspection methods for both ocean structures and ships, equipping them with the necessary skills to manage and maintain maritime infrastructure effectively.

MO234503-M : Integrated Coastal Zone and Small Islands Management
Credit : 3
Prerequisite : None
This course provides a comprehensive exploration of coastal areas, focusing on their definition, unique characteristics, and the history of coastal management. Students will delve into various coastal management issues, such as population growth, coastal usage, and administrative challenges, with examples from Indonesia and other countries. The course also covers the roles of national, provincial, and local governments in managing coastal activities in Indonesia.

MO234504-M : Ocean Energy Conversion System
Credit : 3
Prerequisite : None
This course provides a comprehensive overview of ocean energy systems. Students will learn to measure key ocean parameters such as bathymetry, tides, currents, waves, and ocean thermal properties, and use these measurements to calculate ocean energy potential. The course covers the principles and methods for assessing different types of ocean energy potential, including theoretical, technical, practical, accessible, and viable potential. Students will explore the economic and environmental impacts of marine energy conversion systems and gain knowledge about the technologies and techniques for converting ocean energy into electricity from tidal energy.

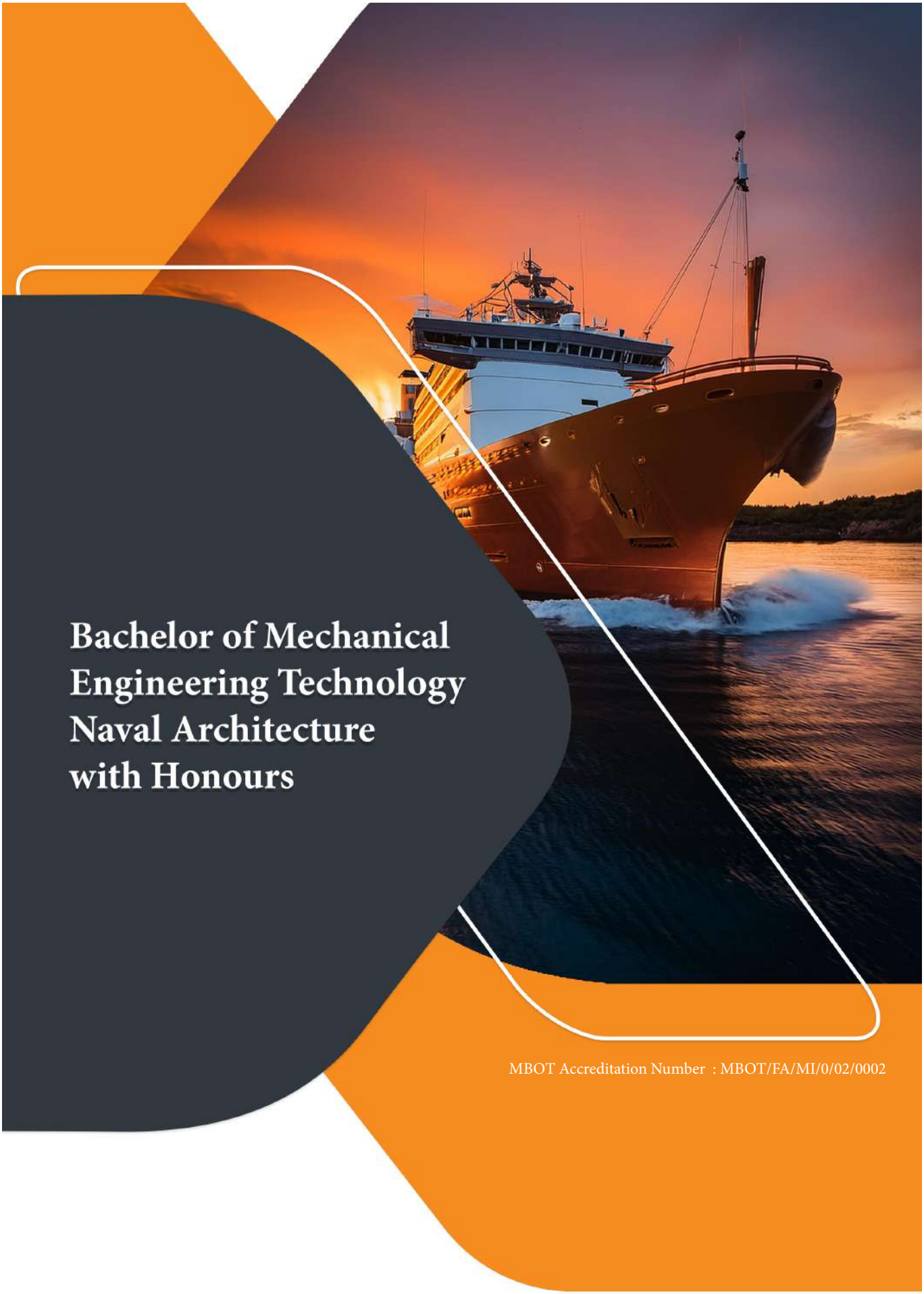
MO234506-M : Ocean Pipeline Design
Credit : 3
Prerequisite : None
This course provides an in-depth understanding of offshore pipeline engineering. Students will learn to calculate key parameters such as inside and outer diameters, pipe thickness, and concrete thickness. They will analyze the static stability of pipes against current and wave loads and understand the technology behind offshore pipe installation and construction. The course also covers post-installation underwater pipeline protection technology, cathodic protection calculations, and the analysis of pipe buckling, scouring, and free span. By the end of the course, students will be equipped with the skills necessary to design, install, and maintain offshore pipelines effectively.

MO234601-M : Research Methodology
Credit : 3
Prerequisite : None
This course is designed to equip students with comprehensive research skills essential for academic and professional success. By the end of the course, students will have a deep understanding of the nature of research, enabling them to identify and develop viable research ideas for their final projects. They will learn to craft detailed research proposals and reports that adhere to scientific principles, ensuring clarity, rigor, and academic integrity. Students will also gain the ability to write research papers suitable for seminars and journals, enhancing their ability to contribute to scholarly discourse. Additionally, the course will prepare students to effectively present.

MO234602-M : Marine Operations and HSE System
Credit : 3
Prerequisite : None
This course covers the essential concepts and practices of marine operations and services. Students will learn about the processes involved in lifting, towing, load out, and installation of jacket platforms, as well as berthing analysis. They will gain skills in implementing and modeling marine operations, both manually and using software. The course also includes an understanding of health and safety management systems (HSE), integrated management systems in offshore structures and operations, and the impact and protection of pollution at sea. By the end of the course, students will be well-prepared to manage and execute marine operations safely and efficiently.

MO234604-M : Operations Research and Optimization
Credit : 3
Prerequisite : None
This course provides an in-depth exploration of optimization in engineering and management contexts. Students will learn to formulate optimization models for a variety of problems and gain an understanding of several standard optimization methods. The course also emphasizes practical skills, enabling students to solve optimization problems using software they develop independently. By the end of the course, students will be equipped to apply optimization techniques effectively in real-world scenarios.

MO234801-M : Undergraduate Thesis
Credit : 6
Prerequisite : None
This course guides students through the process of conducting a final research project. Students will learn to identify and develop research ideas, write proposals and final project reports using the scientific method, and prepare scientific papers for seminars or journals. Additionally, they will gain skills in presenting their research findings through written reports and oral presentations. By the end of the course, students will be well-prepared to undertake and communicate their research effectively.



Bachelor of Mechanical Engineering Technology Naval Architecture with Honours

MBOT Accreditation Number : MBOT/FA/MI/0/02/0002

Bachelor of Mechanical Engineering Technology (Naval Architecture) with Honours

Introduction

The Bachelor of Mechanical Engineering Technology (Naval Architecture) with Honours programme was first offered in the Semester I session 2020/2021 and is the first engineering technology programme offered by UMT. This programme has been accredited by the Malaysia Board of Technologists (MBOT). This programme is offered full-time and takes four (4) years or eight (8) semesters which includes a minimum of 140 credit hours to graduate.

Mechanical Engineering Technology (Naval Architecture) is a programme that combines the science, naval architecture and engineering of ship machining systems. The core of the programme includes studies related to naval architecture, hydrostatic and static/dynamic stability of ships or floating structures, ship machining and instrumentation, ship power plants, ship management and operating systems, and safety based on standards by the marine safety agency and the International Maritime Organization (IMO). Elements implemented include naval architecture and ship construction, mechanical engineering, electrical, electronics, software and security used in the engineering design, classification, maintenance, and operation processes for vessels and floating structures. The programme provides professional knowledge and skills for jobs in the shipping marine and oil and gas industries.

Programme Educational Objectives (PEO)

Graduates who undertake this program will be able to achieve the following objectives:

PEO1: To produce graduates who possess knowledge in mathematics, science, engineering technology, and specialized engineering principles, and are able to apply these principles in solving engineering technology problems.

PEO2: To produce graduates who are skilled in designing systems, components, or processes, and applying knowledge and cognitive skills to meet specific engineering requirements.

PEO3: To produce graduates who demonstrate strong practical skills, including in planning and designing technical studies with an emphasis on safe and sustainable practices.

PEO4: To produce graduates who demonstrate digital skills and can work effectively in environments requiring resilience and time management.

PEO5: To produce graduates who possess leadership, entrepreneurial, and professional ethics skills, and are responsible for their duties and society.

Programme Learning Outcomes (PLO)

At the end of this programme, students will be able to:

PLO1: Demonstrate proficiency in knowledge of mathematics, science, engineering technology, and the principles of engineering technology specialization in relation to defined engineering technology procedures, processes, systems, or methodologies.

PLO2: Apply knowledge and skills to solve engineering technology problems by designing systems, components, or processes to meet specific requirements using knowledge resources from related fields.

PLO3: Able to plan, design studies, and apply technical skills with emphasis on safe and sustainable practices.

PLO4: Demonstrate strong interpersonal skills in relationships and exhibit appropriate social skills and professional ethics.

PLO5: Communicate effectively in conveying information and ideas clearly and professionally.

PLO6: Proficient in using information and digital technology effectively in problem-solving and demonstrate ethical practices in the use of digital technology.

PLO7: Master quantitative skills covering basic mathematics and statistical techniques, and able to use numerical skills in learning, work, and daily life.

PLO8: Skilled in building effective relationships, working in teams, making decisions, and leading with responsibility, confidence, professionalism, and good intrapersonal skills.

PLO9: Demonstrate personal skills through self-learning, confidence, professional ethics, planning ability, honesty, and good time management.

PLO10: Master entrepreneurial skills through knowledge, creativity, and cognitive abilities to effectively develop a business.

PLO11: Display understanding of ethics, integrity, and professionalism, as well as respect for social and cultural differences in carrying out professional responsibilities and interacting with society.

Career Prospects

This programme is offered in view of the rapid development taking place in the shipping industry. Career opportunities in the field of naval architecture include Naval Architect, Mechanical/Ship Instrumentation Engineering Technologist, Coastal & Offshore Engineering Technologist, Construction & Maintenance Technological Engineering Technologist, Ship Design Consultant, Marine Surveyor, QC Officer, Marine Operations Officer, Lecturer/Educator, Standard Agency Officer, Technical/Sales Executive, Science Officer/Researcher.

Programme Graduation Requirements

1. Students must register for and pass all compulsory courses in the programme or their equivalent replacement courses and fulfill the minimum credit hours required for graduation. Students must also achieve a minimum Cumulative Grade Point Average (CGPA) of 2.00.

2. Students are required to complete the Survival and Water Safety Program (SKA) and the Artificial Intelligence for Beginners course (MCBS10017) as graduation requirements.

3. The total credit hours for elective courses that students must complete are subject to the credit hour requirements set by the respective academic program for graduation eligibility and not based on the number of elective courses taken.

4. The list of elective courses available to students in the academic program refers to the course offerings stated in the program handbook of the faculty and other faculties.

5. Students must achieve the minimum grade requirement for English language proficiency as specified below:

Stream	Minimum English Proficiency Requirement
Science, Technology, Engineering, and Mathematics (STEM)	EOP Grade B or MUET Band 4.0

* If, at the time of admission, a student has already attained the minimum MUET Band required for graduation, the student shall be considered to have fulfilled the graduation requirement for MUET proficiency.

Total Credit for Graduation

The minimum number of credits to graduate is 140 credit hours. The distribution of credit hours by course category is as follows:

Categories	Credits	Percentages
University Core	18	13
Programme Core	111	79
University Elective	11	8
Total	**140**	**100**

University Core (18 Credit Hours)

Code Course	Name Course	Credit Hours	Prerequisite
BBB3013	Academic Writing Skills	3 (3+0)	None
BBB3023	Public Speaking	3 (3+0)	None
BBB3033	English for Occupational Purposes	3 (3+0)	None
MPU3132	Appreciation of Ethics and Civilizations	2 (2+0)	None
MPU3143	Communicative Malay Language	3 (3+0)	None
MPU3352	Integrity and Anti-Corruption	2 (2+0)	None
CCXXXXX	Co-Curriculum	2 (0+2)	None

Programme Core (111 Credit Hours)

Code Course	Name Course	Credit Hours
EDI3313	Engineering Mathematics I	3 (3+0)
EDI3323	Engineering Mathematics II	3 (3+0)
EDI3353	Basic Programming for Technologist	3 (2+1)
MNA3013	Engineering Drawing	3 (0+3)
MNA3023	Dynamics	3 (3+0)
MNA3033	Ship Constructions	3 (2+1)
MNA3043	Naval Architecture I	3 (3+0)
MNA3053	Marine Engineering System I	3 (2+1)
MNA3064	Naval Architecture II	4 (2+2)
MNA3073	Marine Engineering System II	3 (2+1)
MNA3093	Naval Architecture III	3 (2+1)
MNA3103	Marine Engineering System III	3 (2+1)
MNA3113	Project Management	3 (2+1)
MNA3124	Capstone Design Project	4 (1+3)
MNA3133	Ship Repair and Maintenance Systems	3 (2+1)
MNA3143	Naval Architecture IV	3 (2+1)
MNA3153	Marine Engineering System IV	3 (2+1)
MNA3163	Automation & Control System	3 (2+1)
MNA3173	Engineering Statistics	3 (3+0)
MNA3183	Occupational Safety and Health	3 (3+0)
MNA3192	Engineers, Law and Society	2 (2+0)
MNA3203	Statics	3 (3+0)
MNA4982	Final Year Project I	2 (0+2)
MNA4994	Final Year Project II	4 (0+4)
MNA49712	Industrial Training	12 (0+12)
MMT3023	Fluid Mechanics	3 (2+1)
MMT3043	Materials Engineering	3 (2+1)
MMT3053	Thermodynamics	3 (2+1)
MMT3082	Machining Workshop and Welding	2 (0+2)
MMT3112	Marine Technology Laboratory	2 (0+2)
MMT3123	Strength of Materials	3 (2+1)
MMT3144	Marine Electronics and Instrumentation	4 (2+2)
MMT4253	Marine Corrosion	3 (2+1)
MMT4293	Ship Structure	3 (2+1)

University Elective (11 Credit Hours)

Students are required to register for and pass any elective courses totaling 11 credit hours as listed throughout the duration of the program, subject to the approval and consent of the Head of Programme.

Code Course	Name Course	Credit Hours
MMT4163	Marine Technology and Environmental	3 (2+1)
MMT4193	Maritime Engineering Design	3 (2+1)
MMT4213	Diesel Engines	3 (2+1)
MMT4223	Research Method in Technology	3 (3+0)
MMT4263	Offshore Structure	3 (3+0)
MMT4273	Marine Hydrodynamics	3 (2+1)
MMT4313	Offshore Mooring and Riser	3 (3+0)
MMT4323	Offshore Pipeline	3 (3+0)
MMT4333	Maritime and Coastal Engineering	3 (3+0)
MMT4343	Design of Floating Structures	3 (3+0)
MMT4353	Computer Aided Marine Design	3 (1+2)
MMT4363	Marine Computer Aided Modelling	3 (1+2)
MMT4373	Computer Fluid Dynamic	3 (1+2)

Course Scheme
Bachelor of Mechanical Engineering Technology (Naval Architecture) with Honours

Code	Course Name	Credit Hours	Pre-requisite	Code	Course Name	Credit Hours	Pre-requisite
Semester 1				**Semester 2**			
MNA3013	Engineering Drawing	3(0+3)	-	EDI3323	Engineering Mathematics II	3(3+0)	-
MMT3023	Fluid Mechanics	3(2+1)	-	MNA3203	Statics	3(3+0)	-
EDI3313	Basic Programming for Technologist	3(3+0)	-	MPU3132	Appreciation of Ethics and Civilizations	2(2+0)	-
EDI3353	Engineering Mathematics I	3(2+1)	-	BBB3013	Academic Writing Skills	3(3+0)	-
MPU3143	Communicative Malay Language	3(3+0)	-	BBB3023	Public Speaking	3(3+0)	-
MPU3352	Integrity and Anti-Corruption	2(2+0)	-	CCXXXXX	Co-Curriculum	2(0+2)	-
Total Credit		**17**		**Total Credit**		**18**	
Semester 3				**Semester 4**			
MNA3043	Naval Architecture I	3(3+0)	-	MNA3023	Dynamics	3(3+0)	-
MNA3053	Marine Engineering Systems I	3(2+1)	-	MNA3033	Ship Constructions	3(2+1)	-
MMT3053	Thermodynamics	3(2+1)	-	MNA3064	Naval Architecture II	4(2+2)	-
MMT3082	Machining and Welding Workshop	2(0+2)	-	MNA3073	Marine Engineering Systems II	3(2+1)	-
MMT3123	Strength of Materials	3(2+1)	-	MNA3192	Engineers, Law and Society	2(2+0)	-
MMT4253	Marine Corrosion	3(2+1)	-	MMT3043	Engineering Materials	3(2+1)	-
			-	MMT3112	Marine Technology Laboratory	2(0+2)	-
Total Credit		**17**		**Total Credit**		**20**	
Semester 5				**Semester 6**			
MNA3093	Naval Architecture III	3(2+1)	-	MNA3143	Naval Architecture IV	3(2+1)	-
MNA3103	Marine Engineering Systems III	3(2+1)	-	MNA3153	Marine Engineering Systems IV	3(2+1)	-
MNA3113	Project Management	3(2+1)	-	MNA3163	Automation & Control System	3(2+1)	-
MNA3124	Capstone Design Project	4(1+3)	-	MNA3173	Engineering Statistics	3(3+0)	-
MNA3133	Ship Repair and Maintenance Systems	3(2+1)	-	MNA4982	Final Year Project I	2(0+2)	-
MMT4293	Ship Structure	3(2+1)	-	MMT3144	Marine Electronics and Instrumentation	4(2+2)	-
Total Credit		**19**		**Total Credit**		**18**	
Semester 7				**Semester 8**			
MNA3183	Occupational Safety & Health	3(3+0)	-	MNA49712	Industrial Training	12(0+12)	-
MNA4994	Final Year Project II	4(0+4)	MNA4982				
BBB3033	English for Occupational Purposes	3(3+0)	-				
	Elective I	3	-				
	Elective II	3	-				
	Elective III	3	-				
Total Credit		**19**		**Total Credit**		**12**	
Total Credit to Graduate : 140							

Notes:

1. Students are required to undertake the Survival and Water Safety Program and Artificial Intelligence for Beginner (MCBS10017) as a condition to graduate.
2. The number of elective course credit hours that must be taken by students in the program of study is subject to the number of elective credit hours set by the program of study to meet graduate qualifications and is not subject to the number of elective courses taken.
3. The list of elective courses that can be taken by students in the program of study refers to the course offerings listed in the handbook of the study program of the faculty and other faculties.

(Reference: UMT Senate Approval-199th Meeting, Year 2025)

MNA3013 : Engineering Drawing
Credit : 3 (0+3)
Prerequisite : None
This course is designed to equip students with fundamental knowledge and practical skills in engineering drawing, which is essential for effective communication in the engineering field. The course emphasizes the importance of technical drawing in supporting the design and construction processes within various engineering industries. Topics covered include basic engineering drawing, orthographic and isometric drawings, 3D modelling and surface development using Computer-Aided Design (CAD) software. Through this course, students will develop the ability to interpret and produce accurate engineering drawings, enabling them to contribute effectively to design projects.

MNA3023 : Dynamics
Credit : 3 (0+3)
Prerequisite : None
This course introduces students to the fundamentals of dynamics in mechanical engineering. It covers topics such as straight-line motion, curved-line motion, conservation of work and energy, velocity and acceleration in horizontal motion, general motion relative to rotating frames, and mass moment of inertia. The aim is to provide students with valuable engineering knowledge for practical technological application.

MNA3033 : Ship Constructions
Credit : 3 (2+1)
Prerequisite : None
This course provides students with an introduction to the principles of ship construction, including the layout of shipyards, the shipbuilding process, materials, facilities, and the machinery and equipment used in shipyards. It also covers the roles of relevant regulatory bodies and industry standards that govern ship construction. This subject is important to enhance the ship production knowledge to the students.

MNA3043 : Naval Architecture I
Credit : 3 (3+0)
Prerequisite : None
Explain some basic naval architecture terms in terms of dimensions and construction of the main ship components of this ship.

MNA3053 : Marine Engineering Systems I
Credit : 3 (2+1)
Prerequisite : None
This Subject introduce students the knowledge of marine engineering terms, control systems, working principles and operation of the typical ship's main and auxiliary machinery. It covers marine boiler, freshwater generator, marine air compressors and pumping systems.

MNA3064 : Naval Architecture II
Credit : 4 (2+2)
Prerequisite : None
This subject will introduce students to calculate ship's form coefficient and apply Simpson rule to find the ship properties. Furthermore, the transverse statical stability and list conditions of ship are calculated under loading, discharging and transferring of cargoes on board ship. Features modern building materials including material strength, limitations and factors affecting the construction materials as appropriate. This subject also includes projects and assignments individually.

MNA3073 : Marine Engineering Systems II
Credit : 3 (2+1)
Prerequisite : None
This subject is designed to fulfill the knowledge requirements related to ship machinery and operations. It covers ship bunkering, sewage treatment plants, marine pumps, and marine valves.

MNA3093 : Naval Architecture III
Credit : 3 (2+1)
Prerequisite : None
This course introduces students to have continuous understanding on longitudinal stability of ship (trim) in various ship's conditions involving loading, discharging and shifting of the cargoes on board as referred to the transverse statical stability. Furthermore, this also takes a fundamental approach to several components of ship resistances i.e., frictional, wave and other resistance components; dimensional analysis; bulbous bow and ship form effects; shallow water effects; added resistance; ship model tests and resistance data presentations i.e., theoretical methods for predicting resistance at concept design and the use of computational fluid dynamic based approaches. In addition, the module also discuss powering and efficiency components; screw propeller geometry; propeller theories; dimensional analysis; hull-propeller interaction; propeller model tests; cavitation; propeller design; and other propulsion systems and applications.

MNA3103 : Marine Engineering Systems III
Credit : 3 (2+1)
Prerequisite : None
Each vessel has a cooling system forthe confort of crew, passengers and also for cooling certain cargoes. The air conditioning system, and cooling is needed and requires expert knowledge in handling the air conditioning systems, including knowledge of the main components of the cooling system as well as methods of operation and maintenance.

MNA3113 : Project Management
Credit : 3 (2+1)
Prerequisite : None
This course introduces the fundamentals of project management and contract. Project life cycle processes are explained which include project initiating, planning, executing, monitoring, controlling and closing. Hands-on applications to Microsoft Project software are also included.

MNA3124 : Capstone Design Project
Credit : 4(1+3)
Prerequisite : None
Capstone Design Project provides opportunities to collaborate with industry in an open and interdisciplinary challenges proposed by the project sponsor and the research industry. Students will use the engineering design process that is defining the functional requirements, concept, analysis, identify risks and countermeasures, selection and physical prototypes.

MNA3133 : Ship Repair and Maintenance Systems
Credit : 3 (2+1)
Prerequisite : None
This course provides an introduction to the activities in the maintenance and repair process of a ship including work planning, docking type, type of repair work, safety aspects, job inspection and the requirements of classification society.

MNA3143 : Naval Architecture IV
Credit : 3 (2+1)
Prerequisite : None
In this course, the dynamic interaction between water and ships associated with the environmental effects is studied in the two subtopics sea keeping and maneuverability. The course is building on and deepens knowledge of wave effects on ship motion. Due to complexity of wave behaviour in nature by incorporating linear wave theory method can be adopted to study the irregular behaviour of waves and relate to ship motions characteristics. Oscillations of floating bodies–equations of motion–added mass and moment of inertia, damping coefficients–exciting forces and moments due to waves, effect of forward speed–heave, pitch and roll oscillations–strip theory for ship like forms–prediction of motion in irregular seas–method of model tests. Introduction to ship maneuvering characteristics in horizontal plane motion-turning circles will be also discussed.

MNA3153 : Marine Engineering Systems IV
Credit : 3 (2+1)
Prerequisite : None
Important knowledge about ships' electrical systems, safety and maintenance will be studied in this course. Topics such as electrical distribution, generator, main circuit breaker, motor, starter, ancillary electrical service, special electrical practice, survey requirement, electric propulsion, high voltage and programmable logic controller are also included.

MNA3163 : Automation and Control Systems
Credit : 3 (2+1)
Prerequisite : None
The objective of this subject is to expose the knowledge of automation and control system in marine application to the students. The contents of this subject are: control system terminology; subsystems and processes; input-output; open-loop; close loop systems; manipulation of block diagram; computer controlled systems; modeling in frequency and time domain; time responses; stability analysis; digital control system; sensors and transducers; Laplace transform; transfer function; sensors for automation; control software packages; case studies and computer simulation. The rational of this subject is the students must have knowledge of automation and control for the operations of marine systems, to become an expert mariner.

MNA3173 : Engineering Statistics
Credit : 3 (3+0)
Prerequisite : None
This course exposes the students on general knowledge, methods, theory and its application of statistic and probability in naval architecture marine engineering. This subject can enhance the knowledge in application of statistical engineering in maritime and naval technology.

MNA3183 : Occupational Safety and Health
Credit : 3 (3+0)
Prerequisite : None
This course covers the rules, regulations and the Act which is closely related to occupational safety and health as OSHM, OSHA and FMA. In addition, it also emphasizes the danger and risk, accident control, industrial hygiene, material safety data sheets, emergency response plans, safety and health audit.

MNA3192 : Engineers, Law and Society
Credit : 2 (2+0)
Prerequisite : None
This course discusses the concepts of ethics, values and morals, and its relationships with engineering profession. The ethical concept in work includes professionalism, accountability, organization and workers within the organization, law and current ethical law, and unlawful acts such as bribes, cheating, discrimination and others.

MNA3203 : Statics
Credit : 3 (3+0)
Prerequisite : None
This course introduces the fundamental principles of mechanical equilibrium, focusing on the analysis of forces and their effects on stationary bodies. Students will explore the concepts of force, torque, and equilibrium, with an emphasis on static systems in engineering applications. The course will cover essential methods for solving problems in both particle and rigid body mechanics, incorporating tools such as free body diagrams, centroid calculations, distributed load analysis, and the moment of inertia.

MNA4982 : Final Year Project I
Credit : 2 (0+2)
Prerequisite : None
The Final Year Project I is designed to train students to conduct scientific research, write reports and make scientific presentations. Final-year students are required to perform a research project under the guidance of one or more supervisors/lecturers in Maritime Technology and related studies. Students are required to submit a title, prepare a research proposal and prepare a research pre-thesis to be evaluated each semester when this subject is registered. Students must also present a research proposal in the final year project 1 seminar.

MNA4994 : Final Year Project II
Credit : 4 (0+4)
Prerequisite : None
Final Year Project II (PITA II) is a continuation of PITA I. The students need to implement the research as proposed in a research proposal, analyze data, and complete the thesis to be evaluated by the supervisor for each semester subject that is registered. The students also need to present in a final year project seminar and submit the final thesis, technical report and logbook to PITA coordinator.

MNA49712 : Industrial Training
Credit : 12 (0+12)
Prerequisite : None
Students will be placed in government or private organisations related to the environment for a period of 24 weeks. Students will carry out current duties appropriate to the Maritime Technology program under the supervision of both industrial and university supervisors. This course incorporates elements of peeragogy (collaborative teaching and learning) between students and supervisors in the industry, as well as unconventional learning and teaching elements (situation learning and inquiries) in completing the miniprojects entrusted. Combining elements of cognitive, communication, interpersonal, ethics and professionalism, and leadership, autonomy and responsibility skills, these will be translated through final reports, presentations and feedback from both industrial and UMT supervisors.

MMT3023 : Fluid Mechanics
Credit : 3 (2+1)
Prerequisite : None
This course aims to provide students with fundamental knowledge of fluid mechanics in static and dynamic conditions, which is essential in marine and mechanical engineering. Topics include pressure, buoyancy, fluid flow, energy loss, and Bernoulli's principle. Laboratory sessions are included to reinforce theoretical understanding and develop hands-on skills in experimentation and data analysis. Students will gain a strong technical foundation to apply in designing fluid-related systems and be well-prepared for advanced engineering courses and future professional careers.

MMT3043 : Materials Engineering
Credit : 3 (2+1)
Prerequisite : None
This course provides students with foundational knowledge on the relationship between material structure and properties, essential for understanding material behavior in engineering applications. It covers atomic structure, bonding, crystalline and molecular imperfections, and their relation to mechanical and engineering properties. Additional topics include material failure modes, phase diagrams, compositions, applications, and fabrication of materials such as metals, polymers, composites, and ceramics. This course equips students with a strong technical base for effectively analyzing and selecting materials in engineering contexts.

MMT3053 : Thermodynamics
Credit : 3 (2+1)
Prerequisite : None
The study of energy, its transformations, and interactions within systems. This course introduces the core principles of thermodynamics, exploring fundamental concepts, various forms of energy, energy transfer mechanisms, and pure substances' properties. The energy conservation principle applies to both closed and open systems. The Second Law of Thermodynamics is introduced, with a focus on its applications to thermodynamic cycles, cyclic devices, and processes. Experiments with Marcet boilers, air conditioning, and heat exchangers are included in the laboratory sessions.

MMT3082 : Machining Workshop and Welding
Credit : 2 (0+2)
Prerequisite : None
The course introduces basic knowledge in handling machinery and equipment in metal cutting, using lathe and milling, welding and practicing basic principles of safety at work and in workshops. Laboratory work covers sheet metal fabrication, cutting, bending, welding, basic machining, measuring techniques using proper tools and using hand power tools. Understanding specifications, scale, engineering design. Workshop safety and writing technical reports.

MMT3112 : Marine Technology Laboratory
Credit : 2 (0+2)
Prerequisite : None
This subject introduces students to the principles and practices of computer-aided manufacturing (CAM). CAM involves the use of computer software to control the manufacturing process, including the design, planning, and execution of production. Students will learn how CAM systems integrate with computer-aided design (CAD) software to automate the manufacturing process of products, including parts, assemblies, and finished products. Carried out a group project assembling a solar panel.

MMT3123 : Strength of Materials
Credit : 3 (2+1)
Prerequisite : None
This subject introduces students to basic marine engineering terminology, control systems, and the operating principles of main and auxiliary ship machinery. It includes marine boilers, freshwater generators, air compressors, and pumping systems. Emphasis is placed on understanding the functions and efficiency of real marine equipment. The course is designed to equip students with essential theoretical knowledge and practical skills needed for careers in the shipping and marine engineering industries.

MMT3144 : Marine Electronics and Instrumentation
Credit : 4 (2+2)
Prerequisite : None
The objective of this subject is to expose the knowledge of electronics and instrumentation in marine application to the students. The contents of this subject are basic electrical and electronics; symbols in electrical and electronic circuits; electronic instrumentation on board ships; principles of operations of RADAR, echo-sounder, RDF, GPS, gyro-compass; specifications and selection of electronic equipment; boat electrical specification; laboratory. The rational of this subject is the students must have knowledge of electrical and electronic for the operations of marine instrumentation and systems, to become an expert mariner.

MMT4163 : Marine Technology and Environmental
Credit : 3 (2+1)
Prerequisite : None
This course introduces students to current developments and issues in coastal and marine environments involving the application of technologies related to erosion, pollution, and resource exploration. Students will explore bottom sampling, seabed mapping using acoustic techniques, and resource surveys. The course also covers chemical and biological methods for rehabilitating marine resources and monitoring water quality. It equips students with the knowledge to evaluate marine environmental impacts, including resource exploitation, alternative energy, and pollution caused by shipping and sound activities.

MMT4193 : Maritime Engineering Design
Credit : 3 (2+1)
Prerequisite : None
This subject focuses on the factors that affect design and operations in maritime engineering design. The scope of the subject shall be focusing on design philosophy,design process, requirement and analysis. Students are required to select a topic, prepare a proposal, analysis, write reports and make presentations. The design processes in this subject shall be within the scope of coastal and offshore structures (ship, offshore structure, marine infrastructure, marine components and systems).

MMT4213 : Diesel Engines
Credit : 3 (2+1)
Prerequisite : None
This course covers basic components, function, operation and systems of diesel engine such as mechanical structure, cooling, lubricating, fuel, trouble shooting and maintenance. The student will be able to describe the history of diesel engines and diesel systems and their evolution; demonstrate knowledge of the basic principles of diesel systems and engines and how they function; and utilize precision instruments to diagnose and repair basic systems and engines.

MMT4223 : Research Method in Technology
Credit : 3 (3+0)
Prerequisite : None
Students select a research topic, prepare a research proposal, a summary about sources of error in surveys. Survey design, research questions and hypotheses, sampling, data collection, data analysis, data management, quantitative methods, qualitative procedures, basic research statistics, software for statistics.

MMT4253 : Marine Corrosion
Credit : 3 (2+1)
Prerequisite : None
This course provides an introduction to the theory and practices in marine corrosion, covering the natural processes of corrosion formation and the environmental factors affecting it. Students will learn basic methods for preventing marine corrosion and will be exposed to current techniques for corrosion control and prevention.

MMT4263 : Offshore Structure
Credit : 3 (3+0)
Prerequisite : None
This course provides an introduction to engineering offshore structures associated with oil and gas industry , environmental load , load effects of the environment on offshore structures , analysis and design of offshore facilities, analysis and design of topside modules , Load - out , installation, hook-up, and the operation, inspection, maintenance, and repair, assessment of existing structures, installation and inspection of pipelines, offshore structures and other relevant piping structure.

MMT4273 : Marine Hydrodynamics
Credit : 3 (2+1)
Prerequisite : None
This course introduces students to the fundamentals of dynamics in mechanical engineering. It covers topics such as straight-line motion, curved-line motion, conservation of work and energy, velocity and acceleration in horizontal motion, general motion relative to rotating frames, and mass moment of inertia. The aim is to provide students with valuable engineering knowledge for practical technological applications.

MMT4293 : Ship Structure
Credit : 3 (2+1)
Prerequisite : None
This course requires basic engineering mechanics and an extension of material strength. It covers the introduction to ship structural, ship loading, hull girder moment, hull girder bending stress and deflection, hull girder shear stress, stress analysis and struts and columns. This course emphasis on the student ability to identify and solve the structural design problem by carrying the necessary calculation and analysis.

MMT4313 : Offshore Mooring and Riser
Credit : 3 (3+0)
Prerequisite : None
This course provides an introduction to the offshore structural engineering related to mooring and riser system. Loading mechanism, mooring and riser system design, components, standards used, top tension risers, SCR, involved analysis of the mooring and riser system, and method of installation. Structure evaluation methods are also among the topics to be included in the subject.

MMT4323 : Offshore Pipeline
Credit : 3 (3+0)
Prerequisite : None
This course introduces piping systems and engineering covering principles of underwater offshore piping, piping types, methods of protecting pipes, different aspects to students. It also covers the processes of constructing and installation of pipes and piping system, the design concepts, selection of suitable materials, pipe inspection.

MMT4333 : Maritime and Coastal Engineering
Credit : 3 (2+1)
Prerequisite : None
This course is an introduction to the maritime field that focuses on coastal engineering. In this course, students will be exposed to the introduction of coastal engineering in general, wave events and related theories, water level rise and tides, coastal erosion prevention structure, introduction to estuary and sediment movement on the coastal area. With the knowledge in this course students will be able to help to solve the problems of the coastal environment and how it gives importance to the environment.

MMT4343 : Design of Floating Structures
Credit : 3 (3+0)
Prerequisite : None
This subject gives students an introduction to the engineering of offshore floating structures that may be used for marine operations. This subject would be to expose students to design concepts for floating structures such as semi-submersible, TLP, FPSO and SPAR. It also would add to student knowledge in the process of construction and installation of floating offshore structures. This subject also gives an overview of the system and concept design to stability and structure hull. Lessons on stabilization and the system are also included in this subject other than design.

MMT4353 : Computer Aided Marine Design
Credit : 3 (1+2)
Prerequisite : None
This course introduces students to industry-standard software for generating complex 3D hull form modeling for various marine structures. It covers stability analysis, motion and resistance prediction, structural modeling, structural analysis, and export for vessel detailing. Designed for degree programs in Applied Science, Technology, and Engineering Technology, this course equips students with a versatile tool for marine design. Students will learn to optimize vessel performance, safety, and regulatory compliance, making it particularly valuable for those in naval architecture programs.

MMT4363 : Marine Computer Aided Modelling
Credit : 3 (1+2)
Prerequisite : None
This course introduces students to the fundamental principles and applications of Computer-Aided Ship Design (CASD) with a focus on 3D modeling and Finite Element Analysis (FEA). Students will learn to design and analyze complex mechanical components using industry-standard software tools. The course covers essential topics such as parametric and non-parametric modeling, part and assembly design, and the theoretical and practical aspects of FEA, including meshing, boundary conditions, and load simulations. Through project-based learning, students will apply these techniques to real-world engineering problems, optimizing designs for performance, durability, and safety. The course aims to equip future engineers with the knowledge and hands-on experience necessary for modern engineering design and analysis, fostering innovation and problem-solving skills in a computer-aided engineering environment.

MMT4373 : Computer Fluid Dynamic
Credit : 3 (1+2)
Prerequisite : None
The course is designed for Students with no or little CFD (Computational Fluid Dynamics) knowledge who want to learn CFD application to solve engineering problems. The course will provide a general perspective to the CFD and its application to fluid flow and heat transfer and it will teach the use of some of the popular CFD packages and provides Students will learn basics of CFD and will use that basic knowledge of CFD software such as meshing, boundaries, initial condition, numerical physic, turbulent etc. However, it should be emphasized that software learning is not the objective of this class, and it only will be used as a tool to teach students the concepts in a practical framework. Most CFD packages have a variety of modules to deal with a specific type of flow. Students will be introduced to different modules and their specific applications. They will then be able to utilize the CFD package to simulate any particular problem.

EDI3313 : Engineering Mathematics I
Credit : 3 (3+0)
Prerequisite : None
This course discusses matrix and emphasizes the important concepts in mathematical engineering including limit,differentiation, integration,differential equation and vector system.

EDI3323 : Engineering Mathematics II
Credit : 3 (3+0)
Prerequisite : None
This course introduces some methods of mathematical analysis and applications to solve problems in technology. Topics involved are the determinant matrix and eigenvalues, the solution of first and second degree of ordinary differential equations, Laplace Transforms, Fourier Series and Fourier Transforms, partial differential equations and numerical methods for solving common first-order ordinary differential equations.

EDI3353 : Basic Programming for Technologist
Credit : 3 (2+1)
Prerequisite : None
This course contains basic programming and programming language, problem solving techniques, flow diagrams and structured algorithms, program coding techniques and instructions to solve formal problems. Hands-on programming exercises will be given to strengthen students' programming language.

Bachelor of Applied Science (Electronics and Instrumentation) with Honours

MBOT Accreditation Number : MBOT/FA/EE/0/02/003

Bachelor of Applied Science (Electronics and Instrumentation) with Honours

Introduction

Bachelor of Applied Science (Electronics and Instrumentation) programme offers an undergraduate programme that drives the field of electronics and instrumentation. In the programme offered, students will have the opportunity to enhance their knowledge in the field of electrical and electronic based engineering while strengthening their skills in applying basic understanding in related fields especially in electronics and instrumentation, with emphasis on problem solving, research and development. With this background, it will make it easier for graduates to move into a challenging work environment. Graduates will be easier to familiarize themselves in the industry and be able to work effectively and brilliantly.

Students are also trained to use the instruments effectively and the best techniques in solving scientific problems, thus learning the way of collecting data and analysis of results. Students are also required to complete industrial training through placement in relevant private and government agencies. Final year students are required to carry out individual research projects in research and development and further strengthen their understanding and application of the concepts of physics, electronics and instrumentation.

Programme Educational Objectives (PEO)

Graduates who undertake this program will be able to achieve the following objectives:

PEO1: Graduates who are knowledgeable in fundamental principles and technically competitive in the field of electronics and instrumentation, in line with industry requirements and digital needs.

PEO2: Graduates who can communicate effectively and exemplify good leadership qualities within the organization.

PEO3: Graduates who are capable to solve numeracy problems related to electronics and instrumentation in an innovative, creative, and ethical manner.

PEO4: Graduates who are able to demonstrate entrepreneurial skills and identify lifelong learning needs for an outstanding career advancement.

Programme Learning Outcomes (PLO)

At the end of this programme, students will be able to:

PLO1: Understand the basic principles of electronics and instrumentation holistically and in depth.

PLO2: Analyze, synthesize and have the ability to think critically and innovatively in various aspects of electronics and instrumentation methods.

PLO3: Process, practice, and apply knowledge related to the field of electronics and instrumentation, as well as to solve related problems using appropriate scientific methods.

PLO4: Interpret and evaluate relevant issues within a suitable social context by utilizing various skills and knowledge acquired within the organization.

PLO5: Communicate ideas and present technical information effectively and confidently, both in written and oral form.

PLO6: Apply digital knowledge and skills in understanding the concepts of electronics and instrumentation.

PLO7: Interpret and use numeracy skills to solve current problems.

PLO8: Actively participate in an organization and demonstrate excellent leadership qualities.

PLO9: Independently learn electronics and instrumentation by continuously seeking and managing information in order to acquire new knowledge relevant to career development.

PLO10: Identify business opportunities and develop negotiation skills in the field of electronics and instrumentation.

PLO11: Uphold professional, moral, and ethical values based on socially acceptable norms.

Career Prospects

Graduates from the Bachelor of Applied Science (Electronics and Instrumentation) programme will have career opportunities in government and private agencies. Graduates from this field can work as technologies in industries (automation, electronics, instrumentation, quality, R&D, IoT and etc.), lecturers (universities, polytechnics, matriculation, private colleges), teachers (Physics, Mathematics, Design and etc.), research officer/science officer (research institute), material scientist, physicist, technical manager (electronics/instrumentation), science officer, sales engineer, businessman, air traffic controller and many more.

Programme Graduation Requirements

1. Students must register for and pass all compulsory courses in the programme or equivalent replacement courses, as well as fulfill the minimum credit requirement for graduation. Students must also achieve a CGPA of not less than 2.00.

2. Students are required to undertake the Survival and Water Safety Program (SKA) and the Artificial Intelligence for Beginners (MCBS10017) as a condition to graduate.

3. The number of elective course credit hours that must be taken by students in the program of study is subject to the number of elective credit hours set by the program of study to meet graduate qualifications and is not subject to the number of elective courses taken.

4. The list of elective courses that can be taken by students in the program of study refers to the course offerings listed in the handbook of the study program of the faculty and other faculties.

5. Students must achieve the minimum grade requirement for English language proficiency as follows:

Stream	Minimum English Requirement
Science, Technology, Engineering and Mathematics (STEM)	EOP Grade B or MUET Band 4.0

*If, at the time of admission, a student has already achieved the minimum MUET Band required for graduation, the student is considered to have fulfilled the graduation requirement for MUET proficiency.

Total Credit for Graduation

The minimum amount of credit to graduate is 122 credit hours. The distribution of credit hours by course category is as follows:

Category	Credit	Percentage
University Core	18	15
Programme Core	72	59
University Elective	32	26
Total	**122**	**100**

University Core (18 Credit Hours)

Code Course	Name Course	Credit Hours	Prerequisite
BBB3013	Academic Writing Skills	3 (3+0)	*None
BBB3023	Public Speaking	3 (3+0)	None
BBB3033	English for Occupational Purposes	3 (3+0)	None
MPU3132	Appreciation of Ethics and Civilizations	2 (2+0)	None
MPU3143	Communicative Malay Language	3 (3+0)	None
MPU3352	Integrity and Anti-Corruption	2 (2+0)	None
CCXXXXX	Co-Curriculum	2 (0+2)	None

Programme Core (72 Credit Hours)

Course Code	Course Name	Credit Hours
EDI3013	Engineering Mathematics I	3 (3+0)
EDI3023	Engineering Mathematics II	3 (3+0)
EDI3033	Electricity and Magnetism	3 (3+0)
EDI3043	Digital Electronics	3 (2+1)
EDI3053	Circuit Theory	3 (2+1)
EDI3063	Sensors and Transducers	3 (3+0)
EDI3073	Electronic Devices	3 (3+0)
EDI3083	Computational Techniques	3 (2+1)
EDI3093	Modern Instrumentation System	3 (3+0)
EDI3113	Analogue Electronics	3 (2+1)
EDI3123	Measurement System	3 (3+0)
EDI3183	Basic Programming for Technologist	3 (2+1)
EDI4103	Signals and System	3 (3+0)
EDI4133	Power Electronics	3 (2+1)
EDI4143	Electromagnetism	3 (3+0)
EDI4153	Embedded System	3 (2+1)
EDI4163	Control System	3 (3+0)
EDI4173	Numerical Method	3 (3+0)
EDI4982	Final Year Research Project I	2 (0+2)
EDI4994	Final Year Research Project II	4 (0+4)
EDI49712	Industrial Training	12 (0+12)

University Elective (32 Credit Hours)

Students are free to register for any course offered as appropriate based on student interest and maturity. Students are required to take at least 18 credit hours from the list of elective courses below or subject to the approval of the Head of Programme:

Course Code	Course Name	Credit Hours
EDI3403	Design of Electronic Equipments	3 (2+1)
EDI3533	Thermal and Modern Physics	3 (3+0)
EDI3543	Mechanics and Waves	3 (3+0)
EDI3553	Material Sciences	3 (3+0)
EDI4413	Seminar and Research	3 (3+0)
EDI4423	Electronics and Medical Imaging	3 (3+0)
EDI4433	Advance Analogue Electronics	3 (3+0)
EDI4443	Internet of Things	3 (2+1)
EDI4463	Optics and Laser Technology	3 (3+0)
EDI4473	Computer Interfacing and Control	3 (2+1)
EDI4483	Principle of Communication System	3 (3+0)
EDI4493	Electrical Machines	3 (3+0)
EDI4503	Wireless Communication	3 (3+0)
EDI4513	Introduction to SIMULINK Environment	3 (2+1)
EDI4523	Plasma Electronics	3 (3+0)
EDI4563	Solid State Physics	3 (3+0)
EDI4573	Quantum Mechanics	3 (3+0)
EDI4583	Physical Acoustics	3 (3+0)
EDI4593	Atomic Physics	3 (3+0)

EDI4603	Semiconductor Device	3 (3+0)
EDI4613	Materials Processing Technology	3 (3+0)
EDI4623	Physics and Thin Film Technology	3 (3+0)
EDI4633	Wireless Power Transfer	3 (3+0)
EDI4643	High Voltage Technology	3 (3+0)
EDI4653	Condition Monitoring	3 (3+0)
EDI4663	Introduction to Materials Analysis	3 (3+0)
EDI4673	Introduction to Renewable Energy	3 (3+0)
EDI4683	Introduction to Energy Storage	3 (3+0)
EDI4693	Medical Instrumentation	3 (3+0)
EDI4703	Introduction to Hybrid and Electric Vehicles	3 (3+0)
EDI4713	Introduction to Computer Aided Drawing	3 (2+1)
EDI4723	Sustainability in Telecommunication Technology	3 (3+0)
EDI4733	Batteries and Supercapacitors Technology	3 (3+0)
EDI4743	Hydrogen Technology-Based and Storage	3 (3+0)

Course Scheme
Bachelor of Applied Science (Electronics and Instrumentation) with Honours

Code	Course Name	Credit Hours	Pre-requisite	Code	Course Name	Credit Hours	Pre-requisite
Semester 1				**Semester 2**			
EDI3043	Digital Electronics	3(2+1)	-	BBB3023	Public Speaking	3(3+0)	-
EDI3073	Electronic Devices	3(3+0)	-	EDI3013	Engineering Mathematics I	3(3+0)	-
EDI3183	Basic Programming for Technologist	3(2+1)	-	EDI3063	Sensors and Transducers	3(3+0)	-
MPU3143	Communicative Malay Language	3(3+0)	-	EDI3083	Computational Technique	3(2+1)	-
MPU3352	Integrity and Anti-Corruption	2(2+0)	-	EDI3123	Measurement System	3(3+0)	-
CCXXXXX	Co-Curriculum	2(0+2)	-	MPU3132	Appreciation of Ethics and Civilizations	2(2+0)	-
Total Credit		**16**		**Total Credit**		**17**	
Semester 3				**Semester 4**			
EDI3023	Engineering Mathematics II	3(3+0)	-	BBB3013	Academic Writing Skills	3(3+0)	-
EDI3033	Electricity and Magnetism	3(3+0)	-	EDI3113	Analogue Electronic	3(2+1)	-
EDI3053	Circuit Theory	3(2+1)	-	EDI4103	Signal and System	3(3+0)	-
EDI3093	Modern Instrumentation System	3(3+0)	-	EDI4133	Power Electronics	3(2+1)	-
	Elective 1	3	-		Elective 3	3	-
	Elective 2	3	-		Elective 4	3	-
					Elective 5	2	
Total Credit		**18**		**Total Credit**		**20**	
Semester 5				**Semester 6**			
EDI4143	Electromagnetism	3(3+0)	-	BBB3033	English for Occupational Purpose	3(3+0)	-
EDI4153	Embedded System	3(2+1)	-	EDI4173	Numerical Methods	3(3+0)	-
EDI4163	Control System	3(3+0)	-	EDI4994	Final Year Research Project II	4(0+4)	EDI4982
EDI4982	Final Year Research Project I	2(0+2)	-		Elective 9	3	-
	Elective 6	3	-		Elective 10	3	-
	Elective 7	3	-		Elective 11	3	-
	Elective 8	3	-				
Total Credit		**20**		**Total Credit**		**19**	
Semester 7							
EDI49712	Industrial Training	12(0+12)	-				
Total Credit		**12**					
Total Credit to Graduate : 122							

Notes:

1. Students are required to undertake the Survival and Water Safety Program and Artificial Intelligence for Beginner (MCBS10017) as a condition to graduate.
2. The number of elective course credit hours that must be taken by students in the program of study is subject to the number of elective credit hours set by the program of study to meet graduate qualifications and is not subject to the number of elective courses taken.
3. The list of elective courses that can be taken by students in the program of study refers to the course offerings listed in the handbook of the study program of the faculty and other faculties.

(Reference: UMT Senate Approval-199th Meeting, Year 2025)

Course Synopsis
Bachelor of Applied Science (Electronics and Instrumentation) with Honours

EDI3013 : Engineering Mathematics I
Credit : 3 (3+0)
Prerequisite : None
This course discusses matrixes and emphasizes the important concepts in mathematical engineering including limit, differentiation, integration, differential equation and vector system.

EDI3023 : Engineering Mathematics II
Credit : 3 (3+0)
Prerequisite : None
This course introduces some methods of mathematical analysis and applications to solve problems in engineering and technology. Topics involved are the determinant matrix and eigenvalues, the solution of first and second degree of differential equations, Laplace Transforms, Fourier Series and Fourier Transforms, partial differential equations and numerical methods for solving common differential equations.

EDI3033 : Electricity and Magnetism
Credit : 3 (3+0)
Prerequisite : None
This course discusses the basic concept of electricity and magnetism. Students will be exposed to conceptual understanding and application of electricity such as charge, electric field, electrostatic force, electric flux, electric potential, potential difference, current, dielectric, circuits, inductance, capacitor and capacitance, charge distribution, and many more. Students also learn about Coulomb's Law, Gauss Law, Ohm's Law, Ampere's Law, and Kirchhoff Laws. For magnetic topics, students will learn about magnet, magnetic force, electromagnetic inductions, magnetic field, magnetic flux, and fundamental laws such as Gauss Law, Biot-Savart laws, Faraday's law, and Lenz's law. The course also introduces electromagnetic oscillations and spectrum.

EDI3043 : Digital Electronics
Credit : 3 (2+1)
Prerequisite : None
This course introduces Number Systems, Operations and Codes, Logic Gates, Boolean Algebra and Logic Simplification, Karnaugh Maps, and Combinational Logic Analysis.

EDI3053 : Circuit Theory
Credit : 3 (2+1)
Prerequisite : None
This course focuses deeply on circuit theory of electric and electronics. It consists of methods of circuit analysis, circuit theorems, first-order circuits, second-order circuits, sinusoids and phasors and AC circuit power analysis. The use of measurement tools and connecting the electrical and electronics component in practical are also included.

EDI3063 : Sensors and Transducers
Credit : 3 (3+0)
Prerequisite : None
This course is useful for students to understand the sensing mechanism which is a process of converting a physical variable into electrical signals. Sensors and transducers are key components in every instrument and are widely used in electrical and electronic circuits.

EDI3073 : Electronic Devices
Credit : 3 (3+0)
Prerequisite : None
This course emphasizes theory aspect dan physical problems in electronic devices. Starting with understanding in terms of arrangement and movement of atom and electron, up to the energy that is involved in the devices. Continue with the learning on semiconductor characteristics including currents, carrier movement and structure of the devices. Electronic devices that will discuss are main semiconductor devices such as diode types (p-type, n-type) and transistor types (bipolar, FET), ICs, and also photo-electronic devices such as photodiode and LED.

EDI3083 : Computational Techniques
Credit : 3 (2+1)
Prerequisite : None
In this course, the fundamental programming concepts and skills required for basic problem solving using MATLAB software will be introduced. It emphasizes the concept of programming and the use of built-in functions in MATLAB and AutoCAD.

EDI3093 : Modern Instrumentation System
Credit : 3 (3+0)
Prerequisite : None
This course starts with the fundamental that underlies with the development of modern instrumentation starting from sensor and transducer design, reliability, choice and economical aspects as well as calibration in the measurements system. Students will be introduced with non-destructive testing, and instrumentations based on electromagnetic radiation in communication and medical applications. Topics for instrumentations based on spectrometer, spectrophotometer and microscopy will be also exposed.

EDI3113 : Analogue Electronics
Credit : 3 (2+1)
Prerequisite : None
This course introduces diode with its applications and dc biasing for BJT and BJT amplifiers.

EDI3123 : Measurement System
Credit : 3 (3+0)
Prerequisite : None
The course introduces basic measurement systems and data analysis techniques. The topic covers generalized measurement systems, reference and standards, measurement uncertainty and statistical analysis, calibration principles, the response of measurement systems, signal transmission, introduction to signals and sampling, frequency response, data acquisition, and signal conditioning, data display and recording, intelligent sensors, and measurement reliability.

EDI3183 : Basic Programming for Technologist
Credit : 3 (2+1)
Prerequisite : None
This course contains basic programming and programming language, problem solving techniques, flow diagram and structured algorithms, program coding techniques and instructions to solve formal problems. Hands on programming exercises will be given to strengthen students' programming language.

EDI3403 : Design of Electronic Equipments
Credit : 3 (2+1)
Prerequisite : None
This course covers the various activities of electronic designs including planning design, drawing, experimentation, prototyping, testing, troubleshooting, and providing final documentation. Throughout the course, students will be shown how to use the software to design and draw electronic circuits and produce a simple electronic project depending on the design and creation of students' own creativity.

EDI3533 : Thermal and Modern Physics
Credit : 3 (3+0)
Prerequisite : None
This course introduces the fundamental principle of thermodynamics and its application in thermal physics. Other than basic concepts in temperature and heat such as internal energy and heat transfer, the ideal gas law and Boltzmann theory will also be discussed. Thermodynamic laws including heat engine and Carnot principle are discussed in detail. Discussion in modern physics such as Einstein theory, characteristics of particles and atoms, photoelectric effect, and nuclear fusion and fission will be emphasized as well.

EDI3543 : Mechanics and Waves
Credit : 3 (3+0)
Prerequisite : None
This course deals with the motion of particles and rigid bodies in one, two- and three-dimensions using Newtonian and Lagrangian Mechanics. Among topics that will be discussed include non- dispersive waves in physics, wave propagation and EM waves.

EDI3553 : Materials Science
Credit : 3 (3+0)
Prerequisite : None
Classification of types of materials such as metals, ceramics, glasses, polymers and composites. Emphasis is given to phase diagrams of their binary systems, crystallization and microstructures, the phase diagram and also interphases in materials. The study of imperfections and mechanical properties of materials. The final part deals with experimental techniques used in materials science.

EDI4103 : Signal and System
Credit : 3 (3+0)
Prerequisite : None
Introduction and the basic concept of discrete and continuous time signal. Circuit theory for signals and systems. Modulation method, Fourier transformation, sample of data, digital filters and technique, Laplace and Z transformations.

EDI4133 : Power Electronics
Credit : 3 (2+1)
Prerequisite : None
This course introduces the basic concepts of switched-mode converter circuits for controlling and converting electrical power with high efficiency. Principles of converter circuit analysis are introduced, and are developed for finding the steady state voltages, current, and efficiency of power converters. Assignments include simulation of a dc-dc converter, analysis of an inverting dc-dc converter, and modeling and efficiency analysis.

EDI4143 : Electromagnetism
Credit : 3 (3+0)
Prerequisite : None
Recap on electricity and magnetism. Students will learn application of theories of electromagnetism in differential and integral form to solve Gauss law; the use of Poisson and Laplace equation in 2 and 3 dimensions, to solve boundary condition, rectangular, cylindrical and spherical coordinates system, free and bounded charges. Problem solving in field, force and potential for electricity and magnetism are learnt using vector representation. Students also exposed to Maxwell equation to solve problems involving free space in material and dielectric, boundary condition, magnetic scalar and vector potentials, bound and unbound current, Pointing vector and gauge transformation. This course also involves electromagnetic plane waves in free space, polarization, frequency dependence of permittivity, permeability and conductivity and skin thickness.

EDI4153 : Embedded System
Credit : 3 (2+1)
Prerequisite : None
This course is useful for students to understand how a microprocessor and microcontroller work, starting from retrieving data from input devices, processing data using uploaded code, storing processed data in memory devices, and sending out processed data to output devices. This course is also useful for students to build a simple program for a microcontroller-based system which is one of the key components in an electronic instrument.

EDI4163 : Control System
Credit : 3 (3+0)
Prerequisite : None
This course provides students with a background of control principles in various engineering applications. Throughout this course, students will learn the basic mathematical tools such as Laplace transform, transfer function, block diagram, signal flow graph, mathematical modeling of dynamic systems, time response analysis, stability of linear system, root locus and frequency domain analysis. MATLAB based approach will be used to aid the students in understanding of the concept introduced.

EDI4173 : Numerical Methods
Credit : 3 (3+0)
Prerequisite : None
This course is offered to expose students to the numerical techniques used in problem solving in relation to the electronic and instrumentations applications. The lecture begins with an introduction to the computer simulations in solving electronic and instrumentation problems and error analysis. Specific numerical techniques will be introduced including root finding and extrapolation in non-linear equations, system of linear equations, numerical integration and differentiation, and ordinary differential equations.

EDI4413 : Seminar and Research
Credit : 3 (3+0)
Prerequisite : None
This course introduces general research techniques with emphasis in physic research. It covers a project proposal, references, data analysis and statistical distribution, computational solutions, interactive techniques and computer distribution. Students are required to prepare a project proposal and to present it in a seminar. Students are also required to attend all seminars organized by the programme.

EDI4423 : Electronics and Medical Imaging
Credit : 3 (3+0)
Prerequisite : None
This course brings together material from engineering, physics and physiology which are relevant to situations in which electronic devices are in direct contact with the body. The primary aim is to familiarize students with some of the important medical applications of electronics, where there is a direct connection to the body, and to explain how the requirements for the equipment are derived. The materials taught concern not only with how the electronic devices work, as well as what they must do for adequate performance and safety. Students also will develop their knowledge and understanding of technical aspects involved in general and fluoroscopic radiography and its conduct. This subject includes the important clinical and radiation safety measures required.

EDI4433 : Advanced Analogue Electronics
Credit : 3 (3+0)
Prerequisite : None
This course is useful for students to understand the functionality of signal conditioning elements such as amplifiers, filters, oscillators and voltage regulators that are commonly used in electronics and instrumentation systems.

EDI4443 : Internet of Things
Credit : 3 (2+1)
Prerequisite : None
This course introduces the concepts of the internet of things device (Arduino, ESP32 or DragonBoard Green) that can provide an affordable platform for new generations to get into the wonderful world of computing in a truly meaningful way. We explore the platforms to develop hardware and software, discuss the design concepts that will make the intelligent electronic device eye-catching and appealing.

EDI4463 : Optics and Laser Technology
Credit : 3 (3+0)
Prerequisite : None
This course deals with the phenomenon and characteristics of optics, light, photonics and laser. Topics include interference, diffractions, polarizations and coherent and non-coherent sources. Semiconductor laser, solid-state laser, gas laser, excimer laser and few other types of lasers will also be discussed. Other optical applications such as interferometry and optical fibre will also be focused.

EDI4473 : Computer Interfacing and Control
Credit : 3 (2+1)
Prerequisite : None
This course discusses the theoretical concept behind computer interfacing and control system elements and operations. In addition, different types of industrial control systems are explored. At the same time, this course offers the development and implementation of computer interfacing in collecting and analyzing data by using suitable hardware and software.

EDI4483 : Principles of Communications System
Credit : 3 (3+0)
Prerequisite : None
This course gives exposure to the principles of communication systems by focusing on the elements of communication system, spectrum analysis, AM and FM modulation techniques, analog to digital conversion and introductory to the information theory.

EDI4493 : Electrical Machines
Credit : 3 (3+0)
Prerequisite : None
This course covers the fundamental issues affecting wireless communication and studies the development of technology in wireless communication mainly on cellular systems, local area networks, and wireless communication (WLAN).

EDI4503 : Introduction to SIMULINK Environment
Credit : 3 (3+0)
Prerequisite : None
This course covers the fundamental issues affecting wireless communication and studies the development of technology in wireless communication mainly on cellular systems, local area networks, and wireless communication (WLAN).

EDI4513 : Introduction to SIMULINK Environment
Credit : 3 (2+1)
Prerequisite : None
This course introduces SIMULINK models, dynamic system models and simulations, manage blocks, data and signals, customize SIMULINK environments and run models.

EDI4523 : Plasma Electronics
Credit : 3 (3+0)
Prerequisite : None
This course gives exposure in terms of concept and application of plasma in electronics. Start with explanation on plasma, how it can be formed, dan its application in daily life. Explanation begins with the fundamental of collision of atoms and molecules, up to the explanation on the energy produced and classification of the plasma. Plasma application is also emphasized particularly in electronics and semiconductor fabrication.

EDI4563 : Solid State Physics
Credit : 3 (3+0)
Prerequisite : None
This course discusses the structure and crystal bonding force. Experiments for structural analysis are described briefly. Lattice vibrations and their effect on thermal properties, acoustics and optics will be the basis for discussion model free electrons in the metal. A more realistic treatment of these electrons will be discussed in the Model Path. This model will be used to differentiate between the semiconductor and metal conductors. The properties of the dielectric, optical, magnetic and defects in solids will also be discussed.

EDI4573 : Quantum Mechanics
Credit : 3 (3+0)
Prerequisite : None
The purpose of this course is to expose students to the fundamental concept of quantum mechanics. Students will learn the origin of quantum mechanics and its role to explain microscopic particles such as an electron, atom and molecule, and wave equation of matter. Students will also learn the Schrodinger equation for a particle in 1-dimensional and 3-dimensional for simple potentials such as infinite well, barrier, step-function potential and the harmonic oscillator.

EDI4583 : Physical Acoustics
Credit : 3 (3+0)
Prerequisite : None
This course discusses the fundamental principles underlying the generation, transmission, and reception of acoustic waves and their application to numerous fields. Applications and examples are drawn from acoustical measurements, noise control, underwater acoustics and architectural acoustics. Applications of ultrasonic instruments and acoustic sensors in industry will be discussed.

EDI4593 : Atomic Physics
Credit : 3 (3+0)
Prerequisite : None
This course deals with atomic phenomena using the quantum mechanical framework. Topics include solutions to Schrödinger equations, the wave function for the hydrogen atom, angular momentum and magnetic effects, spectrum for one electron atom and multiple electron atom, statistics of identical atoms and particles, molecule and bonding energy and spectrum of rotating, vibrating and electronic molecular state.

EDI4603 : Semiconductor Devices
Credit : 3 (3+0)
Prerequisite : None
The purpose of this course is to provide the student with the essential background on semiconductor materials including crystal and energy bands, charge carriers (electrons and holes), doping, and transport, (drift and diffusion). The basic concepts of the generation recombination process, PN junction, metal semiconductor contact, and metal insulator semiconductor capacitor also will be discussed.

EDI4613 : Materials Processing Technology
Credit : 3 (3+0)
Prerequisite : None
This course discusses detailed coverage of materials and manufacturing processes that industrial designers need, and overly technical discussions commonly directed toward engineers. The practical knowledge needed to develop a real-world understanding of materials and processes and make informed choices for industrial design projects is also exposed. In this course, students will find everything from basic terminology to valuable insights on why certain shapes work best for certain applications. They'll learn how to extract the best performance from all the most commonly used methods and materials.

EDI4623 : Physics and Thin Film Technology
Credit : 3 (3+0)
Prerequisite : None
This course will enable students to acquire knowledge of the basic principles of thin films and their applications in industry. Students will be exposed to various fabrication techniques of thin films.

EDI4633 : Wireless Power Transfer
Credit : 3 (3+0)
Prerequisite : None
This course covers the principle of wireless power transfer. That includes the fundamental mediums of transferring power wirelessly. Four basic strategies to transmit power wirelessly are included (Inductive, Acoustic/Ultrasound waves, Optical, Microwave) to discuss in detail.

EDI4643 : High Voltage Technology
Credit : 3 (3+0)
Prerequisite : None
This course will expose the various types of high voltages in power systems and protection methods. Nature of breakdown mechanisms in solid, liquid, gaseous and dielectrics will be studied. The generation of high voltages and currents together with their measurement techniques will be emphasized. Testing methods of power apparatus and insulation, such as HVDC and breaker using recent technologies will be included.

EDI4653 : Condition Monitoring
Credit : 3 (3+0)
Prerequisite : None
This course aims to provide an understanding of both mechanical and electrical condition monitoring and associated instrumentation requirements for successful condition monitoring. The main focus in mechanical condition monitoring is vibration monitoring since this is the most popular method of determining the condition and diagnosing faults in rotational machines, although other techniques used in condition monitoring are also discussed.

EDI4663 : Introduction to Materials Analysis
Credit : 3 (3+0)
Prerequisite : None
The aim of the course is to introduce various techniques for materials analysis, particularly surface and thermal analysis, that are used for both academic and industrial research and development.

EDI4673 : Introduction to Renewable Energy
Credit : 3 (3+0)
Prerequisite : None
This course discusses the several main renewable energy resources that could become significant to mankind in the near future. Its purpose is to introduce students to these renewable energies and its conversion process with basic theory. These include solar, wind, biomass, hydropower, geothermal, tidal and wave energy and ocean thermal energy.

EDI4683 : Introduction to Energy Storage
Credit : 3 (3+0)
Prerequisite : None
This course discusses the several main energy storage technologies that could become significant to mankind in the near future. Its purpose is to introduce students to this energy storage and its conversion process with basic theory. These include thermal energy storage, flywheel energy storage, pumped hydro storage, and waterpower, fuel cells, tidal and wave energy and ocean thermal energy.

EDI4693 : Medical Instrumentation
Credit : 3 (3+0)
Prerequisite : None
This course starts with the fundamental that underlies with knowledge and understanding especially on instrument introduction, principle of physics, basic components, and also operational procedures. Topics for instrumentation are based on medical application.

EDI4703 : Introduction to Hybrid and Electric Vehicles
Credit : 3 (3+0)
Prerequisite : None
This course introduces the concept of hybrids, plug in hybrids, fuel cells and electric vehicles. This courses also evaluate about vhybrid, plug in hybrid, fuel cell and electric vehicles technology architecture, component, and discuss the current issue of vehicle technology in Malaysia.

EDI4713 : Introduction to Computer Aided Drawing
Credit : 3 (2+1)
Prerequisite : None
This course introduces the concept of computer aided drawing, constructing computer aided drawing and applying aided drawing using AutoCAD software.

EDI4723 : Sustainability in Telecommunication Technology
Credit : 3 (3+0)
Prerequisite : None
This course covers the concept of sustainability in the field of telecommunication technology. Learning includes an introduction to sustainability, electronic technologies for energy efficiency and sustainable growth, network energy consumptions, energy improvements in green and sustainable telecommunication technologies.

EDI4733 : Battery and Supercapacitor Technology
Credit : 3 (3+0)
Prerequisite : None
This course focuses on the fundamentals of energy storage, considering the operation and design of various batteries and supercapacitor technology. Students will be introduced to scientific knowledge inside batteries and supercapacitors by learning their basic components, mechanisms, and performance criteria. Specific topics for the types of batteries and supercapacitors will be exposed. Energy storage applications in stationary and mobile technologies, as well as safety considerations, will be discussed.

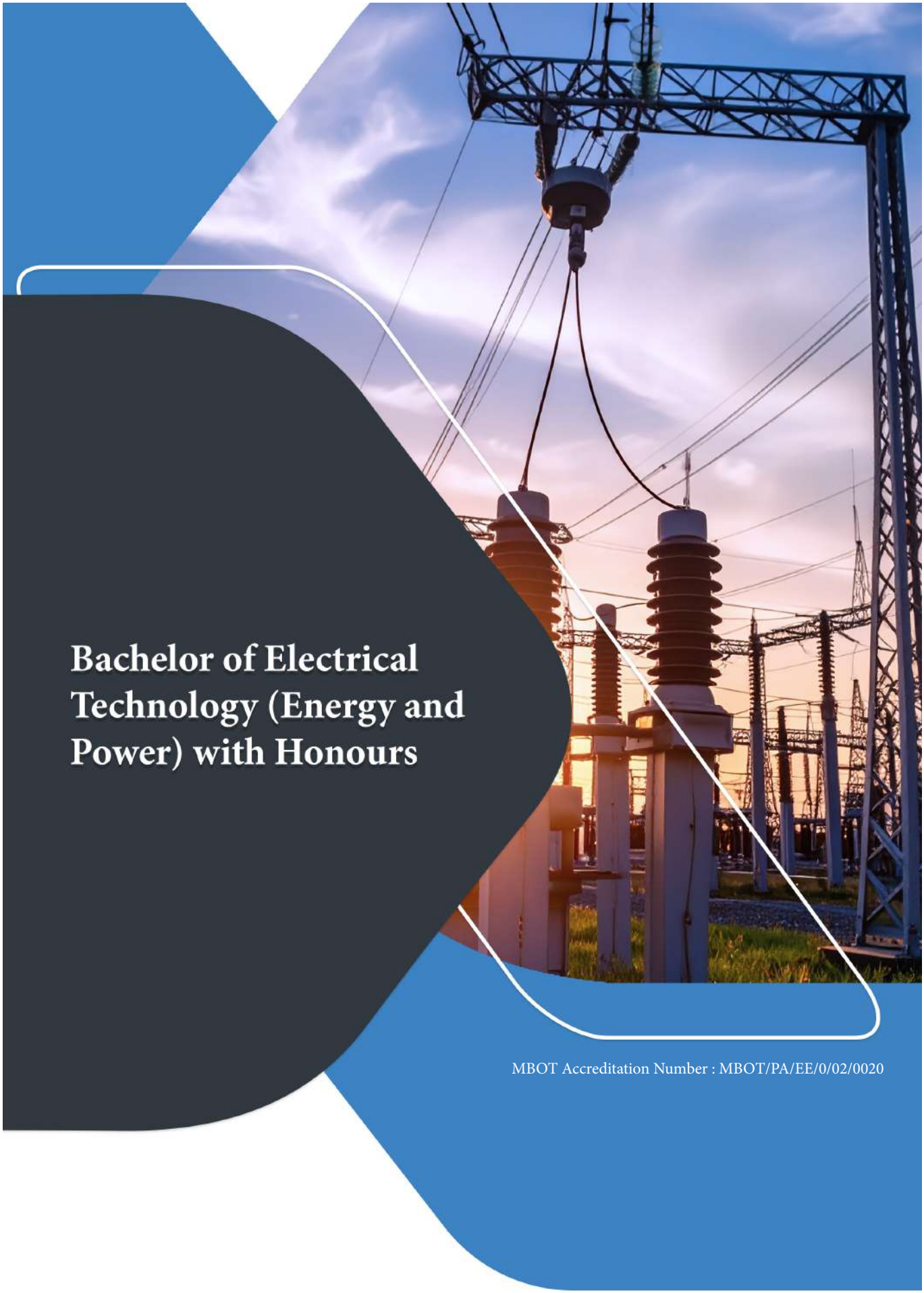
EDI4743 : Hydrogen Technology-Based and Storage
Credit : 3 (3+0)
Prerequisite : None
This course begins with an overview of hydrogen-based energy technologies and the integration of hydrogen production, storage, and fuel cells. Students will be introduced to hydrogen production/generation methods. The course will cover the fundamental concepts and classifications of hydrogen storage and fuel cells. Hydrogen processing and applications in various applications will be discussed.

EDI4982 : Final Year Research Project I
Credit : 2 (0+2)
Prerequisite : None
This an individual research project in connection with a technical and/or scientific problem and under the guidance of an academic staff. The project undertaken may fall under one of the following areas: Mathematical analysis, experimental tests, computer simulation, hardware and/software development, to their field of interest. In this course students should prepare and present a research proposal, demonstrates parts of findings and results of the research work.

EDI4994 : Final Year Research Project II
Credit : 4 (0+4)
Prerequisite : EDI4982
This course is the continuity of Final Year Project I. Students will continue conducting research activities that have been planned and started during Final Year Project I. Students will also have their progress and final presentation and complete their thesis reports during this course. In this course, students will also be exposed to scientific paper writing.

EDI49712 : Industrial Training
Credit : 12 (0+12)
Prerequisite : None

This course provides an opportunity for students to delve hands-on into the working world. The type of training conducted is determined by the industry involved with the consent of the faculty. At the end of this course, students gain exposure to the real work environment through interaction with industry workers, obtain skills in applying basic concepts in all courses studied on campus as well as able and confident to solve every work problem given by the industry.



Bachelor of Electrical Technology (Energy and Power) with Honours

MBOT Accreditation Number : MBOT/PA/EE/0/02/0020

Bachelor of Electrical Technology (Energy and Power) with Honours

Introduction

The Bachelor of Electrical Technology (Energy and Power) with Honours program emphasizes power generation, transmission, and electrical energy distribution systems. It is designed to produce graduates who are both knowledgeable and highly skilled in electrical technology, with a particular focus on energy and power.

Graduates will acquire a comprehensive understanding of the fundamental principles of electrical technology and the ability to apply this knowledge to research and technical problem-solving in energy and power systems. Students are trained to think critically, analyze and synthesize complex technical issues, and apply technology and innovation in addressing challenges related to electrical energy, independently or collaboratively. In addition, mastery of practical skills equips students to operate modern equipment and effectively manage power system operations and maintenance.

The program also incorporates elements of entrepreneurship, enabling students to identify business opportunities in the energy and power sector. At the same time, it emphasizes the cultivation of strong character and professional ethics, grounded in values and social norms recognized by the industry.

In their final year, students undertake a one-year industrial attachment with a relevant organization or company as part of the Work-Based Learning (WBL) courses. This immersive experience is designed to strengthen practical competencies, enhance industry readiness, and bridge the gap between academic learning and real-world applications.

Programme Educational Objectives (PEO)

This programme is offered for students to achieve the following objectives:

PEO1: To produce technologists who are knowledgeable and practically skilled in solving problems related to electrical technology, in line with industry developments and digital needs.

PEO2: To produce technologists with leadership qualities and competence in teamwork, as well as strong communication and interpersonal skills across disciplines within organizations and society.

PEO3: To produce competent technologists with strong numeracy skills in analyzing problems related to the field of electrical technology, including the marine industry, while upholding professional ethics and being responsive to technological advancements.

PEO4: To produce technology entrepreneurs with innovative skills in the field of energy and power who are committed to lifelong learning for career advancement as sustainable professional technologists.

Programme Learning Outcome (PLO)

At the end of this programme, students will be able to:

PLO1: Understand the fundamental principles of electrical technology in a holistic and in-depth manner, and to possess knowledge of the processes involved in conducting related research.

PLO2: Analyze, synthesize, and demonstrate the ability to think critically and innovatively in various aspects of technology and applications related to energy and power; and to be capable of applying this knowledge in research, both independently and with guidance.

PLO3: Interpret, implement, and apply knowledge related to energy and power technology, as well as to solve related problems using the latest appropriate equipment, both independently and with guidance.

PLO4: Interpret and evaluate relevant issues within an appropriate social context by applying various skills and knowledge acquired within the organization.

PLO5: Communicate ideas and present technical information derived from research effectively and confidently, both in written and oral form.

PLO6: Apply digital knowledge and skills in explaining concepts related to electrical energy and power technology.

PLO7: Interpret and apply numeracy skills to solve current problems.

PLO8: Actively engage in organizations and demonstrate outstanding leadership qualities.

PLO9: Continuously acquire knowledge and gain experience related to management technology and technical services in order to obtain new insights relevant to career development.

PLO10: Identify business opportunities and demonstrate negotiation skills in the field of electrical technology, particularly related to energy and power.

PLO11: Uphold professional, moral, and ethical values based on socially accepted norms.

Career Prospects

The Bachelor of Electrical Technology (Energy and Power) program offers a wide range of career opportunities in the electrical industry, with a focus on energy and power, in line with current technological advancements. Graduates have the potential to pursue careers in areas such as power electrical technologists, generation and energy distribution system officers, power automation and control, green energy (such as solar, wind turbines, and biomass), as well as power plant operations and maintenance. In addition, they may also work as energy technology consultants, electrical safety and risk officers, or developers of smart grid and IoT technologies. These career opportunities are available with leading companies such as TNB, Petronas, Intel, Infineon, and others.

Programme Graduation Requirements

1. Students must register for and pass all compulsory courses in the programme or equivalent replacement courses, as well as fulfill the minimum credit requirement for graduation. Students must also achieve a CGPA of not less than 2.00.

2. Students are required to undertake the Survival and Water Safety Program (SKA) and the Artificial Intelligence for Beginners (MCBS10017) as a condition to graduate.

3. The number of elective course credit hours that must be taken by students in the program of study is subject to the number of elective credit hours set by the program of study to meet graduate qualifications and is not subject to the number of elective courses taken.

4. The list of elective courses that can be taken by students in the program of study refers to the course offerings listed in the handbook of the study program of the faculty and other faculties.

5. Students must achieve the minimum grade requirement for English language proficiency as follows:

Stream	EOP Grade B or MUET Band 4.0
Science, Technology, Engineering and Mathematics (STEM)	EOP Gred B or MUET Band 4.0

*If, at the time of admission, a student has already achieved the minimum MUET Band required for graduation, the student is considered to have fulfilled the graduation requirement for MUET proficiency.

Total of Credit for Graduation

The minimum number credits to graduate is 140 credit hours. The distribution of credit course by category is as follows:

Code Course	Credit	Percentages
University Core	18	13
Programme Core	111	80
University Elective	11	7
Total	**140**	**100**

University Core (18 Credit Hours)

Code Course	Name Course	Credit Hours	Prerequisite
BBB3013	Academic Writing Skills	3 (3+0)	*None
BBB3033	English for Occupational Purposes	3 (3+0)	None
BBB3023	Public Speaking	3(3+0)	None
MPU3132	Appreciation of Ethics & Civilization	2 (2+0)	None
MPU3143	Communicative Malay Language	3 (3+0)	None
MPU3352	Integrity and Anti-Corruption	2 (2+0)	None
CCXXXXX	Co-Curriculum	2 (0+2)	None

Program Core (111 Credit Hours)

Course Code	Course Name	Credit Hours
ETK3013	Mathematics for Technologist I	3 (3+0)
ETK3023	Mathematics for Technologist II	3 (3+0)
ETK3033	Introduction to Circuit Theory	3 (2+1)
ETK3043	Introduction to Research Method	3 (2+1)
ETK3053	Introduction to Energy Technology	3 (3+0)
ETK3063	Advanced Circuit Theory	3 (2+1)
ETK3073	Electrical Measurement and Instrumentation	3 (2+1)
ETK3083	Electrical Machines Technology	3 (3+0)
ETK3093	Energy Efficiency, Management and Audit	3 (3+0)
ETK3103	Electrical Energy System	3 (3+0)
ETK3113	Introduction to Electrical Design	3 (2+1)
ETK3123	Control Systems Technology	3 (2+1)
ETK3133	Industrial Automation	3 (2+1)
ETK3143	Introduction to Smart Grid	3 (3+0)
ETK3153	Building Automation System	3 (2+1)
ETK4012	Professional Practices and Business for Technologist	2 (2+0)
ETK4023	Capstone Project	3 (2+1)
ETK4033	Business Strategy for Technologist	3 (2+1)
ETK4043	Power System Technology and Application	3 (2+1)
ETK4053	Management and Marketing Technology	3 (3+0)
ETK4063	Power Electronics and Drive Technology	3 (3+0)
ETK4073	Shipboard Electrical Power System	3 (3+0)
ETK4908	Industrial Electrical System	8(0+8)
ETK4918	Industrial Project Management	8(0+8)
ETK4982	Undergraduate Research Project 1	2(0+2)
ETK4994	Undergraduate Research Project 2	4(0+4)
ETK49712	Industrial Training	12(0+12)

University Elective (11 Credit Hours)

Students are required to select any four (4) courses from the list of elective courses below and must pass them in order to graduate. The number of elective courses offered in each semester depends on the teaching plan of the Electrical and Electronic Technology program.

Course Code	Course Name	Credit Hours
	1. Energy Technology	
RET3413	Marine Energy and Hydropower	3 (2+1)
RET4423	Wind Energy	3 (2+1)
RET4433	Solar Energy	3 (2+1)
RET4463	Bioenergy	3 (3+0)
ETK4403	Marine Energy Systems	3 (3+0)
ETK4533	Biomass Energy Conversion and Power Generation	3 (3+0)
EDI4683	Introduction to Energy Storage	3 (3+0)
KEJ4683	Energy and Climate Change	3 (3+0)

Course Code	Course Name	Credit Hours
	2. Power Technology	
EDI4643	High Voltage Technology	3 (3+0)
ETK4503	Power Distribution System Design	3 (3+0)
ETK4513	Power System Protection	3 (3+0)
ETK4523	Power Quality	3 (3+0)
	3. General Technology	
CSF3613	Machine Learning	3 (3+0)
ETK4603	Intermediate C Programming	3 (2+1)
ETK4613	Underwater Vehicle Technology	3 (3+0)
ETK4623	Python for Technologist	3 (2+1)
ETK4633	Introduction to Stock Market Trading for Technical Professionals	3 (2+1)
EDI4703	Introduction to Hybrid and Electric Vehicles	3 (3+0)
EDI4483	Principle of Communication System	3 (3+0)

Course Scheme
Bachelor of Electrical Technology (Energy and Power) with Honours

Code	Course Name	Credit Hours	Pre-requisite	Code	Course Name	Credit Hours	Pre-requisite
Semester 1				**Semester 2**			
MPU3143	Communicative Malay Language	3(3+0)	-	BBB3023	Public Speaking	3(3+0)	-
EDI3033	Electricity and Magnetism	3(3+0)	-	MPU3132	Appreciation of Ethics and Civilizations	2(2+0)	-
EDI3183	Basic Programming for Technologist	3(2+1)	-	MPU3352	Integrity and Anti-Corruption	2(2+0)	-
ETK3033	Introduction to Circuit Theory	3(2+1)	-	ETK3013	Mathematics for Technologist I	3(3+0)	-
ETK3043	Introduction to Research Method	3(2+1)	-	ETK3053	Introduction to Energy Technology	3(3+0)	-
CCCXXX2	Co-Curriculum	2(0+2)	-	ETK3063	Advanced Circuit Theory	3(2+1)	-
			-	ETK3073	Electrical Measurement and Instrumentation	3(2+1)	-
Total Credit		**17**		**Total Credit**		**19**	
Semester 3				**Semester 4**			
ETK3023	Mathematics For Technologist II	3(3+0)	-	BBB3013	Academic Writing Skills	3(3+0)	-
ETK3083	Electrical Machines Technology	3(3+0)	-	ETK3093	Energy Efficiency, Management and Audit	3(3+0)	-
ETK3103	Sustainable Electrical Energy System	3(3+0)	-	ETK3123	Power Electronics and Drive Technology	3(2+1)	-
ETK3113	Introduction to Electrical Design	3(2+1)	-	ETK3133	Industrial Automation	3(2+1)	-
ETK3153	Building Automation System	3(2+1)	-	ETK3143	Introduction to Smart Grid	3(3+0)	-
KAS3513	Occupational Safety and Health	3(3+0)	-	ETK4023	Capstone Project	3(2+1)	-
					Elective 1	2	
Total Credit		**18**		**Total Credit**		**20**	
Semester 5				**Semester 6**			
EDI4153	Embedded System	3(2+1)	-	BBB3033	English For Occupational Purpose	3(3+0)	-
ETK4012	Professional Practices And Business for Technologist	2(2+0)	-	ETK4043	Power System Technology and Application	3(2+1)	-
ETK4033	Business Strategy for Technologist	3(3+0)	-	ETK4053	Management and Marketing Technology	3(3+0)	-
ETK4063	Control System Technology	3(2+1)	-	ETK4994	Undergraduate Research Project 2	4(0+4)	-
ETK4073	Shipboard Electrical Power System	3(3+0)	-		Elective 3	3	-
ETK4982	Undergraduate Research Project 1	2(0+2)	-		Elective 4	3	-
	Elective 2	3	-				
Total Credit		**19**		**Total Credit**		**19**	
Semester 7*				**Semester 8***			
ETK4908	Industrial Electrical System	8(0+8)	-	ETK49712	Industrial Training	12(0+12)	-
ETK4918	Industrial Project Management	8(0+8)	-				
Total Credit		**16**		**Total Credit**		**12**	
Total Credit to Graduate : 140							

Notes:

1. Students are required to undertake the Survival and Water Safety Program and Artificial Intelligence for Beginner (MCBS10017) as a condition to graduate.
2. The number of elective course credit hours that must be taken by students in the programme of study is subject to the number of elective credit hours set by the programme of study to meet graduation qualifications and is not subject to the number of elective courses taken.
3. The list of elective courses that can be taken by students in the programme of study refers to the course offerings listed in the handbook of the study programme of the faculty and other faculties.
4. *Students will undertake Work-Based Learning (WBL) courses in industry during Semesters 7 and 8.

(Reference: UMT Senate Approval-199th Meeting, Year 2025)

Course Synopsis
Bachelor of Electrical Technology (Energy and Power) with Honours

ETK3013 : Mathematics for Technologist I
Credit : 3 (3+0)
Prerequisite : None
This course discusses matrices and emphasizes key concepts in engineering mathematics, including limits, differentiation, integration, differential equations, and vector systems.

ETK3023 : Mathematics for Technologist II
Credit : 3 (3+0)
Prerequisite : None
This course introduces some methods of mathematical analysis and applications to solve problems in technology. Topics involved are the determinant matrix and eigenvalues, the solution of first and second degree of ordinary differential equations, Laplace Transforms, Fourier Series and Fourier Transforms, partial differential equations and numerical methods for solving common first-order ordinary differential equations.

ETK3033 : Introduction to Circuit Theory
Credit : 3(2+1)
Prerequisite : None
This course introduces laws of circuit theory and methods of analysis . The students will study the network topology, independent variables, Nodal and Mesh analysis and other circuit theorems such as Superposition, Thevenin and Norton as well as linearity. Further, the course will also discuss the steady state capacitance and inductance as well as its RL and RC circuit analysis (DC circuit) . The use of measurement tools and connecting the electrical and electronics component in practical are also included.

ETK3043 : Introduction to Research Method
Credit : 3(2+1)
Prerequisite : None
This course introduces general research techniques with emphasis in engineering technology research. It convers project proposal, introduction, literature review, methodology, and data analysis.

ETK3053 : Introduction to Energy Technology
Credit : 3 (3+0)
Prerequisite : None
This course aims to provide students with fundamental knowledge of energy technologies that may become important to humanity in the near future. Its purpose is to introduce students to these energy technologies and the conversion process through theoretical basis. These include energy sources and impact, solar energy, biomass, wind energy, energy from micro and mini hydro and other energy sources and technologies.

ETK3063 : Advanced Circuit Theory
Credit : 3(2+1)
Prerequisite : None
This course is the continuation of Introduction to Circuit Theory. The students will be introduced to basic theories and mathematical concepts to analyze AC circuits. The course covers single-phase and 3-phase power systems; as well as transformers. Laplace transform; Initial- and Final Value Theorem; transfer functions; poles and zeros. Frequency response and bode plot will be applied in the analysis of analog circuits in frequency domain. At the end of the course, two-port networks will be introduced.

ETK3073 : Electrical Measurement and Instrumentation
Credit : 3(2+1)
Prerequisite : None
The electrical measurement and instrument course is an introductory course that provides students with a comprehensive understanding of measurement principles and instruments in electrical engineering. Topics covered include the concepts of measurements and measurement systems, instruments for electrical parameter measurement, potentiometers and transformers, DC and AC bridges, and display devices. Through practical lab work, students will gain hands-on experience in accurate measurements. By the end of the course, students will have a solid foundation in electrical measurement principles, problem-solving skills,and the ability to display measurements in practical scenarios.

ETK3083 : Electrical Machines Technology
Credit : 3 (3+0)
Prerequisite : None
This course covers the introduction to machinery priciples, transformer, AC Machinery fundamental, and DC Machinery fundamental.

ETK3093 : Energy Efficiency, Management and Audit
Credit : 3 (3+0)
Prerequisite : None
This course aims to provide students with a comprehensive understanding of energy management, efficiency, and audit techniques. The course covers topics such as energy consumption patterns, energy audits, energy management systems and energy-efficient technologies. The course also emphasizes the importance of energy conservation and the role of energy management in sustainable development.

ETK3103 : Sustainable Electrical Energy System
Credit : 3 (3+0)
Prerequisite : None
This course is designed to provide an in-depth understanding of the fundamental concepts, theories, and applications of electrical energy systems. Electrical Energy Systems is a comprehensive course designed to provide students with a thorough understanding of the generation, transmission, and distribution of electrical energy. The course aims to equip students with the knowledge and skills necessary to analyze, design, and operate efficient and reliable electrical power systems. By the end of the course, students will have gained a comprehensive understanding of electrical energy systems, their components, and their operation. They will be able to analyze power systems, evaluate their performance, and propose solutions for efficient and sustainable energy generation, transmission, and distribution.

ETK3113 : Introduction to Electrical Design
Credit : 3(2+1)
Prerequisite : None
This course provides students with an introduction to electrical design, electrical components, electrical circuits, electrical drawings, and documentation using AutoCAD software. Besides that, students also learn about 3D printing.

ETK3123 : Power Electronics and Drive Technology
Credit : 3(2+1)
Prerequisite : None
This course introduces the basic concepts of switched-mode converter circuits for controlling and converting electrical power with high efficiency. Principles of converter circuit analysis are introduced, and are developed for finding the steady state voltages, current, and efficiency of power converters. Assignments include simulation of a dc-dc converter, analysis of an inverting dc-dc converter, and modeling and efficiency analysis.

ETK3133 : Industrial Automation
Credit : 3(2+1)
Prerequisite : None
Small medium scale are in the phase of switiching to PLC and SCADA technology pfr the data acquisition control. Therefor it it necessary for the electronics/electrical technologies of both PLC and SCADA. This course attemps to provide basic technologies tp develope operational competency. Hence this course is the foundation for the technologies who want to further specialize in the Indistrial automation field.

ETK3143 : Introduction to Smart Grid
Credit : 3 (3+0)
Prerequisite : None
This subject cover the smart grid concept, different between convertional electrical network, infrastructure, interoperability, communication system and application of smart grid.

ETK3153 : Building Automation System
Credit : 3(2+1)
Prerequisite : None
This course introduces students to the principles, components, and applications of Building Automation System (BAS) technology. The course covers various topics related to the design, installation, operation, and maintenance of BAS in commercial and industrial buildings.

ETK4012 : Professional Practices and Business for Technologist
Credit : 2 (2+0)
Prerequisite : None
This course introduces students to the fundamental principles of professional practices and business management in the context of technological industries. Students will learn about business organization, management, marketing, and entrepreneurship, as well as ethical considerations and legal aspects of business operations. Through case studies, research projects, and guest lectures, students will develop a comprehensive understanding of the intersection of technology and business.

ETK4023 : Capstone Project
Credit : 3(2+1)
Prerequisite : None
A capstone project is introduced to allow students to demonstrate knowledge and understanding of engineering and management principles, and work as a member and leaders in a team to manage projects in multidisciplinary environments. The capstone project is a major component of any engineering curriculum. It showcases knowledge and skills acquired over years of studies to design a product/service of significance, and solve an open-ended problem in electrical engineering. Projects can be industrially sponsored, or departmentally through research projects proposed by faculty, or student.

ETK4033 : Business Strategy for Technologist
Credit : 3 (3+0)
Prerequisite : None
This course focuses deeply on business strategy and skills for technologists. It covers the topics related to business such as organization and organizing, human resource management, laws, project management, money in the organization, meeting customer needs, and information technology and electronic commerce.

ETK4043 : Power System Technology and Application
Credit : 3(2+1)
Prerequisite : None
This course is an introductory subject in the field of electric power systems and electrical to mechanical energy conversion. Electric power has become increasingly important as a way of transmitting and transforming energy in industrial, military and transportation uses. Examples of new uses for electric power include all manners of electric transportation systems (electric trains that run under catenary, diesel-electric railroad locomotion, 'maglev' medium and high speed tracked vehicles, electric transmission systems for ships and diesel-electric locomotives, replacement of hydraulics in high performance actuators, aircraft launch and recovery systems, battery powered factory material transport systems, electric and hybrid electric cars and buses, even the 'more electric' airplane).

ETK4053 : Management and Marketing Technology
Credit : 3 (3+0)
Prerequisite : None
Management and Marketing Technology is a subject that focuses on the principles and practices of business management and marketing in the context of technology. This subject covers a broad range of topics related to business operations, marketing strategies, and technology, including management principles, marketing principles, information technology, digital marketing, e-commerce, data analysis, and ethical and social responsibility issues.

ETK4063 : Control System Technology
Credit : 3(2+1)
Prerequisite : None
This course provides students with a background of control principles in various technology applications. Throughout this course, students will learn the basic mathematical tools such as Laplace transform, transfer function, block diagram, signal flow graph, mathematical modeling of dynamic systems, time response analysis, stability of linear system, root locus and frequency domain analysis. MATLAB based approach will be used to aid the students understanding of the concept introduced.

ETK4073 : Shipboard Electrical Power System
Credit : 3(3+0)
Prerequisite : None
This course covers the electrical power system for commercial and navy ships. It starts with the introduction to shipboard power system architectures that includes the types of drives, electrical design task, electrical load analysis and power system configurations. Then, the common aspects of power equipments such as load, AC generator, AC and DC motors transformers and cables are discussed further in the next topic. The course also covers specific issues related to the shipboard such as fault current and system protection, economic use of power, electric propulsion, ship emission regulation and clean power technologies, and also marine industry standards.

ETK4403 : Marine Energy Systems
Credit : 3 (3+0)
Prerequisite : None
Marine renewable energy is a significant resource for generating electricity, and if some conversion technologies have already reached a certain level of maturity, others are emerging. The originality of this course is to offer a broad spectrum of knowledge from academic and industry experts of various origins. It deals with general aspects such as the specificities and constraints of the marine environment, the concepts of hydrodynamics and ocean engineering, as well as the industrial and economic sides necessary for the assembly of projects. It also discusses conversion technologies such as offshore wind, tidal power plants, tidal stream turbines, wave energy converters, and ocean thermal energy plants.

ETK4503 : Power Distribution System Design
Credit : 3(3+0)
Prerequisite : None
The course covers the principles of electrical power distribution, load analysis, system components, and system design. The subject also includes the study of power factor correction, power quality, electrical safety, maintenance and troubleshooting.

ETK4513 : Power System Protection
Credit : 3 (3+0)
Prerequisite : None
This course focuses on protection schemes in a power system to ensure maximum continuity of electrical supply with minimum damage to life, equipment, and property. It also covers several fault characteristics of the individual power system elements.

ETK4523 : Power Quality
Credit : 3 (3+0)
Prerequisite : None
This course focuses deeply on electric power quality in power systems. It consists of power quality phenomena, voltage sags, momentary interruptions, voltage sag analysis, and electrical transient phenomena. Fundamentals of harmonics and analysis of power systems harmonics are also included.

ETK4533 : Biomass Energy Conversion and Power Generation
Credit : 3(3+0)
Prerequisite : None
This course provides an in-depth understanding of biomass as a renewable energy resource, focusing on its composition, energy-related properties, and role in energy conversion. It covers thermochemical and biochemical biomass conversion processes and explores the latest technologies in biomass-based power generation.

ETK4603 : Intermediate C Programming
Credit : 3(2+1)
Prerequisite : None
This course focuses on the intermediate level of C programming. It consists of stack memory, pointers, programming problems, and debugging. The use of heap memory, reading, and writing files, recursion, structure, and applications are also included.

ETK4613 : Underwater Vehicle Technology
Credit : 3 (3+0)
Prerequisite : None
This course provides an introduction to the design, analysis, and operation of underwater vehicles for various applications. Topics covered include principles of hydrodynamics and hydrostatics, sensors and instrumentation, control and automation, underwater communication and navigation, safety and emergency procedures, and maintenance and repair of underwater vehicles. The course includes lectures, laboratory exercises, group projects, and presentations.

ETK4623 : Python for Technologists
Credit : 3(2+1)
Prerequisite : None
This course teaches the fundamentals of Python programming and automation. Students learn how to write efficient code, work with data structures, and use object-oriented programming. The subject covers web development, data analysis, and real-world projects to help students apply their skills. By the end, students are able to solve complex problems and develop practical solutions using Python.

ETK4633 : Introduction to Stock Market Trading for Technologist Professionals
Credit : 3 (2+1)
Prerequisite : None
This course is designed to provide technologist professionals with an introduction to stock market trading. The course will cover fundamental concepts of investing, technical analysis, and portfolio management, and provide students with practical experience trading in a simulated stock market environment.

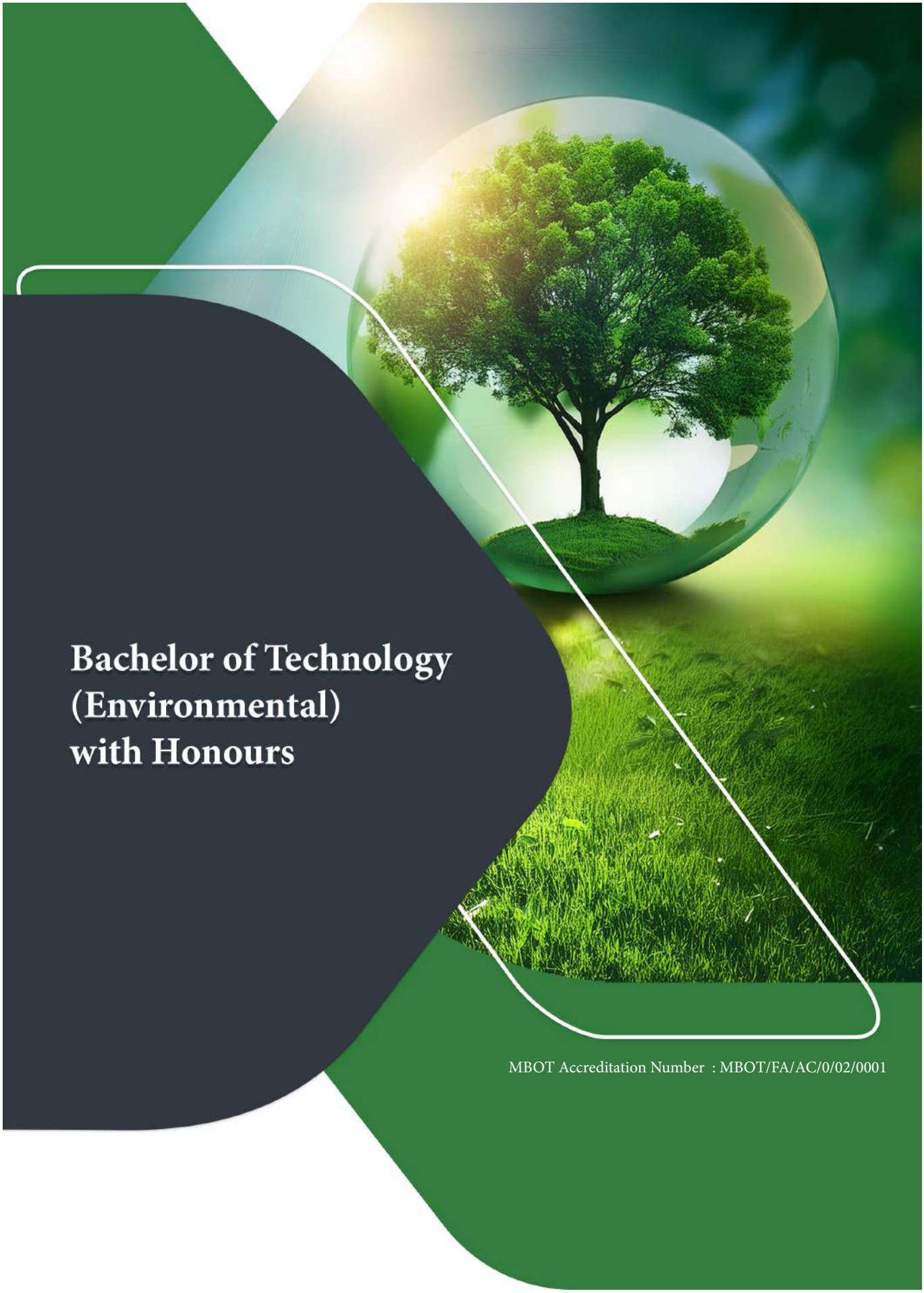
ETK4908 : Industrial Electrical System
Credit : 8 (0+8)
Prerequisite : None
This course provides students with the knowledge and skills necessary to design, install, maintain, and troubleshoot industrial electrical systems. This course applied in industrial settings for power distribution, control, and automation. Designed to provide safe and reliable electrical power to industrial equipment and machinery.

ETK4918 : Industrial Project Management
Credit : 8 (0+8)
Prerequisite : None
This course introduces students to the concepts and techniques used in managing technology electrical application project development in industrial environment. Through this project, students will generate project plan and schedule, cost estimation, in additon to preparing related documentations. The aspect that will be accessed here is students' ability in managing project development. This course will be supervised by industrial supervisor and monitored by UMT.

ETK4982 : Undergraduate Research Project 1
Credit : 2 (0+2)
Prerequisite : None
This an individual research project in connection with a technical and/or scientific problem and under the guidance of an academic staff. The project undertaken may fall under one of the following areas: Mathematical analysis, experimental tests, computer simulation, hardware and/software development, to their field of interest. In this course students should prepare and present a research proposal, demonstrates parts of findings and results of the research work.

ETK4994 : Undergraduate Research Project 2
Credit : 4(0+4)
Prerequisite : None
This course is the continuity of Final Year Project I. Students will continue conducting research activities that have been planned and started during the Final Year Project I. Students will also have their progress and final presentation and complete their thesis reports during this course. In this course, students will also be exposed to scientific paper writing.

ETK49712 : Industrial Training
Credit : 12 (0+12)
Prerequisite : None
This course provides an opportunity for students to delve hands-on into the working world. The type of training conducted is determined by the industry involved with the consent of the faculty. At the end of this course, students gain exposure to the real work environment through interaction with industry workers, obtain skills in applying basic concepts in all courses studied on campus as well as able and confident to solve every work problem given by the industry.



Bachelor of Technology (Environmental) with Honours

MBOT Accreditation Number : MBOT/FA/AC/0/02/0001

Bachelor of Technology (Environmental) with Honours

Introduction

Bachelor of Technology (Environment) with Honours is a four-year undergraduate programme that was first introduced in the year 2000. In this programme, students will be equipped with a wide range of knowledge, attitude and skills in environmental sciences, technology, engineering, and management which will enable them to effectively meet the needs of industry and community.

The programme is delivered by lecturers with diverse expertise and each course is taught through face-to-face or online lectures, discussion, tutorials as well as problem-based projects according to the course learning objectives. In the third year, each student will undertake a final year research project under the supervision of an appointed supervisor. This research training will expose students to relevant digital and numeracy skills for data analysis, technical presentation and system modelling. Students also learn essential practical and problem-solving skills in managing their projects.

In the final year, students are required to complete a 24-week industrial training placement at approved local or international organisations related to environmental technology. This training will enable students to integrate their academic knowledge and soft skills gained to tackle environmental issues at the workplace.

Programme Educational Objectives (PEO)

Graduates who undertake this program will be able to achieve the following objectives:

PEO1: Possess basic knowledge and technical skills in science, technology, engineering and environmental management.

PEO2: Ability to solve the environmental problems creatively and innovatively using a sustainable approach and application of numeracy and digital technology skills.

PEO3: Ingenious, competitive, and skilled in communicating effectively and have good leadership qualities in an organization.

PEO4: Always practice the qualities of professionalism and integrity in line with professional ethics and practice.

PEO5: Able to identify and take advantage of entrepreneurial, business, consulting, and lifelong learning opportunities.

Programme Learning Outcomes (PLO)

At the end of this programme, students will be able to:

PLO1: Acquire foundational knowledge and understanding of science, technology, engineering, and environmental management.

PLO2: Critically and analytically evaluate process components, relevant acts, and regulations in addressing environmental issues.

PLO3: Demonstrate comprehensive technical competencies in the field of environmental studies.

PLO4: Function effectively both independently and collaboratively within teams.

PLO5: Communicate ideas and information proficiently in discussions concerning contemporary environmental issues.

PLO6: Integrate the use of digital technologies and modern computer applications in problem-solving, management, and information dissemination.

PLO7: Apply numeracy skills in problem-solving, decision-making, and drawing conclusions.

PLO8: Exhibit effective leadership capabilities.

PLO9: Engage in independent learning and identify the need for lifelong education.

PLO10: Demonstrate managerial skills and identify opportunities in entrepreneurship and consultancy.

PLO11: Uphold professional, moral, and ethical values grounded in accepted social norms.

Career Prospects

Graduates of this programme will have the opportunity to pursue careers in various sectors. Among the prominent careers are: Environmental Scientist, Hazardous Materials Consultant and Manager, Environmental Compliance Managers, Environmental Investigator Officer, Environmental Coordinator, Waste Management Consultant, Site Rehabilitation Consultant, Wastewater Treatment Operator, Pollution Control Consultant, Environmentalist, Environmental Activist, Occupational Health Consulting Officer, and Educator in the field of environment.

Programme Graduation Requirements

1. Students must register for and pass all compulsory courses in the program or their equivalent replacement courses and fulfill the minimum credit requirement for graduation. Students must also achieve a minimum CGPA of 2.00.

2. Students are required to complete the Survival and Water Safety Program (SKA) and the course Artificial Intelligence for Beginners (MCBS10017) as part of the graduation requirements.

3. The total credit hours for elective courses that students must complete are subject to the minimum elective credit hours stipulated by the program and not based on the number of elective courses taken.

4. *KAS49712 Industrial Training will be conducted throughout Semester 8. Students are required to return to Universiti Malaysia Terengganu (UMT) for presentation and submission of their report. Assessment and grading will be carried out according to the schedule applicable to other courses.

5. Students must achieve the minimum grade requirement for English language proficiency as specified below;

Stream	Minimum English Proficiency Requirement
Science, Technology, Engineering, and Mathermatics (STEM)	EOP Grade B or MUET Band 4.0

*If, at the time of admission, a student has already attained the minimum MUET Band required for graduation, the student shall be considered to have fulfilled the graduation requirement for MUET proficiency.

Total of Credit for Graduation

The minimum number credits to graduate is 133 credit hours. The distribution of credit course by category is as follows:

Categories	Credit	Percentages
University Core	18	14
Programme Core	77	58
University Elective	38	28
University Elective	**133**	**100**

University Core (18 Credit Hours)

Code Course	Name Course	Credit Hours	Prerequisite
BBB3013	Academic Writing Skills	3 (3+0)	*None
BBB3033	English for Occupational Purposes	3 (3+0)	None
BBB3023	Public Speaking	3(3+0)	None
MPU3132	Appreciation of Ethics & Civilization	2 (2+0)	None
MPU3143	Communicative Malay Language	3 (3+0)	None
MPU3352	Integrity and Anti-Corruption	2 (2+0)	None
CCXXXXX	Co-Curriculum	2 (0+2)	None

Program Core (77 Credit Hours)

Course Code	Course Name	Credit Hours	Prerequisite
KAS3013	Introduction to Environmental Technology	3 (3+0)	None
KAS3023	Environmental Statistics	3 (3+0)	None
KAS3032	Principles of Environmental Analysis	2 (2+0)	None
KAS3213	Water Treatment Technology	3 (3+0)	None
KAS3223	Wastewater Treatment Technology	3 (2+1)	KAS3213
KAS3313	Quality and Air Pollution	3 (3+0)	None
KAS3323	Meteorology and Environment	3 (2+1)	None
KAS3513	Occupational Safety and Health	3 (3+0)	None
KAS3523	Environmental Laws and Regulations	3 (3+0)	None
KAS3533	Environmental Management	3 (3+0)	None
KAS3723	Hydrology and Water Resource	3 (2+1)	None
KAS4113	Environmental Design	3 (1+2)	KAS3223
KAS4413	Solid Waste Management	3 (3+0)	None
KAS4423	Hazardous and Scheduled Waste Management	3 (3+0)	None
KAS4553	Environmental Impact Assessment	3 (2+1)	None
KAS4983	Final Year Research Project I	3 (0+3)	None
KAS4993	Final Year Research Project II	3 (0+3)	KAS4983
KAS49712	Industrial Training	12 (0+12)	None
KEJ3123	Materials Engineering	3 (2+1)	None
KEJ3133	Engineering Drawing for Environmental Technology	3 (1+2)	None
KEJ3143	Fluid Mechanics	3 (2+1)	None
KEJ3163	Chemical Process Principles	3 (3+0)	None
KEJ3173	Mathematics for Technology	3 (3+0)	None

University Elective (38 Credit Hours)

Students are free to register for any course offered as appropriate based on student interest and maturity. Students are also required to take 6 credit hours of guided electives and at least 21 credit hours from the list of elective courses below, or subject to the approval by the Head of Programme:

Course Code	Course Name	Credit Hours	Prerequisite
KAS4013	Applied Digital Skills for Professionals	3 (2+1)	None
KAS4213	Urban Drainage and Sewerage	3 (3+0)	None
KAS4223	Advanced Wastewater Treatment	3 (3+0)	None
KAS4233	Wetlands	3 (3+0)	None
KAS4243	Industrial Effluent and Activated Sludge Treatment	3 (3+0)	None
KAS4253	Water Services and Management	3 (3+0)	None
KAS4313	Air Pollution Control Technology	3 (3+0)	KAS3313
KAS4323	Indoor Air Quality	3 (3+0)	KAS3313
KAS4333	Emission from Combustion Process	3 (3+0)	None
KAS4343	Air Quality Monitoring and Instrumentations	3 (3+0)	None
KAS4353	Environmental Noise and Vibration	3 (3+0)	None
KAS4513	Geotechnical Engineering	3 (3+0)	None
KAS4533	Industrial Hygiene	3 (3+0)	KAS3513
KAS4543	Occupational Safety Health Management and Audit	3 (3+0)	KAS3513

KAS4563	Life Cycle Assessment	3 (3+0)	None
KAS4573	Sustainability Operation and Management	3 (3+0)	None
KAS4713	Groundwater and Pollution	3 (3+0)	None
KAS4723	Surface Water Hydrology	3 (3+0)	None
KAS4733	Coastal Environment	3 (2+1)	None
KAS4743	Soil Physics	3 (3+0)	None
KAS4753	Watershed Management	3 (3+0)	None
KAS4763	Soil Nature and Physical Properties	3 (3+0)	None
KAS4773	Applied Geographic Information System (GIS) for Environment	3 (2+1)	None
KEJ4113	Unit Operations	3 (3+0)	None
KEJ4123	Chemical Reaction Technology	3 (3+0)	None
KEJ4133	Heat Transfer	3 (3+0)	None
KEJ4143	Mass and Energy Balances	3 (3+0)	None
KEJ4513	Engineering Economics	3 (3+0)	None
KEJ4523	Chemical Process Safety	3 (3+0)	None
KEJ4613	Renewable Energy Technology	3 (3+0)	None
KEJ4623	Membrane Technology	3 (3+0)	None
KEJ4633	Clean Technology	3 (3+0)	None
KEJ4643	Polymer and Environment	3 (3+0)	None
KEJ4653	Environmental Nanotechnology	3 (3+0)	None
KEJ4663	Thermochemical Treatment and Biomass Recovery	3 (3+0)	None
KEJ4673	Anaerobic Digestion Process Technology	3 (3+0)	None
KEJ4683	Energy and Climate Change	3 (3+0)	None
KEJ4693	Energy Management and Audit	3 (3+0)	None

Guided Electives (6 Credit Hours)

Students of Intake Academic Session 2025/2026 are required to take a Guided Elective Course, namely a third language course, as part of the prescribed elective course requirements. This course consists of Level 1 (BBC3013 – Mandarin Language I) and Level 2 (BBC3023 – Mandarin Language II), which are offered in Semester 2 and Semester 3 of study.

*Please refer to the Guidelines for the Implementation of Third Language Course Offerings for further details.

Course Scheme
Bachelor of Technology (Environment) with Honours

Code	Course Name	Credit Hours	Pre-requisite	Code	Course Name	Credit Hours	Pre-requisite
Semester 1				**Semester 2**			
MPU3143	Communicative Malay Language	3(3+0)	-	BBB3013	Academic Writing Skills	3(3+0)	-
MPU3352	Integrity and Anti-Corruption	2(2+0)	-	BBB3023	Public Speaking	3(3+0)	-
KEJ3123	Materials Engineering	3(2+1)	-	MPU3132	Appreciation of Ethics and Civilizations	2(2+0)	-
KEJ3173	Mathematics for Technology	3(3+0)	-	KAS3023	Environmental Statistics	3(3+0)	-
KAS3013	Introduction to Environmental Technology	3(3+0)	-	KAS3032	Principles of Environmental Analysis	2(2+0)	-
KAS3523	Environmental Law and Regulations	3(3+0)	-	CCXXXXX	Co-Curriculum	2(0+2)	-
					Elective 1	2	-
Total Credit		**17**		**Total Credit**		**17**	
Semester 3				**Semester 4**			
KAS3213	Water Treatment Technology	3(3+0)	-	KAS3223	Wastewater Treatment Technology	3(2+1)	KAS3213
KAS3313	Quality and Air Pollution	3(3+0)	-	KAS3323	Meteorology and Environment	3(2+1)	-
KEJ3133	Engineering Drawing for Environmental Technology	3(1+2)	-	KAS3533	Environmental Management	3(3+0)	-
KEJ3143	Fluid Mechanics	3(2+1)	-	KAS3723	Hydrology and Water Resources	3(2+1)	-
KEJ3163	Chemical Process Principles	3(3+0)	-	KAS4413	Solid Waste Management	3(3+0)	-
	Elective 2	3(3+0)	-		Elective 3	3	-
Total Credit		**18**		**Total Credit**		**18**	
Semester 5				**Semester 6**			
KAS3513	Occupational Safety and Health	3(3+0)	-	BBB3033	English for Occupational Purposes	3(3+0)	-
KAS4113	Environmental Design	3(1+2)	KAS3223	KAS4553	Environmental Impact Assessment	3(2+1)	-
KAS4423	Hazardous and Scheduled Waste Management	3(3+0)	-	KAS4983	Final Year Research Project I	3(0+3)	-
	Elective 4	3	-		Elective 7	3	-
	Elective 5	3	-		Elective 8	3	-
	Elective 6	3	-		Elective 9	3	-
Total Credit		**18**		**Total Credit**		**18**	
Semester 7				**Semester 8**			
KAS4993	Final Year Research Project II	3(0+3)	KAS4983	KAS49712	Industrial Training*	12(0+12)	-
	Elective 10	3	-				
	Elective 11	3	-				
	Elective 12	3	-				
	Elective 13	3	-				
Total Credit		**15**		**Total Credit**		**12**	
Total Credit to Graduate : 133							

Notes:

1. Students are required to undertake the Survival and Water Safety Program and Artificial Intelligence for Beginner (MCBS10017) as a condition to graduate.
2. The number of elective course credit hours that must be taken by students in the program of study is subject to the number of elective credit hours set by the program of study to meet graduate qualifications and is not subject to the number of elective courses taken.
3. The list of elective courses that can be taken by students in the program of study refers to the course offerings listed in the handbook of the study program of the faculty and other faculties.
4. *KAS49712 Industrial Training will be conducted throughout Semester 8. Students are required to return to Universiti Malaysia Terengganu (UMT) for presentation and submission of their report. Assessment and grading will be carried out according to the schedule applicable to other courses.

(Reference: UMT Senate Approval-199th Meeting, Year 2025)

Course Synopsis
Bachelor of Technology (Environment) with Honours

KAS3013 : Introduction to Environmental Technology
Credit : 3 (3+0)
Prerequisite : None
This course provides the student with fundamental knowledge about the environmental elements and the comprehensive scope of environmental technology, uniquely framed through a cross-disciplinary systems thinking lens. It delves into the basic concepts of environmental technology, hydrology, and ecosystem dynamics, emphasizing their critical role within the context of global environmental frameworks and challenges. A key focus is placed on the technological and strategic advancements, including climate resilience measures and the implementation of green infrastructure, alongside sustainable resource management and advanced pollution control strategies to safeguard the quality of air, water, and soil. Furthermore, the course integrates the principles of Sustainable Development Goals (SDGs), explores how environmental technologies contribute to achieving these global targets. By examining the complex interdependence within ecological, social, technological, and economic systems, students will be empowered to formulate holistic, integrated, and forward-looking approaches essential for fostering a truly sustainable global environment.

KAS3023 : Environmental Statistics
Credit : 3 (3+0)
Prerequisite : None
This course exposes students to an approach oriented to probability and data analysis to solve problems related to the environment. It is designed to give students the knowledge and skills to interpret and analyze data. Course content includes data description in the environment, probability, estimating the value of a parameter using confidence intervals, comparison tests, correlation and regression as well as environmental sampling and modeling. Overall, students are inculcated with 21st century elements in managing, analyzing and interpreting data critically and using appropriate methods. Technology 4.0-guided approach can produce students who have skills in analyzing a lot of data (big data analytics) for the sake of universal sustainability. At the end of this course, students will gain the ability to apply fundamental statistical methods to collect, analyze, and interpret environmental data.

KAS3032 : Principles of Environmental Analysis
Credit : 2 (2+0)
Prerequisite : None
This course introduces students to the fundamental theories and skills in conducting environmental analysis. The topics covered emphasize an introduction to the basic concepts of environmental analysis mechanisms, environmental sampling techniques, principles of environmental analysis, as well as quality assurance and quality control concepts in environmental analysis. By the end of the course, students will be able to acquire the basic knowledge needed to plan and carry out environmental sampling processes and identify appropriate techniques for analyzing environmental data and samples.

KAS3213 : Water Treatment Technology
Credit : 3 (3+0)
Prerequisite : None
This course introduces students to the fundamental theories and processes of water treatment, from the water source to distribution to consumers. The topics covered include the criteria, principles, and processes of water treatment, as well as distribution techniques and their components. The course emphasizes compliance with relevant standards, regulations, and legislation. Students are also exposed to the basic design of several components in the water treatment process. At the end of this course, students will be able to master fundamental knowledge in the management of water treatment and distribution systems, including an understanding of design criteria, selection of appropriate treatment processes, and compliance with water quality standards. Students will also be able to identify the main components in water treatment systems and understand the function of each component in ensuring a clean, safe, and continuous water supply to consumers.

KAS3223 : Wastewater Treatment Technology
Credit : 3 (2+1)
Prerequisite : KAS3213
This course introduces students to the fundamental aspects of wastewater characterization, pollutant types, and principles of conventional and advanced treatment technologies. Emphasis is placed on the design and operation of treatment systems, regulatory compliance for effluent discharge, and sludge management. At the end of the course, students will achieve two key outcomes: (1) able to explain wastewater characteristics and treatment principles, and (2) able to perform calculations related to the design of treatment components, systems, and processes. Practical sessions reinforce pollutant analysis and treatment applications.

KAS3313 : Quality and Air Pollution
Credit : 3 (3+0)
Prerequisite : None
This course introduces the students to the causes and effects of air pollution. The topics covered include the general philosophy of air pollution, environmental impacts, classification of air pollution, data monitoring, processing and modelling. This course also provides knowledge of the latest rules and management methods in air pollution concepts based on the Clean Air Regulations, 2014. At the end of the course, students will be able to understand air pollution concepts and apply appropriate monitoring in line with current environmental regulations.

KAS3323 : Meteorology and Environment
Credit : 3 (2+1)
Prerequisite : None
This course introduces students to the fundamental concepts and applications of meteorology in the context of the environment. It provides a scientific basis for understanding atmospheric processes, weather observations, meteorological instruments, technology used in environmental meteorology which include Internet of Things (IoT) for environmental monitoring and environmental meteorological data presentation which include the application of Artificial Intelligence (AI) in environmental data analysis and modelling. The course is offered to equip students with essential knowledge and skills in understanding atmospheric and environmental interactions. At the end of this course, students will be able to master the basic concept of meteorology, atmospheric structure, meteorology parameters and technology used in meteorology. Students will also be able to report meteorological or climatological data using data visualization tools and interpret the meteorological or climatological processes behind certain meteorological or climatological phenomena that occur. By understanding weather patterns, climate trends, and environmental monitoring techniques and analysis, students will be prepared for contemporary challenges in atmospheric and environmental science, contribute to sustainable development, and support informed decision-making in environmental management and policy.

KAS3513 : Occupational Safety and Health
Credit : 3 (3+0)
Prerequisite : None
This course introduces students to the philosophy, principles, and rationale of the Occupational Safety and Health Act 1994, including the Occupational Safety and Health (Amendment) Act 2022, along with the related regulations. Legislation related to fire services, employment, petroleum, and gas supply will also be discussed. At the end of this course, students will be able to understand the purpose and key elements of occupational safety and health laws in Malaysia, identify relevant legal requirements across various sectors, and appreciate the importance of legal compliance in promoting safe and healthy work environments.

KAS3523 : Environmental Laws and Regulations
Credit : 3 (3+0)
Prerequisite : None
This course provides students with exposure to the fundamental principles and enforcement of environmental laws and regulations at both national and international levels. Students will learn about the relevant legal systems under the Environmental Quality Act 1974 and its related regulations, such as the Environmental Quality (Clean Air, Industrial Effluent, Scheduled Waste, Environmental Impact Assessment (EIA), and others) Regulations. The course also includes an introduction to international conventions and agreements such as the Basel Convention, the Stockholm Convention, the Kyoto Protocol, and the Paris Agreement. Emphasis will be placed on the relationship between legislation and current environmental issues such as air and water pollution, scheduled waste, and noise. Students will be trained to analyze environmental issues occurring in Malaysia and to propose solutions from the perspective of environmental law and sustainable environmental management.

KAS3533 : Environmental Management
Credit : 3 (3+0)
Prerequisite : None
This course provides a comprehensive understanding of Environmental Management, integrating human-environment interactions with scientific and management applications to address current environmental challenges. It covers fundamental principles of pollution management, control, and environmental protection across water, air, soil, and alongside resource management strategies. The course also emphasizes the impact of human activities on both the environment and human health. Key contemporary elements, including Global Frameworks, Sustainable Development Goals (SDGs), ESG (Environmental, Social, and Governance) frameworks, and Planetary Boundaries, are explored to provide a holistic perspective on sustainable practices. Students will also gain exposure to knowledge like environmental auditing and assessment for effective protection, risk management, and pollution control. End of this course, students will be equipped with the knowledge to contribute effectively to environmental protection and sustainable development initiatives.

KAS3723 : Hydrology and Water Resource
Credit : 3 (2+1)
Prerequisite : None
This course introduces the fundamentals of hydrology and water resources, covering key topics such as the water cycle, precipitation, streamflow, evaporation, infiltration, groundwater, hydrograph analysis, flood control, watershed management, and hydrological data interpretation. The course is offered to address the growing need for effective water management in response to environmental challenges such as climate change, urbanization, and water scarcity. It aims to provide students with a solid understanding of water cycle processes and how they impact ecosystems, infrastructure, and society. Students will learn to connect hydrological theory with practical techniques through collaborative and self-directed learning approaches. Students will gain experience in data collection, analysis, and the use of tools to assess and manage water-related issues. By the end of the course, students will develop valuable skills in data interpretation, problem-solving, and decision-making, equipping them to contribute to sustainable water resource management in both environmental and engineering contexts.

KAS4013 : Applied Digital Skills for Professionals
Credit : 3 (2+1)
Prerequisite : None
This course equips students with essential digital skills for professional development. It provides hands-on training in utilizing digital tools and Artificial Intelligence (AI)-based applications for effective communication, document preparation, and productivity enhancement. The course also emphasizes ethical practices and professionalism in writing, including crafting formal emails and resumes tailored to the specific needs of their field. This course establishes a strong foundation for students to become technologically proficient and professionally competent technologists.

KAS4113 : Environmental Design
Credit : 3 (1+2)
Prerequisite : KAS3223
This course is designed to equip students with foundational knowledge and practical skills in designing unit operations and processes related to environmental design. Students will be introduced to the fundamentals of environmental design, water treatment system design, process synthesis and analysis, and the operation of treatment units. The course also covers feasibility studies and operation and maintenance aspects of treatment plants. As part of the learning experience, students will be required to carry out a mini design project related to water or wastewater treatment, complete a project report, and deliver a presentation. By the end of this course, students will be able to apply environmental principles in the design of treatment systems, synthesize appropriate treatment processes, evaluate design feasibility and costs, and effectively communicate their project outcomes through written and oral formats.

KAS4213 : Urban Drainage and Sewerage
Credit : 3 (3+0)
Prerequisite : None
This course introduces students to the planning, design, operation, and management of urban drainage and sewerage systems. The primary aim is to equip students with the knowledge and practical skills needed to address stormwater challenges in urban environments, especially in the face of rapid urbanization and climate change. Students will learn about the impacts of urbanization on natural hydrological processes and how it leads to increased stormwater runoff. Key topics covered include runoff estimation, sewer flow analysis, and the design of sewerage systems, as well as the planning of flood detention ponds, concrete basins, and erosion and sedimentation control measures. The course also emphasizes sustainable urban drainage approaches, including green infrastructure and best management practices (BMPs), to reduce environmental impacts and improve system performance. By the end of the course, students will be able to understand how urban development affects hydrology, analyze and estimate stormwater runoff, design effective drainage and sewer systems, develop flood control and erosion management plans, and apply integrated, sustainable solutions to urban drainage problems. This course prepares students to meet real-world demands in urban water management and to contribute to the development of resilient, environmentally responsible infrastructure.

KAS4223 : Advanced Wastewater Treatment
Credit : 3 (3+0)
Prerequisite : None
This course introduces the students to a selection of advanced wastewater treatment technologies and their working principles in various water treatment applications. The topics include the limitations for conventional treatment, advanced treatments for removal of micro pollutants, membrane technology, advanced filtration, adsorption, ion conversion, advanced oxidation, distillation and methods of reuse and recycling of treated wastewater. At the end of the course, students will be able to extend the knowledge of the advanced concepts wastewater treatment systems.

KAS4233 : Wetlands
Credit : 3 (3+0)
Prerequisite : None
This course discusses the introduction to wetlands; methods of determining and classifying wetlands; the role of science in the recognition and mapping of wetlands; wetland problems and indicators; and management issues. Besides, the course emphasizes compliance with relevant standards, regulations, and legislation. This course highlights the application of 21st century skill elements where students are encouraged to collaborate in learning and be able to relate theory to fieldwork. Students will also be able to identify the main components in wastewater treatment systems and understand the function of each component in ensuring a clean, safe, and continuous water supply to consumers.

KAS4243 : Industrial Wastewater Treatment by Activated Sludge
Credit : 3 (3+0)
Prerequisite : None
This course enables students to gain knowledge of the principles, theories and treatment of activated sludge as one of the biological treatments for industrial effluent. Knowledge of effective monitoring methods for predetermined parameters, current issues as well as treatment application problems on the characteristics of industrial effluent according to current developments will be discussed. This course prepares students to become a professional wastewater treatment plant operator. Based on Academic Program Criteria 4.0, this course encourages students to solve effluent monitoring problems based on the selected types of industrial effluents.

KAS4253 : Water Services and Management
Credit : 3 (3+0)
Prerequisite : None
This course introduces students to the concept, policy and operations related to water services and management. The course addresses the crucial roles of key entities in water governance, responsibility and involvement of stakeholders in water management, sustainable water practices and strategies. This course will equip the students with the knowledge on sustainable practices and innovative solutions for effective water resource management.

KAS4313 : Air Pollution Control Technology
Credit : 3 (3+0)
Prerequisite : KAS3313
This course covers the principles and technologies of air pollution control, including pollutant behavior, regulatory requirements, and atmospheric factors. It emphasizes control methods for particulate and gaseous emissions, inspection and maintenance of control equipment, and the application of air pollution modelling approaches. By the end of the course, students will be able to explain concepts, evaluate air quality issues, and apply appropriate control strategies and technologies.

KAS4323 : Indoor Air Quality
Credit : 3 (3+0)
Prerequisite : KAS3313
This course introduces students to the concepts and significant of Indoor Air Quality (IAQ) in industrial settings. It also focuses on fundamental building systems, human reactions, indoor contaminants, IAQ assessment, strategy and prevention of IAQ problems in buildings, special indoor environments and risk and action assessments. It explores the sources and types of indoor air pollutants, health impacts of poor IAQ, and the physical, chemical, and biological factors that influence air quality indoors. By the end of this course, students will be able to understand the key principles of indoor air quality, identify common indoor pollutants and their sources, and evaluate the factors that influence air quality in enclosed spaces. They will gain skills in measuring and assessing IAQ using appropriate tools and standards, interpreting data, and recommending effective strategies.

KAS4333 : Emission from Combustion Process
Credit : 3 (3+0)
Prerequisite : None
This course will equip the student with knowledge of combustion engines and the pollution generated from their emissions. The course covers the basis of engine operation, the thermodynamics of the combustion process, the rate and mechanism of combustion, the measurement and control of pollutants. The student will be introduced to the application of software in analyzing the emission and efficiency of engine.

KAS4343 : Air Quality Monitoring and Instrumentations
Credit : 3 (3+0)
Prerequisite : None
This course introduces the basic principles, methods and tools used to monitor air quality. Students will learn how to identify and measure key air pollutants like dust particles, harmful gases and toxic substances following standards of NAAQS. The course covers different types of instruments including particle samplers, gas sensors and real-time monitoring systems. It also explains how to collect data, use data loggers, perform calibration, and ensure data quality through QA/QC procedures. Modern technologies like IoT, artificial intelligence (AI) and cloud-based systems are also introduced to reflect current industry trends under Industrial Revolution 4.0. Real-world case studies from DOE Malaysia and US-EPA provide practical understanding. By the end of the course, students will have the knowledge and skills to handle air quality monitoring systems effectively in both environmental and industrial settings.

KAS4353 : Environmental Noise and Vibration
Credit : 3 (3+0)
Prerequisite : None
This course introduces the fundamentals of environmental noise and vibration including their sources, propagation, impacts and control measures. Students will learn to measure and analyze noise using sound level meters and key indices (LAeq, L10, L90) and apply noise mapping techniques. The course covers regulatory frameworks from DOE Malaysia and WHO, community noise annoyance and control strategies such as barriers and enclosures. Students will be equipped with the skills to understand, critically comment and holistically assess the impact and control of environmental noise and vibration based on the elements of Industrial Technology 4.0.

KAS4413 : Solid Waste Management
Credit : 3 (3+0)
Prerequisite : None
This course introduces students to the principles of integrated solid waste management, focusing on household, institutional, commercial, industrial (ICI), and construction & demolition (C&D) waste in Malaysia. Students will gain in-depth knowledge of the characteristics and composition of solid waste generated from these diverse sources. The course covers integrated management procedures and systems, including solid waste sampling, collection, treatment, and disposal methods. Emphasis is placed on waste reduction at the source and minimizing environmental pollution through proper waste management practices. At the end of the course, students will be able to determine waste generation rate, calculate waste collection effectiveness and propose sustainable waste disposal or minimization options.

KAS4423 : Hazardous and Scheduled Waste Management
Credit : 3 (3+0)
Prerequisite : None
This course explores the fundamental theories and principles of hazardous and scheduled waste management, emphasizing strategies to minimize environmental and human health risks. It provides comprehensive coverage of waste control technologies, relevant legislation and policies, as well as best practices for waste storage, keeping, and management. Aligning with Sustainable Development Goal (SDG) 12: Responsible Consumption and Production, the course promotes sustainable waste management practices, encouraging resource efficiency, waste reduction, and the transition toward a circular economy. At the end of this course, the students will be able to identify scheduled waste, manage scheduled waste based on current legislation and propose suitable waste minimization techniques.

KAS4513 : Geotechnical Engineering
Credit : 3 (3+0)
Prerequisite : None
This course discusses the analysis and property of soil classification. The law and fundamentals of compression, shear, strain, stability and water seepage are discussed as well. The course emphasizes compliance with relevant standards, regulations, and legislation. At the end of this course, students will be equipped with the skills to understand, critically comment and holistically analyze problems related to soil mechanics guided by 21st century skill elements. Based on Academic Program Criteria 4.0, students who take this course will also be exposed to real practice from the industry through selected topics such as slope stability.

KAS4533 : Industrial Hygiene
Credit : 3 (3+0)
Prerequisite : KAS3513
This course covers the fundamental concepts of Industrial Hygiene, with a focus on the identification, evaluation, and control of workplace hazards. Topics include the recognition of common occupational hazards such as dust, noise, gases, lighting, heat, and radiation, as well as basic toxicology, fundamentals of exposure assessment, and hazard monitoring techniques. At the end of this course, students will be able to identify workplace hazards, apply exposure assessment methods, and recommend appropriate control measures to enhance occupational health and safety.

KAS4543 : Occupational Safety Health Management and Audit
Credit : 3 (3+0)
Prerequisite : KAS3513
The aim of this course is to introduce the student to the field of occupational safety and health and related management practices. The topics included in this course discuss the safety and health management, emergency management methods, safety ethics to be followed as well as management audits. The implementation of the health safety management system in the work of international standards ISO45001 and the implementation in industry as well as the promotion of safety campaigns are also discussed.

KAS4553 : Environmental Impact Assessment
Credit : 3 (2+1)
Prerequisite : None
Environmental impact assessment (EIA) is an important process for predicting the environmental consequences of a plan or project. This course introduces the student to guidelines, policies, regulations and acts related to implementation of EIA. The students will be equipped with the skills and knowledge to critically evaluate the impact of a development project on the environment and socio-economic.

KAS4563 : Life Cycle Assessment
Credit : 3 (3+0)
Prerequisite : None
This course introduces Life Cycle Analysis (LCA) as a systematic approach to evaluating the environmental impacts of products, services, and infrastructure throughout their entire life cycle, from raw material extraction to end-of-life disposal (cradle-to-grave). It integrates elements of the Sustainable Development Goals (SDGs), the Environmental, Social, and Governance (ESG) framework (with a focus on environmental aspects), and planetary boundaries such as climate change and biogeochemical cycles. Students will become familiar with key LCA components, including goal and scope definition, construction of life cycle flow diagrams with defined system boundaries, compilation of life cycle inventories, impact assessment, and result interpretation. Emphasis is also placed on the analysis of existing data and real-world case studies aligned with current global environmental challenges. By the end of the course, students will be able to critically interpret LCA findings and effectively communicate insights based on literature and available datasets.

KAS4573 : Sustainable Operation and Management
Credit : 3 (3+0)
Prerequisite : None
This course focuses on developing and applying skills to promote sustainable operations and management practices. Students will explore key concepts in green technology procurement, environmental management practices (including water, air, and energy management), and sustainability requirements. By the end of the course, students will gain the knowledge and competencies necessary to meet sustainability criteria by implementing modifications in both operational processes and management strategies.

KAS4713 : Groundwater and Pollution
Credit : 3 (3+0)
Prerequisite : None
This course introduces students to the fundamental theories and processes related to groundwater, including groundwater hydraulics, well hydrodynamics, groundwater flow modeling, as well as water quality and groundwater pollution. Topics covered also include issues related to saltwater intrusion and its impact on groundwater resources. The course emphasizes an understanding of groundwater flow principles and the application of conceptual and mathematical models in analyzing aquifer systems. By the end of this course, students will be able to acquire fundamental knowledge in the management and conservation of groundwater, including the ability to interpret hydraulic parameters, analyze flow and pollution in aquifer systems, and assess the risks of saltwater intrusion. Students will also be able to identify key components of well systems and understand the role of each element in ensuring the quality and safety of groundwater resources for human and environmental use.

KAS4723 : Surface Water Hydrology
Credit : 3 (3+0)
Prerequisite : None
This course introduces students to the fundamental concepts of surface water hydrology, focusing on the movement and distribution of surface water across space and time. Key topics include the principles and processes of surface water, analysis of hydrological data from catchment areas, and hydrological modeling. Students will review and apply foundational hydrological concepts through practical system-based applications. Furthermore, the course equips students with the skills to design hydrological systems using advanced modeling software.

KAS4733 : Coastal Environment
Credit : 3 (2+1)
Prerequisite : None
This course is designed to provide students with a comprehensive understanding of the physical processes shaping coastal environments and their practical applications, driven by the growing importance of coastal zones as hubs for human settlement, economic activity, and ecological diversity, yet highly vulnerable to natural hazards and human-induced changes. Students will learn the fundamental theories of waves, tides, estuarine dynamics, and sediment transport, and explore how these processes influence coastal morphology and stability. The course also covers the design and engineering of coastal protection structures such as breakwaters, with emphasis on sustainable and environmentally sensitive solutions. By the end of the course, students are expected to understand and apply theoretical knowledge to analyze wave, tidal, and sediment processes in the nearshore zone, evaluate and propose engineering solutions to mitigate coastal issues such as erosion, flooding, and habitat loss, and recognize the environmental and socio-economic impacts of coastal development and protection measures. Ultimately, this course equips students with the technical knowledge and analytical skills needed to address contemporary challenges in coastal management and protection, preparing them to contribute effectively as engineers, planners, or researchers in coastal and environmental fields.

KAS4743 : Soil Physics
Credit : 3 (3+0)
Prerequisite : None
This course introduces students to the theories and principles of soil physics, encompassing the movement of water, gases, heat, and pollutants within the soil. Emphasis is placed on the dynamic processes of natural fluids in soil and the interactions between soil physical properties and environmental factors. Topics covered include the concepts of water and air movement through soil pores, heat transfer, as well as the transport and retention of pollutants. The course also incorporates analytical and quantitative methods to understand soil behavior in response to natural changes and human interventions. By the end of this course, students will be able to master the fundamental knowledge related to physical processes in soil, interpret the movement of water, gases, heat, and pollutants based on soil physical properties, and analyze their environmental impacts. Students will also be able to apply soil physics principles to address issues in natural resource management, pollution control, and soil conservation, in addition to developing the skills to evaluate soil physics data for research and practical applications.

KAS4753 : Watershed Management
Credit : 3 (3+0)
Prerequisite : None
This course introduces the fundamental concepts of watershed management planning and principles. It encompasses the water quality issues, storm water management, drought management, soil erosion, rainwater harvesting and watershed modeling. The students will be exposed to field work activity and learn how to use computer modelling to solve selected watershed management issues.

KAS4763 : Soil Nature and Physical Properties
Credit : 3 (3+0)
Prerequisite : None
This course introduces students to the fundamental theories and the physical and natural properties of soil, which are essential for understanding the functions and roles of soil within environmental systems. Topics covered include soil engineering, soil water characteristics, the relationship between soil and the hydrological cycle, soil aeration and temperature, soil erosion and its control methods, and chemical pollution that affects soil quality. The course also emphasizes understanding natural processes that influence soil stability and fertility, as well as their implications for sustainable development. By the end of the course, students will be able to master basic knowledge related to the physical and natural properties of soil, including an understanding of the interactions among water, air, temperature, and soil structure. Students will also be able to identify the causes of soil erosion and pollution and propose appropriate mitigation measures. Additionally, students will be capable of interpreting the functions of soil in various contexts such as agriculture, engineering, and environmental management, to support the sustainable preservation of soil resources.

KAS4773 : Applied Geographic Information System (GIS) For Environment
Credit : 3 (2+1)
Prerequisite : None
This course introduces students to the fundamentals of Geographic Information Systems (GIS) and its applications in environmental analysis. Topics include GIS software, geospatial data types, introduction to UAV technology, IoT, AI integration, and spatial data processing. Students will learn to install and operate GIS software, handle vector and raster data, perform spatial analysis, and create thematic maps. The course emphasizes hands-on experience through software usage and environmental project applications. By the end of the course, students will be able to explain GIS principles and data types, use GIS tools to process and analyze spatial data, and apply GIS techniques to solve environmental problems and develop informative maps for real-world scenarios.

KAS4983 : Final Year Research Project I
Credit : 3 (0+3)
Prerequisite : None
Final Year Project I introduces students to independent research in Environmental Technology. Students will identify a research problem, conduct a literature review and propose a suitable methodology under minimal supervision. Emphasizing self-directed learning, the course guides students to develop a proposal, draft Chapters 1–3 of their thesis and present their work in a seminar. Students will also use relevant tools for reference management and scientific writing. By the end, students will gain skills in research planning, academic writing, ethical conduct and effective communication.

KAS4993 : Final Year Research Project II
Credit : 3 (0+3)
Prerequisite : KAS4983
Final year students are required to conduct research projects related to Environmental Technology as proposed during PITA 1 under the guidance of a Supervisor. Students are required to present the research progress at the beginning of the semester and then discuss the research findings in the research thesis according to the prescribed format. The main findings of the study should be presented orally in the Seminar. At the end of the semester, a complete and approved thesis must be bound and submitted to the faculty. This course is offered to develop the capacity and abilities of students in research. The implementation of this course emphasizes self-learning (Heutogogical approach) where students are given autonomy to manage and organize selected projects with minimal guidance from the appointed Supervisor. In addition, students will be exposed to scientific equipment, applications and computer software (technology 4.0) to observe, organize and analyze study data. Communication skills as well as critical and creative thinking that form the basis of 21st century skills development are applied through presentation and thesis writing activities.

KAS49712 : Industrial Training
Credit : 12 (0+12)
Prerequisite : None
Students will be placed in government or private organizations related to the environment for a period of 24 weeks. Students will carry out current duties appropriate to the Environmental Technology program under the supervision of both industrial and university supervisors. This course incorporates elements of peeragogy (collaborative teaching and learning) between students and supervisors in the industry, as well as unconventional learning and teaching elements (situation learning and inquiries) in completing the mini projects entrusted. Combining elements of cognitive, communication, interpersonal, ethics and professionalism, and leadership, autonomy and responsibility skills, these will be translated through final reports, presentations and feedback from both industrial and UMT supervisors.

KEJ2013 : Basic Mathematics and Chemistry
Credit : 3 (3+0)
Prerequisite : None
This course provides undergraduate students with essential mathematical and chemical principles, building a strong foundation for further studies. The mathematics component covers topics such as numbers, indices, logarithms, unit conversions, algebra, and equations. The chemistry component introduces atomic structure, periodic trends, chemical bonding, stoichiometry, mole concepts, and unit conversions. The course emphasizes problem-solving and logical reasoning skills, preparing students to tackle scientific concepts and applications. It is particularly relevant for non-science undergraduates, bridging knowledge gaps and enhancing analytical thinking for interdisciplinary challenges in technology and environmental studies.

KEJ3123 : Materials Engineering
Credit : 3 (2+1)
Prerequisite : None
This course introduces students to the relationship between atomic structure and the properties of materials. It covers the structure and bonding of atoms, the arrangement of atoms, their imperfections as well as their relationship to the properties of materials. Other topics include mechanical properties and material failures. The composition, properties, uses, and manufacturing of materials such as metal alloys, polymers, composites and ceramics are also discussed. Other discussions include corrosion, types of corrosion and corrosion control methods. Laboratory practicals are also implemented to encourage teamwork and expose student to physical labwork.

KEJ3133 : Engineering Drawing for Environmental Technology
Credit : 3 (1+2)
Prerequisite : None
This course introduces the student to techniques and tools for making environmental engineering drawings. The student gains practical experience in geometric construction, orthographic and isometric, projection of planes, points and lines and development of surfaces using computer aided drawing and design techniques mainly for environmental processes.

KEJ3143 : Fluid Mechanics
Credit : 3 (2+1)
Prerequisite : None
This course introduces students to the fundamental theories and principles of fluid mechanics, covering the behavior of fluids in both static and dynamic conditions. Key topics include fluid properties, pressure and equilibrium in static fluids, the principles of mass conservation, energy and Bernoulli's equation, types of internal flow such as laminar and turbulent flow, head losses in pipelines, as well as methods for measuring fluid velocity and flow rate. Students will also engage in laboratory experiments to understand the practical applications of the concepts learned. The course emphasizes adherence to relevant engineering principles and standards in analyzing fluid systems and incorporates 21st-century skills through collaborative and heutagogical learning approaches. Web-based teaching and learning, interactive activities, and online assessments are also utilized to support the development of self-directed problem-solving skills in engineering contexts. By the end of this course, students will have acquired fundamental knowledge in fluid mechanics, including an understanding of fluid properties and behavior, application of engineering principles in flow systems, as well as methods for measuring and analyzing fluid flow. Students will also be able to identify and interpret key parameters in fluid systems and understand the function of each component in ensuring the effectiveness of engineering fluid systems.

KEJ3163 : Chemical Process Principles
Credit : 3 (3+0)
Prerequisite : None
This course introduces the concepts of thermodynamics including laws of thermodynamics, volumetric and thermodynamic properties of fluids, thermodynamics properties of fluids, and thermodynamics applications. This course is also an introduction to the analysis of chemical processes with an emphasis on mass and energy balances. Topics include an introduction to flow chart for the chemical industry, concepts of recycle, bypass and purge in mass balances. At the end of this course, students will learn how to solve problems related to chemical process using the principle of mass and energy balance, and thermodynamics.

KEJ3173 : Mathematics for Technology
Credit : 3 (3+0)
Prerequisite : None
This course introduces the student to the fundamental mathematical tools and concepts commonly applied in technology. Topics covered in the course include topics from Algebra (solution of equations, trigonometry, complex numbers), Calculus (functions and graphs, review of differentiations, rates of change and differential equations, integration techniques and applications) and Geometry (vectors and curves). The mathematical calculation concepts introduced in this course will help students master the topics in the advanced courses.

KEJ4113 : Unit Operations
Credit : 3 (3+0)
Prerequisite : None
This course enables students to gain knowledge on the basic concept of unit operation that discuss separation process based on thermo-physical properties in equipments and materials. The topics covered include evaporation, drying, liquid-gas separation, vapour-liquid separation, solid-fluid separation, and physical separations. In addition, the students will be exposed to the skill for calculating and designing unit operation system at the required production rate and specification.

KEJ4123 : Chemical Reaction Technology
Credit : 3 (3+0)
Prerequisite : None
The course is intended to familiarize the students with concepts of reaction rate, derivation of rate expressions from reaction mechanism, ideal reactor types, integral method of analysis, differential method of analysis, principles of chemical reactor analysis and design, experimental determination of rate equations, design of batch and continuous reactors, how to choose the most appropriate reactor for a given feed, optimization of selectivity in multiple reactions, consideration of temperature and pressure effects, etc. At the end of this course, students will be exposed to the relationship between chemical kinetics and design with Aided by Technology 4.0.

KEJ4133 : Heat Transfer
Credit : 3 (3+0)
Prerequisite : None
This course involves heat transfer topics such as conduction, convection, radiation, condensation, boiling and heat exchanger design. The course will emphasize the principles of heat transfer in steady and unsteady state by conduction, convection and radiation. The course will also focus on the application of heat transfer to the design of heat exchanger and its working principles. At the end of this course, students will also be exposed to problem-solving procedures in heat transfer applications and in heat exchanger design.

KEJ4143 : Mass and Energy Balances
Credit : 3 (3+0)
Prerequisite : None
This course introduces fundamental concepts in engineering design calculations to solve material and energy balance problems for industrial processes involving various unit operations under different conditions. Topics discussed include an introduction to engineering calculations, processes and process variables, fundamentals of material balances, single-phase systems, energy and energy balances, balances in non-reactive processes, and balances in reactive processes. At the end of this course, students will be able to explain the basic concepts of engineering design calculations related to material and energy balances, identify and interpret process variables in various unit operations, prepare material and energy balances for single-phase systems under various operating conditions, and apply balance principles in both non-reactive and reactive processes.

KEJ4513 : Engineering Economics
Credit : 3 (3+0)
Prerequisite : None
This course introduces students to the fundamental concepts of engineering economy, aimed at assisting rational and effective investment decision-making within engineering contexts. Students will explore various types of investment and selection strategies to ensure project profitability and sustainability. Key topics include the time value of money, encompassing present value, future value, annual value, and fixed interest rate computations. Students will also learn essential methods of economic project evaluation, including present worth, future worth, rate of return, and cost-benefit analysis. The course will cover inflation, cost estimation, depreciation, and taxation, along with their implications on the economic feasibility of engineering projects. Emphasis is placed on real-world case study discussions to allow students to apply these principles to practical engineering problems. By the end of the course, students will be equipped to identify and evaluate the most profitable engineering projects and make data-driven investment decisions in line with engineering best practices.

KEJ4523 : Chemical Process Safety
Credit : 3 (3+0)
Prerequisite : None
This course discusses the principles of process safety management in a chemical processing plant. The topics covered in this course include the introduction to process safety and loss prevention, properties of hazardous chemical substances and their release/dispersion mechanisms which lead to fires, explosions and toxic release events. In addition, the process hazard analysis and risk assessment techniques are also comprehensively discussed. This course empowers the student with numeracy skills to solve engineering problems related to process hazard and risk assessment.

KEJ4613 : Renewable Energy Technology
Credit : 3 (3+0)
Prerequisite : None
This course introduces the student to various types of renewable energy technology as new source of energy and their applications. Topics covered in this course include the solar energy's fundamental theories (thermal and photovoltaic), hydroelectric, wind, geothermal, marine thermal, waves, tidal, biomass, hybrid system technology, efficiency, and energy storage. This course also discusses the development of renewable energy technology in the first industrial revolution era until the fourth industrial revolution.

KEJ4623 : Technology Membrane
Credit : 3 (3+0)
Prerequisite : None
The course enables students to gain knowledge on the concept of separation technology, development of membrane technology, concept of membrane separation, materials, membrane properties, fabrication techniques, and its characterization. This topic also covers pressure-driven membrane, transport mechanisms, fouling and membrane design and configuration. At the end of this course, students will be able to master fabrication techniques and membrane separation processes as well as able to solve problems related in the industry.

KEJ4633 : Clean Technology
Credit : 3 (3+0)
Prerequisite : None
This course discusses the critical relationship between technology and environmental sustainability, examining pollution sources (e.g., gas, coal, fossil fuels, solid waste, and scheduled waste) and the environmental impact of industrial growth. A core focus will be on fostering cross-disciplinary systems thinking to analyze complex environmental problems and to design integrated solutions, particularly in the context of climate resilience and green infrastructure initiatives. At the end of this course, students will gain a comprehensive understanding of clean technology principles and strategies, including clean energy, green chemistry, and industrial ecology, and explore their practical application across diverse sectors such as agriculture, water and wastewater treatment, solid waste management, and air pollution control, promoting a holistic and adaptive approach to environmental challenges.

KEJ4643 : Polymer and Environment
Credit : 3 (3+0)
Prerequisite : None
This course introduces students to the relationship between polymers and the environment. Course materials include an introduction to the basic principles of polymer chemistry and environmental stability of polymers towards various factors such as degradation, weathering and biodegradation. With the wide range of applications of polymers, this course also discusses the methods of recovery and recycling of polymers as well as environmentally friendly polymers that are biodegradable polymers. The cybergogy approach is also used to encourage students' involvement in blended teaching and learning activities. Group project and presentation about polymer recycling are also implemented in this course.

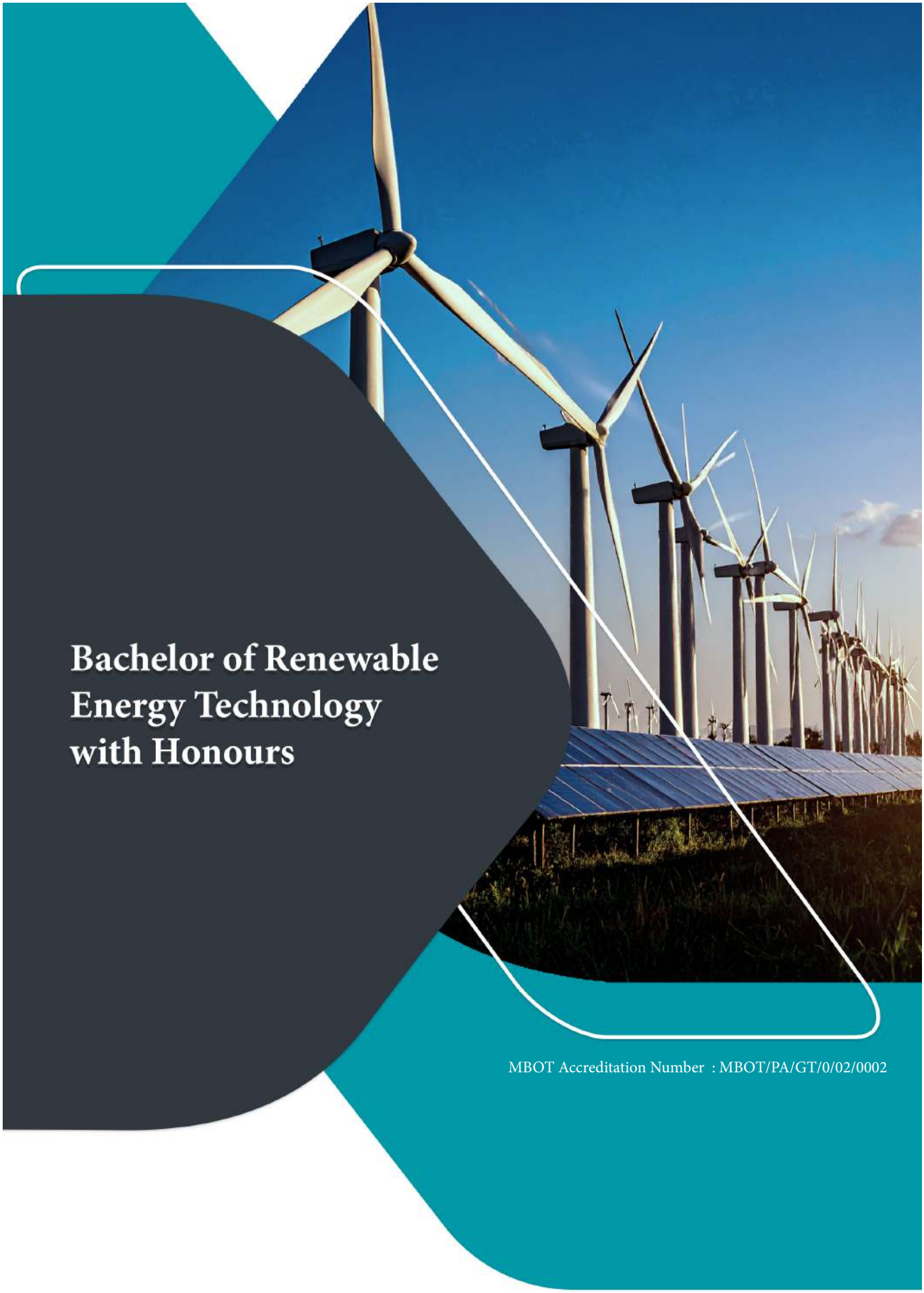
KEJ4653 : Environmental Nanotechnology
Credit : 3 (3+0)
Prerequisite : None
This course discusses the principles of nanotechnology and its applications in environmental field. Topics covered include the introduction of nanoscience and nanotechnology, the basic principles of "nano effects", classification of nanomaterials, synthesis and processing of nanostructures, applications of nanotechnology in environmental field and ethics in nanotechnology. At the end of this course, students will be able to interpret the fundamental principles of nanotechnology and its impacts on human and the environment, as well as the measures to address them. This course empowers the student with 21st century skills by encouraging them to think critically and creatively, actively collaborate and communicate to discuss issues related to environmental application of nanotechnology. Cybergogy approaches are applied to promote student involvement in blended teaching and learning activities. Web based teaching and learning, online assessments and online interactive activities are also implemented in this course.

KEJ4663 : Thermochemical Treatment and Biomass Recovery
Credit : 3 (3+0)
Prerequisite : None
This course discusses modern thermochemical treatment technologies applied in waste management and biomass recovery. The main focus is on processes such as incineration, pyrolysis, gasification, and hydrothermal liquefaction. Students will be exposed to the fundamental principles of each technology, including system design, operating parameters, process efficiency, as well as the types and characteristics of the resulting products. In addition, pollution control technologies associated with thermochemical processes will be highlighted. At the end of the course, students will be able to explain the basic principles of various thermochemical technologies in biomass treatment and recovery and evaluate the effectiveness of these technologies in addressing waste and environmental pollution issues.

KEJ4673 : Anaerobic Digestion Process Technology
Credit : 3 (3+0)
Prerequisite : None
This course discusses the principles, theories of processing and anaerobic digestion design for digestion of organic waste and subsequently to the production of biogas. In addition to the introduction to basic design, it also emphasizes effective monitoring methods for the parameters that have been set to ensure that anaerobic digestion operates at the prescribed level of effectiveness. This course provides input for students to prepare to become professional organic food processing plant operator. Visual layout of wastewater treatment plant will also be used to support the application of IR 4.0 value during the lecture.

KEJ4683 : Energy and Climate Change
Credit : 3 (3+0)
Prerequisite : None
This course discusses the introduction to energy systems, conventional energy technologies, renewable energy technologies, energy and environmental costs, introduction to carbon elements, the occurrence of climate change, climate change solutions, and Life Cycle Assessment (LCA) procedures. It also covers electricity generation activities from the First to the Fourth Industrial Revolution and the impact of electricity generation during these four periods on global climate change. At the end of this course, students will be able to explain the fundamental concepts of energy systems, conventional and renewable energy technologies, and their relationship to environmental costs and climate change; identify and describe carbon elements as well as the causes and impacts of global climate change related to energy generation activities; analyze the impact of electricity generation activities from the First to the Fourth Industrial Revolution on global climate change; and evaluate the potential climate change solutions through sustainable energy technology approaches and Life Cycle Assessment (LCA) procedures.

KEJ4693 : Energy Management and Audit
Credit : 3 (3+0)
Prerequisite : None
This course introduces the principles of energy management and auditing, covering electrical system fundamentals, energy load analysis, audit instrumentation, audit methodologies, cost evaluation, energy performance indicators, and sustainable energy concepts. Students will also explore energy modeling techniques and the evolution of energy generation and management practices from the First to the Fourth Industrial Revolution. Emphasis is placed on practical tools and strategies for improving energy efficiency and reducing environmental impact across various sectors. By the end of this course, students will be able to analyze energy systems, perform basic energy audits, interpret energy data, and propose energy-saving strategies aligned with sustainability goals.



Bachelor of Renewable Energy Technology with Honours

MBOT Accreditation Number : MBOT/PA/GT/0/02/0002

Bachelor of Renewable Energy Technology with Honours

Introduction

The Bachelor of Renewable Energy Technology with Honours is a four-year undergraduate program introduced in 2025. It is designed to equip students with knowledge, skills, and professional values in the fields of science, technology, engineering, and renewable energy management. Graduates of this program are expected to meet the needs of industry and society effectively, innovatively, and sustainably.

The program adopts the Experiential Learning and Competency-Based Education Landscape (EXCEL) approach, emphasizing the core element of Industry Driven Experiential Learning (IDEAL) a teaching and learning method based on real industrial experience.

In the seventh and eighth semesters, students will be placed in industry settings to undergo Work-Based Learning, which includes Skill-Based Learning courses and an Industry Final Year Project. During this period, students will carry out a Final Year Project jointly supervised by both industry and university supervisors. The project will be based on real industrial challenges and aims to deliver practical and impactful solutions. The primary focus of this course is to expose students to systematic methods of conducting industrial research projects while strengthening their scientific communication skills. This includes the ability to prepare and present proposals, progress reports, and research findings through structured oral presentations or thesis writing.

Programme Educational Objectives (PEO)

Graduates who undertake this program will be equipped to achieve the following objectives:

PEO1: To produce technologists who are knowledgeable and practically competent in renewable energy technology, aligned with current industry demands and digital requirements.

PEO2: To produce technologists in the field of renewable energy technology who can lead and communicate effectively in multidisciplinary team-based activities within organizations.

PEO3: To produce technologists capable of solving problems related to renewable energy technology and applying numeracy in digital technologies in an innovative, creative, and ethical manner.

PEO4: To produce technologists who demonstrate entrepreneurial skills and recognize the need for lifelong learning to advance their careers as outstanding professional technologists.

Programme Learning Outcomes (PLO)

At the end of this programme, students will be able to:

PLO1: Understand fundamental concepts in mathematics, science, and technology that can be applied to procedures, processes, and systems used in renewable energy-related industries.

PLO2: Demonstrate practical and technical skills, and apply foundational knowledge of renewable energy technology to solve organizational and industrial problems.

PLO3: Analyze, synthesize, and think critically and innovatively across various aspects of renewable energy technology.

PLO4: Interpret and evaluate relevant issues within appropriate social contexts using a range of skills and knowledge acquired in organizational settings.

PLO5: Communicate ideas and present technical information effectively and confidently, both in written and oral forms.

PLO6: Apply digital knowledge and skills to understand concepts related to renewable energy technology.

PLO7: Interpret and utilize numeracy skills to solve contemporary problems.

PLO8: Actively engage in organizational activities and exhibit outstanding leadership qualities.

PLO9: Independently acquire knowledge in renewable energy technology by continuously seeking and managing information for career development.

PLO10: Identify business opportunities and negotiation skills within the field of renewable energy technology.

PLO11: Uphold professional, moral, and ethical values based on socially accepted norms.

Career Prospects

Graduates of this program will have the opportunity to pursue diverse career paths as officers, managers, or technologists in the fields of energy and sustainability. They may also serve as consultants and assessors in energy and sustainability sectors, energy efficiency officers or managers, as well as educators (teachers or lecturers) and research officers.

Programme Graduation Requirements

1. Students must register for and pass all compulsory courses in the program or their equivalent replacement courses, and fulfill the minimum credit requirement for graduation. Students must also achieve a minimum CGPA of 2.00.

2. Students are required to complete the Survival and Water Safety Program (SKA) and the course Artificial Intelligence for Beginners (MCBS10017) as part of the graduation requirements.

4. The total credit hours for elective courses that students must complete are subject to the minimum elective credit hours stipulated by the program, and not based on the number of elective courses taken.

5. The list of elective courses available to students in the program refers to the course offerings stated in the academic program guidebook of the respective faculty and other faculties.

6. In Semesters 7 and 8, students will undertake Work-Based Learning (WBL) courses in industry settings.

7. Students must meet the minimum grade requirement for English language proficiency as specified below:

Stream	Minimum English Proficiency Requirement
Science, Technology, Engineering, and Mathermatics (STEM)	EOP Grade B or MUET Band 4.0

*If, at the time of admission, a student has already attained the minimum MUET Band required for graduation, the student shall be considered to have fulfilled the graduation requirement for MUET proficiency.

Total of Credit for Graduation

The minimum number credits to graduate is 140 credit hours. The distribution of credit course by category is as follows:

Categories	Credit	Percentages
University Core	18	14
Programme Core	108	77
University Elective	14	9
Total	**140**	**100**

University Core (18 Credit Hours)

Code Course	Name Course	Credit Hours	Prerequisite
BBB3013	Academic Writing Skills	3 (3+0)	None
BBB3033	English for Occupational Purposes	3 (3+0)	None
BBB3023	Public Speaking	3(3+0)	None
MPU3132	Appreciation of Ethics & Civilization	2 (2+0)	None
MPU3143	Communicative Malay Language	3 (3+0)	None
MPU3352	Integrity and Anti-Corruption	2 (2+0)	None
CCXXXXX	Co-Curriculum	2 (0+2)	None

Program Core (108 Credit Hours)

Code Course	Name Course	Credit Hours	Prerequisite
KEJ3123	Materials Engineering	3 (2+1)	None
KEJ3133	Engineering Drawing for Environmental Technology	3 (1+2)	None
KEJ3143	Fluid Mechanics	3 (2+1)	None
KEJ3173	Mathematics For Technology	3 (3+0)	None
KEJ4513	Engineering Economics	3 (3+0)	None
KEJ4663	Thermochemical Treatment and Biomass Recovery	3 (3+0)	None

KEJ4693	Energy Management and Audit	3 (3+0)	None
RET3013	Electronics Technology	3 (3+0)	None
RET3023	Electrical Power System	3 (2+1)	None
RET3032	Professional Technologist Ethics	2 (2+0)	None
RET3053	Mechanics	3 (3+0)	None
RET3063	Thermodynamics	3 (3+0)	None
RET3083	Fundamental Physics	3 (3+0)	None
RET3093	Basic Programming For Technologist	3 (2+1)	None
RET3413	Marine Energy and Hydropower	3 (2+1)	None
RET3443	Energy Law And Policies	3 (3+0)	None
RET3453	Thermal Energy	3 (3+0)	None
RET4423	Wind Energy	3 (2+1)	None
RET4433	Solar Energy	3 (2+1)	None
RET4463	Bioenergy	3 (3+0)	None
RET4523	Introduction To Energy Storage	3 (3+0)	None
RET4533	Hydrogen-Based Energy and Storage	3 (3+0)	None
RET4968-I	Skill Based Learning 1	8 (0+8)	None
RET4978-I	Skill Based Learning 2	8 (0+8)	RET4968- I
RET4988-I	Industrial Final Year Project 1	8 (0+8)	None
RET4998-I	Industrial Final Year Project 2	8 (0+8)	RET4988-I
AEC3202	Basic Organic Chemistry	2 (2+0)	None
ECO4263	Energy Economics	3 (3+0)	None
KAS3513	Occupational Safety and Health	3 (3+0)	None
MDA3003	Introduction to Data Science	3 (2+1)	None

University Elective (14 Credit Hours)

Students may register for elective courses from the list provided below in accordance with their individual interests and academic readiness. A minimum of 14 credits must be completed from the elective courses, with registration undertaken under academic guidance and subject to the approval of the Head of Programme.

Code Course	Name Course	Credit Hours	Prerequisite
KEJ4633	Clean Technology	3 (3+0)	None
KEJ4683	Energy and Climate Change	3 (3+0)	None
KAS3023	Environmental Statistics	3 (3+0)	None
KAS4553	Environmental Impact Assessment	3 (2+1)	None
KAS4573	Sustainable Operations and Management	3 (3+0)	None
KAS4733	Applied Geographic Information System (GIS) for Environment	3 (2+1)	None
KAS4773	Coastal Environment	3 (2+1)	None
RET4103	Principles of Communication Systems	3 (3+0)	None
RET4113	Electrical Machines	3 (3+0)	None
RET4473	Introduction to Hybrid and Electric Vehicles	3 (2+1)	None
RET4483	Advanced Renewable Energy Technologies	3 (3+0)	None
RET4493	Energy Modelling and Simulation	3 (2+1)	None
RET4503	Hydrogen Production	3 (3+0)	None
RET4543	Battery and Supercapacitor Technology	3 (3+0)	None

Course Scheme
Bachelor of Renewable Energy Technology with Honours

Code	Course Name	Credit Hour	Pre-requisite	Code	Course Name	Credit Hour	Pre-requisite
Semester 1				**Semester 2**			
MPU3143	Communicative Malay Language	3 (3+0)	-	MPU3132	Appreciation of Ethics & Civilization	2 (2+0)	-
MPU3352	Integrity and Anti-Corruption	2 (2+0)	-	BBB3023	Public Speaking	3 (3+0)	-
KEJ3133	Environmental Technology Engineering Drawing	3 (1+2)	-	RET3013	Electronics Technology	3 (3+0)	-
KEJ3173	Mathematic for Technology	3 (3+0)	-	RET3023	Electrical Power System	3 (2+1)	-
AEC3202	Basic Organic Chemistry	2 (2+0)	-	RET3032	Professional Technologist Ethics	2 (2+0)	-
RET3083	Fundamental Physics	3 (3+0)	-	RET3063	Thermodynamics	3 (3+0)	-
CCXXX	Co-curriculum	2 (0+2)	-		Elective 1	2	-
Total Credit		**18**		**Total Credit**		**18**	
Semester 3				**Semester 4**			
KAS3513	Occupational Safety and Health	3 (3+0)	-	BBB3013	Academic Writing Skills	3 (3+0)	-
KEJ3123	Material Engineering	3 (2+1)	-	RET3413	Marine Energy and Hydropower	3 (2+1)	-
KEJ3143	Fluids Mechanics	3 (2+1)	-	RET3443	Energy Law and Policy	3 (3+0)	-
KEJ4663	Thermochemical Treatment and Recovery	3 (3+0)	-	RET3453	Thermal Energy	3 (3+0)	-
RET3053	Mechanics	3 (3+0)	-	RET4463	Bioenergy	3 (3+0)	-
RET3093	Basic Programming for Technologist	3 (2+1)	-	KEJ4513	Engineering Economics	3 (3+0)	-
Total Credit		**18**		**Total Credit**		**18**	
Semester 5				**Semester 6**			
MDA3003	Introduction to Data Science	3 (2+1)	-	BBB3033	English for Occupational Purpose	3 (3+0)	-
RET4433	Solar Energy	3 (2+1)	-	ECO4263	Energy Economy	3 (3+0)	-
RET4523	Introduction to Energy Storage	3 (3+0)	-	KEJ4693	Energy Management and Audit	3 (3+0)	-
RET4533	Hydrogen based Energy and Storage	3 (3+0)	-	RET4423	Wind Energy	3 (2+1)	-
	Elective 2	3	-		Elective 4	3	-
	Elective 3	3	-		Elective 5	3	-
Total Credit		**18**		**Total Credit**		**18**	
Semester 7*				**Semester 8***			
RET4968-I	Skill-Based Learning 1	8 (0+8)	-	RET4978-I	Skill-Based Learning 2	8 (0+8)	RET4968-I
RET4988-I	Industrial Final Year Project 1	8 (0+8)	-	RET4998-I	Industrial Final Year Project 2	8 (0+8)	RET4988-I
Total Credit		**16**		**Total Credit**		**16**	
Total Credit to Graduate : 140							

Notes:

1. Students are required to undertake the Survival and Water Safety Program and Artificial Intelligence for Beginner (MCBS10017) as a condition to graduate.
2. The number of elective course credit hours that must be taken by students in the program of study is subject to the number of elective credit hours set by the program of study to meet graduate qualifications and is not subject to the number of elective courses taken.
3. The list of elective courses that can be taken by students in the program of study refers to the course offerings listed in the handbook of the study program of the faculty and other faculties.
4. *Students will undertake Work-Based Learning (WBL) courses in industry during Semesters 7 and 8.

(Reference: UMT Senate Approval-199th Meeting, Year 2025)

Course Synopsis
Bachelor of Renewable Energy Technology with Honours

KEJ3123 : Materials Engineering
Credit : 3 (2+1)
Prerequisite : None
This course introduces students to the relationship between atomic structure and material properties. It covers atomic structure and bonding, atomic arrangement, imperfections, and their correlation with material behavior. Other topics include mechanical properties and material failure. The diversity, characteristics, applications, and manufacturing of materials such as metal alloys, polymers, composites, and ceramics are also discussed. Additional discussions include corrosion, types of corrosion, and corrosion control methods. Laboratory sessions are conducted to encourage teamwork and provide hands-on experience with physical testing.

KEJ3133 :Engineering Drawing for Environmental Technology
Credit : 3 (1+2)
Prerequisite : None
This course introduces students to techniques and tools for producing environmental engineering drawings. Students gain practical experience in geometric construction, orthographic and isometric projections, plane projections, points and lines, and surface development using computer-aided drawing and design techniques, particularly for environmental processes.

KEJ3143 : Fluid Mechanics
Credit : 3 (2+1)
Prerequisite : None
This course introduces the fundamentals and basic concepts of fluid mechanics, including fluid properties, pressure and fluid statics, conservation of mass, Bernoulli's principle, and energy. It covers internal flow laminar, turbulent, and associated losses as well as velocity and flow rate measurement. Laboratory sessions are included. The course emphasizes 21st-century skill development, encouraging collaborative learning and the ability to connect theoretical knowledge with equipment applications. A heutagogical approach is adopted to foster students' ability to understand fluid mechanics problems and develop solutions. Web-based teaching and learning, activities, and online assessments are also incorporated.

KEJ3173 : Mathematics for Technology
Credit : 3 (3+0)
Prerequisite : None
This course introduces students to fundamental mathematical tools and concepts commonly applied in technological contexts. Topics covered include elements of Algebra (equation solving, trigonometry, complex numbers), Calculus (functions and graphs, review of differentiation, rates of change and differential equations, techniques and applications of integration), and Geometry (vectors and curves). The mathematical computation concepts introduced in this course are intended to support students in mastering topics presented in more advanced courses.

KEJ4513 : Engineering Economics
Credit : 3 (3+0)
Prerequisite : None
This course introduces students to the concepts of engineering economics in selecting appropriate investment projects within an engineering context. Topics covered include an introduction to engineering economics, time value of money, interest and analysis, rate of return analysis, cost-benefit analysis, inflation, cost estimation, depreciation, and taxation. The course emphasizes case study discussions to evaluate the economic feasibility of engineering projects.

KEJ4633 : Clean Technology
Credit : 3 (3+0)
Prerequisite : None
This course explores technology and sustainability, covering sources and emissions of pollution (e.g., gases, coal, fossil fuels, solid waste, and scheduled waste) as well as the environmental impacts of industrial development. It introduces students to the concepts and implementation strategies of clean technologies, including clean energy, green chemistry, and industrial ecology. The course also provides insights into the application of clean technologies in agriculture, water and waste management, and technological transformation through process integration. Current advancements in clean technologies are also discussed.

KEJ4663 : Thermochemical Treatment and Recovery
Credit : 3 (3+0)
Prerequisite : None
This course explores modern thermochemical treatment technologies applied in waste management and biomass recovery. The primary focus is on processes such as combustion, pyrolysis, gasification, and hydrothermal liquefaction. Students will be introduced to the fundamental principles of each technology, including system design, operational parameters, process efficiency, and the types and characteristics of resulting products. Emphasis is also placed on pollution control technologies associated with thermochemical processes. By the end of the course, students will be able to explain the basic principles of various thermochemical technologies for biomass treatment and recovery, and evaluate their effectiveness in addressing waste and environmental pollution issues.

KEJ4683 : Energy and Climate Change
Credit : 3 (3+0)
Prerequisite : None
This course introduces energy systems, covering conventional and renewable energy technologies, energy costs and environmental considerations, carbon elements, climate change, solutions to climate change, and life cycle assessment (LCA) procedures. It also discusses electricity generation activities across the First to Fourth Industrial Revolutions and examines the impact of energy production in each era on global climate change.

KEJ4693 : Energy Management and Audit
Credit : 3 (3+0)
Prerequisite : None
This course discusses the fundamentals of energy management and auditing, including basic electrical systems, energy loads, energy audit instrumentation, audit methodologies, energy cost analysis, energy performance, environmentally friendly concepts, and energy modelling. It also covers energy generation and management activities across the First to Fourth Industrial Revolutions.

RET3013 : Electronic Technology
Credit : 3 (3+0)
Prerequisite : None
This course emphasizes the theoretical aspects and physical challenges related to electronic devices. It begins with an understanding of atomic and electron arrangement and movement, leading to the energy generated within a device. The course then explores the fundamental properties of semiconductors, including current flow, carrier movement, and the structural characteristics of each device. The electronic devices discussed include key semiconductor components such as diodes (p-type, n-type), transistors (bipolar, FET), integrated circuits (ICs), and electro-photonic devices such as photodiodes and LEDs.

RET3023 : Power Electrical Systems
Credit : 3 (2+1)
Prerequisite : None
This course provides a comprehensive overview of electrical fundamentals, including power generation, transmission, and distribution. Students will learn about single-phase and three-phase systems, power quality, electrical grounding, and electric motors. The course also covers power system protection, including protection relay requirements and techniques for analyzing and applying protection to power system components. Practical exercises and real-world scenarios will reinforce learning and develop critical thinking skills.

RET3032 : Professional Technologist Ethics
Credit : 2 (2+0)
Prerequisite : None
This course aims to introduce students to conventional ethical concepts and their application in technological development. It is designed to help students identify issues and challenges they may face as professional technologists upon graduation.

RET3053 : Mechanics
Credit : 3 (3+0)
Prerequisite : None
This course covers the introduction and fundamental concepts of force, resultant and distributed forces, particle equilibrium, moments and couples, rigid body equilibrium, center of gravity and centroid, as well as friction.

RET3063 : Thermodynamics
Credit : 3 (3+0)
Prerequisite : None
This course introduces the fundamental principles of thermodynamics and their applications in renewable energy. Topics include the definition of thermodynamics, the First and Second Laws, properties of ideal gases, and power and refrigeration cycles. Students will be able to relate thermodynamic concepts to the understanding of energy systems, efficiency, and sustainability in renewable energy technologies.

RET3083 : Fundamental Physics
Credit : 3 (3+0)
Prerequisite : None
This course is offered to students from non-physics majors. It focuses on understanding fundamental principles of physics and their applications in everyday life. Lectures cover topics such as kinematics and dynamics, work and energy, fluid mechanics, and thermodynamics. Students will be introduced to problem-solving in physics using mathematical skills.

RET3093 : Basic Programming for Technologist
Credit : 3 (2+1)
Prerequisite : None
This course covers the fundamentals of programming and programming languages, problem-solving techniques, flowcharting, and stepwise refinement in algorithm development. It also introduces programming syntax and instructions for solving formal problems. Practical exercises will be provided to reinforce students' understanding.

RET3413 : Marine Energy and Hydropower
Credit : 3 (2+1)
Prerequisite : None
This course aims to provide an understanding of the physical mechanisms in the ocean, focusing on the generation of surface waves, tides, and currents, along with their impacts. It also prepares students to become familiar with linear hydrodynamic theory for wave energy systems, introduces advanced numerical hydrodynamic modelling of wave and current systems, and control simulation. Finally, students will be exposed to the state-of-the-art electro-mechanical power transmission equipment used in marine energy converters.

RET3443 : Energy Law and Policy
Credit : 3 (3+0)
Prerequisite : None
This course provides exposure to laws and policies related to the energy sector in Malaysia. Students will gain an understanding of the legal framework and administrative structure governing electricity and renewable energy. Environmental issues, energy project financing, and safety are also discussed from a legal perspective. The course includes Malaysia's commitments to global climate agreements and regulations within the energy supply chain. By understanding the regulatory framework, students will be able to evaluate national energy policies and their role in sustainable development and long-term energy security.

RET3453 : Thermal Energy
Credit : 3 (3+0)
Prerequisite : None
This course provides an introduction to thermal energy systems, with a focus on renewable energy applications such as solar thermal and geothermal energy. Students will explore fundamental principles, design aspects, and practical applications of these systems in the context of sustainable energy solutions. The course also covers basic principles of heat transfer and analysis, system optimization, and performance evaluation techniques for various thermal energy systems.

RET4103 : Principles of Communication Systems
Credit : 3 (3+0)
Prerequisite : None
This course introduces the principles of communication systems by exploring key elements such as spectrum analysis, modulation theory including Amplitude Modulation (AM) and Frequency Modulation (FM) probability and random processes, digital representation of analog signals, and an introduction to information theory.

RET4113 : Electrical Machines
Credit : 3 (3+0)
Prerequisite : None
This course covers the principles of electric machines, focusing on magnetic circuits and electromechanical energy conversion. Topics include transformers, synchronous machines, induction machines, and DC machines, with emphasis on their characteristics and applications. The course also explores the role of electric machines in renewable energy technologies, particularly in wind turbine systems, solar energy systems, and energy storage highlighting their importance in sustainable energy solutions.

RET4423 : Wind Energy
Credit : 3 (2+1)
Prerequisite : None
This course introduces the fundamentals of wind turbine systems, including their history, key components, blade design, and aerodynamic principles. Students will learn mechanical and electrical concepts such as drive systems, rotor dynamics, electric machines, and power conversion systems. Safety considerations, design aspects, and economic and cost evaluations are also discussed. The course examines wind turbine siting issues, environmental and wildlife impacts, and includes feasibility studies and hands-on training to enhance understanding of real-world applications of wind energy systems in the renewable energy industry.

RET4433 : Solar Energy
Credit : 3 (2+1)
Prerequisite : None
This course provides a comprehensive introduction to photovoltaic (PV) systems, beginning with the fundamentals of solar energy and site assessment. Students will learn about key components such as cells, modules, batteries, charge controllers, and inverters, as well as PV system configurations. Topics include system sizing calculations, mechanical and electrical integration, and utility grid connection. The course also covers approval processes, inspection, commissioning, maintenance, and troubleshooting. Practical training is provided to enable students to apply theoretical knowledge in the installation and testing of PV systems.

RET4523 : Introduction to Energy Storage
Credit : 3 (3+0)
Prerequisite : None
This course discusses several key energy storage technologies that may become increasingly important to society in the near future. It aims to introduce students to these storage systems and their conversion processes through fundamental theoretical concepts. Topics include thermal energy storage, flywheel energy storage, pumped hydro storage, compressed air energy storage, capacitor-based energy storage, and superconducting magnetic energy storage.

RET4533 : Hydrogen based Energy and Storage
Credit : 3 (3+0)
Prerequisite : None
This course provides a comprehensive introduction to photovoltaic (PV) systems, beginning with the fundamentals of solar energy and site assessment. Students will learn about key components such as solar cells, modules, batteries, charge controllers, and inverters, as well as PV system configurations. Topics include system sizing calculations, mechanical and electrical integration, and utility grid connection. The course also covers approval procedures, inspection, commissioning, maintenance, and troubleshooting. Practical training is provided to enable students to apply theoretical knowledge in the installation and testing of PV systems.

RET4463 : Bioenergy
Credit : 3 (3+0)
Prerequisite : None
This course provides a comprehensive overview of bioenergy, its sources, conversion technologies, and applications. Students will learn the principles of bioenergy production, including biofuels, biopower, and biochemical processes. Topics covered include biomass feedstocks, biorefinery processes, bioconversion technologies, environmental and economic impacts of bioenergy production, as well as policy and regulatory frameworks. Students will also explore the challenges and opportunities associated with the development and commercialization of bioenergy technologies. The course emphasizes the interdisciplinary nature of bioenergy, integrating principles from biology, chemistry, engineering, and environmental science.

RET4473 : Introduction to Hybrid and Electric Vehicles
Credit : 3 (2+1)
Prerequisite : None
This course introduces the concepts of hybrid and electric vehicles, including their architectural configurations and the components used in these systems. Students will analyze hybrid and electric vehicle models using driving cycles through simulation software.

RET4483 : Advanced Renewable Energy Technologies
Credit : 3 (3+0)
Prerequisite : None
This course introduces students to emerging renewable energy technologies and their potential. It aims to familiarize students with the fundamental concepts of renewable energy technologies from both engineering and general scientific perspectives. Each lecture includes examples from real-world applications and ongoing industrial developments.

RET4493 : Energy Modelling and Simulation
Credit : 3 (2+1)
Prerequisite : None
This course provides students with a comprehensive understanding of energy systems, their modelling techniques, and the role of simulation in analyzing and optimizing energy-related processes. It integrates theoretical concepts with practical applications, equipping students with the necessary skills to analyze, design, and evaluate energy systems using modelling and simulation tools.

RET4503 : Hydrogen Production
Credit : 3 (3+0)
Prerequisite : None
This course discusses various existing methods of hydrogen production, with a primary focus on sustainable hydrogen generation techniques.

RET4543 : Battery and Supercapacitor Technology
Credit : 3 (3+0)
Prerequisite : None
This course focuses on the fundamentals of energy storage, emphasizing the operation and design of various battery and supercapacitor technologies. Students will be introduced to the scientific principles underlying batteries and supercapacitors, including basic components, mechanisms, and performance criteria. Specific types of batteries and supercapacitors will be explored in detail. The course also discusses energy storage applications in both stationary and mobile technologies, with consideration of safety aspects.

RET4968-I : Skill-Based Learning 1
Credit : 8 (0+8)
Prerequisite : None
This course is an industry-integrated learning program focused on developing students' practical skills. Students will be exposed to real-world tasks and given opportunities to apply and demonstrate their knowledge and competencies in actual work environments. Direct engagement between students and employers enables interaction, professional networking, and learning from experts in the field.

RET4978-I : Skill-Based Learning 2
Credit : 8 (0+8)
Prerequisite : RET4968-I
This course is an industry-integrated placement that emphasizes the development of students' practical skills. Students will be exposed to real-world tasks and given the opportunity to apply and demonstrate their knowledge and competencies in actual workplace settings. Direct engagement with employers enables students to interact, build professional networks, and gain insights from experts in the field.

RET4988-I : Industrial Final Year Project I
Credit : 8 (0+8)
Prerequisite : None
This course focuses on equipping students with the skills and knowledge required to conduct comprehensive research projects within an industrial setting. It is designed to prepare students for their final year project, which involves addressing real-world industrial challenges. The syllabus covers topics such as project proposal development, research methodology, literature review, data collection and analysis, and project management. Students will learn to identify research objectives, formulate research questions, and develop project plans. Emphasis is placed on critical thinking, problem-solving, and effective communication skills. Throughout the course, students will work closely with industry professionals, participate in site visits, and gain hands-on experience in conducting research in an industrial environment.

RET4998-I : Industrial Final Year Project 2
Credit : 8 (0+8)
Prerequisite : RET4988-I
The syllabus for Industrial Final Year Scientific Project II builds upon the knowledge and skills acquired in Industrial Final Year Scientific Project I. This course focuses on the execution and implementation of the research project proposed in the eighth semester. Students will carry out their projects under the supervision of academic advisors and engage in practical research activities. The syllabus covers topics such as data collection, experimentation, analysis, interpretation of results, and drawing conclusions. Students will learn to use appropriate research tools and techniques to gather and analyze data, and to evaluate the validity and reliability of their findings. Emphasis is placed on problem-solving, critical analysis, and effective project management. Throughout the course, students will continue collaborating with industry professionals, present their progress, and refine their research methodology. The final deliverables include a thesis and a presentation summarizing the project findings.

MDA3003 : Introduction to Data Science
Credit : 3 (2+1)
Prerequisite : None
This course introduces students to data collection, preparation, acquisition, cleaning, aggregation, exploratory data analysis, data modelling, and data visualization, as well as feature engineering and model creation and validation. It covers both conceptual and practical issues. Examples from various fields will be presented, and hands-on use of statistical software and data manipulation tools will be included.

KAS3023 : Environmental Statistics
Credit : 3 (3+0)
Prerequisite : None
This course introduces students to probability-based and data-driven approaches for solving environmental problems. It is designed to equip students with the knowledge and skills to interpret and analyze data effectively. Course content includes environmental data description, probability, parameter estimation using confidence intervals, comparative testing, correlation and regression, as well as environmental sampling and modelling. Students are instilled with 21st-century competencies in managing, analyzing, and critically interpreting data using appropriate methods. Guided by Industry 4.0 technologies, the course prepares students with big data analytics capabilities to support global sustainability. By the end of the course, students will be able to apply basic statistical methods to collect, analyze, and interpret environmental data.

KAS3513 : Occupational Safety and Health
Credit : 3 (3+0)
Prerequisite : None
This course introduces students to the philosophy, principles, and significance of the Occupational Safety and Health Act 1994 in protecting workers in Malaysia. It covers workplace accidents, the nature of hazards, techniques for hazard identification and assessment, and the management of occupational safety and health.

KAS4553 : Environmental Impact Assessment
Credit : 3 (2+1)
Prerequisite : None
Environmental Impact Assessment (EIA) is a critical process for predicting the environmental consequences of a proposed plan or project. This course introduces students to the guidelines, policies, regulations, and procedures related to the implementation of EIA. Students will be equipped with the skills and knowledge to critically assess the environmental and socio-economic impacts of development projects.

KAS4573 : Sustainable Operations and Management
Credit : 3 (3+0)
Prerequisite : None
This course focuses on the development and application of skills to promote sustainable operational and management practices. Students will explore key concepts such as green technology procurement, environmental management practices including water, air, and energy management and sustainability requirements. By the end of the course, students will acquire the knowledge and competencies needed to meet sustainability criteria through the implementation of modifications in operational processes and management strategies.

KAS4733 : Coastal Environment
Credit : 3 (2+1)
Prerequisite : KAS 3213
This course introduces students to the theory and applications of waves, tides, estuaries, sediment transport, and their relevance to coastal zones. Topics covered include wave and tidal theory, and the design of breakwaters for coastal protection. The course emphasizes coastal issues and their environmental impacts.

KAS4773 : Applied GIS for the Environment
Credit : 3 (2+1)
Prerequisite : None
This course aims to train students in environmental problem-solving skills using Geographic Information Systems (GIS) and related analytical techniques. It covers an introduction to open-source GIS software, along with relevant principles, methods, and techniques suitable for addressing issues in the field of environmental technology.

AEC3202 : Basic Organic Chemistry
Credit : 2 (2+0)
Prerequisite : None
This course covers the concepts of chemical bonding, hybridization, acid-base theory, an introduction to functional groups, and IUPAC nomenclature of organic compounds. It also includes discussions on stereochemistry, alkane conformations, physical properties, and chemical reactions of alkanes, alkenes, alkynes, and benzene. By the end of the course, students will be able to integrate their knowledge and predict chemical reactions and resulting products.

ECO4263 : Energy Economy
Credit : 3 (3+0)
Prerequisite : None
This course introduces students to the concepts and applications of economics within the energy sector, including demand, supply, pricing analysis, and key energy policies in Malaysia such as the National Energy Policy 2022–2040, the Renewable Energy Policy, and the Energy Efficiency Policy. Students will be exposed to environmental issues, energy transition, and the role of energy in sustainable development. The course is designed to equip students with the knowledge and analytical skills to evaluate energy-related issues and policies from an economic perspective, in line with industry needs and national strategies. Through this course, students will develop the ability to analyze the interconnections between energy, economic growth, and environmental sustainability.

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