English Version for International Students

ACADEMIC GUIDEBOOK
Undergraduate Programmes for International Students

ACADEMIC SESSION

2023 2024

Technology to Lead

FACULTY OF OCEAN ENGINEERING TECHNOLOGY AND INFORMATICS

UMT
UNIVERSITI MALAYSIA TERENGGANU
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#UMTsohor

FTKKI
FAKULTI TEKNOLOGI KEJURUTERAAN KELAUTAN DAN INFORMATIK

ACADEMIC GUIDEBOOK
ACADEMIC SESSION 2023/2024

UNDERGRADUATE PROGRAMMES FOR INTERNATIONAL STUDENTS
FACULTY OF OCEAN ENGINEERING TECHNOLOGY AND INFORMATICS

Table of Contents

Remarks from the Dean

My gratitude and congratulations to the editors who have successfully prepared the 6th edition of the FTKKI 2023 Pre-Graduate Guidebook. This book is digitally published every year and distributed specifically to new students for reference and guidance throughout their studies as pre-graduates at FTKKI.

I would like to take this opportunity to welcome the new female students to the Faculty of Ocean Engineering Technology and Informatics (FTKKI), Universiti Malaysia Terengganu (UMT). As a faculty with the motto of Technology Leaders, students are very lucky to be part of the FTKKI family because here is the knowledge garden to gain experience to change your family's destiny and life course.

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 FTKKI 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 proggrammes offered by FTKKI 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 and Informatics

Editor Committee

ACADEMIC CALENDAR (DEGREE)
SEMESTER I: SESSION 2023/2024

DATE/ WEEK	ACTIVITIES	PUBLIC HOLIDAYS
1 – 7/10/2023	✓REGISTRATION AND RESIDENTIAL COLLAGE ADMISSION ✓ORIENTATION WEEK	
8/10/2023 – 4/11/2023 [WEEK 1 - 4]	**CLASSES/ LECTURES** - Course Registration (Add & Drop) - Application for Credit Transfer (First Year Student) - Application for Deferment of Study	
5 – 25/11/2023 [WEEK 5 – 7]	**CLASSES/ LECTURES** - Course Registration (Drop)	**Deepavali** 12/11/2023 (Sunday)
26/11/2023 – 2/12/2023	**MID SEMESTER BREAK**	
3 – 9/12/2023 [WEEK 8]	**CLASSES/ LECTURES** - Course Registration (Drop)	
10 – 16/12/2023 [WEEK 9]	**CLASSES/ LECTURES** - Course Review and Confirmation	
17/12/2023 – 13/1/2024 [WEEK 10 – 13]	**CLASSES/ LECTURES**	**Christmas Day** 25/12/2023 (Monday)
14 – 20/1/2024 [WEEK 14]	**CLASSES/ LECTURES** - Issuance of Examination Slip - Online Teaching Evaluation (e-SPP/TEP)	
21 – 27/1/2024	**STUDY WEEK**	
28/1/2024 – 17/2/2024 [WEEK 15 – 17]	**FINAL EXAMINATION** - Online Teaching Evaluation (e-SPP/TEP)	**Israj Mikraj Holiday** 8/2/2024 (Thursday) **Chinese New Year** 10 & 11/2/2024 (Saturday & Sunday)
18/2/2024 – 16/3/2024	**SEMESTER BREAK**	**Sultan Terengganu's Coronation** 4/3/2024 (Monday)

REMINDER

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

Centre For Academic Development and Management, UMT

ACADEMIC CALENDAR (DEGREE)
SEMESTER II: SESSION 2023/2024

DATE/ WEEK	ACTIVITIES	PUBLIC HOLIDAYS
17/3/2024 – 13/4/2024 [WEEK 1 - 4]	**CLASSES/ LECTURES** - Course Registration (Add & Drop) - Application for Credit Transfer (First Year Student) - Application for Deferment of Study	**Nuzul Al-Quran** 28/3/2024 (Thursday) **Hari Raya Aidilfitri** 10 - 11/4/2024 (Wed - Thursday)
14/4/2024 – 4/5/2024 [WEEK 5 - 7]	**CLASSES/ LECTURES** Course Registration (Drop)	**Birthday Of Sultan Terengganu** 26/4/2024 (Friday) **Labour Day** 1/5/2024 (Wednesday)
5 – 11/5/2024	**MID SEMESTER BREAK**	
12 – 18/5/2024 [WEEK 8]	**CLASSES/ LECTURES**	
19 – 25/5/2024 [WEEK 9]	**CLASSES/ LECTURES** - Course Review and Confirmation	**Wesak** 22/5/2024 (Wednesday)
26/5/2024 – 22/6/2024 [WEEK 10 – 13]	**CLASSES/ LECTURES**	**Birthday Of YDP Agong** 3/6/2024 (Monday) **Arafah Day** 16/6/2024 (Sunday) **Hari Raya Aidiladha** 17 - 18/6/2024 (Monday-Tuesday)
23 – 29/6/2024 [WEEK 14]	**CLASSES/ LECTURES** - Issuance of Examination Slip - Online Teaching Evaluation (e-SPP/TEP)	
30/6/2024 – 6/7/2024	**STUDY WEEK**	
7 – 27/7/202 [WEEK 15 – 17]	**FINAL EXAMINATION** - Online Teaching Evaluation (e-SPP/TEP)	**Awal Muharam (Maal Hijrah)** 7/7/2024 (Sunday)

REMINDER

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

Centre for Academic Development And Management, UMT

REMINDER

1) Students may check all academic information through the student's portal at
   https://mynemo.umt.edu.my

2) Students are required to verify the courses that have been registered by week -9 of the current semester.

3) Registration of courses for the next semester can be completed from week-12 to week-17 in the current semester.

4) For the final year students, please refer to Graduating Module (Modul Layak Bergraduat) in the student's portal.

5) 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.

   Note: The above information is subject to current amendments. Students must always be sensitive to announcements issued by the Academic and Quality Management Division (PPAK) and faculty from time to time.

SECTION A

INFORMATION
Faculty of Ocean Engineering and Informatics

Background

Faculty of Ocean Engineering Technology and Informatics was formally founded on 1August 2019 after the restructuring of University Malaysia Terengganu (UMT).

FTKKI was founded as a result from the merging of School of Informatics and Applied Mathematics and School of Ocean Engineering. This faculty was established to pool the expertsin the technology that includes informatics, computer science, mathematics and statistics as well as many facets of engineering field including maritime, civil, mechanical, electric and electronics and chemical under one organization with the aim toempower 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 FTKKI 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 isa pragmatic step towards producing skilled human resources, competitive and have integrity to fulfill the needs of the country.

FTKKI offered 10 undergraduate programmes with the duration of the study being 6 to 8 semesters (3 to 4 years). The programmes that FTKKI offered is as follows: -
1) Bachelor of Applied Science (Maritime Technology) with Honours
2) Bachelor of Mechanical Engineering Technology (Naval Architecture) with Honours
3) Bachelor of Applied Science (Electronics and Instrumentation) with Honours
4) Bachelor of Technology (Environment) with Honours
5) Bachelor of Science (Financial Mathematics) with Honours
6) Bachelor of Science (Applied Mathematics) with Honours
7) Bachelor of Science (Data Anaytics) with Honours
8) Bachelor of Computer Science (Software Engineering) with Honours
9) Bachelor of Computer Science with Maritime Informatics (Honours)
10) Bachelor of Computer Science (Mobile Computing) with Honours

POSTGRADUATE PROGRAMMES
1) Master of Computer Science (Coursework)
2) Master of Information Technology (Coursework)
3) Master of Mathematics (by Coursework)
4) Master of Statistics in Marine Science (Coursework)
5) Master of Science (Research)
6) Doctor of Philosophy (Research)

UMT Vission, Mission, Functions and Slogan

Vision

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

Mission

Generating Knowledge for the Community's Affluence and Environmental Sustainability

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.

Slogan

Ocean of Discoveries, for Global Sustainability

FTKKI Vision, Mission, Slogan & Objective

FTKKI Vision

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

FTKKI Mission

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

FTKKI Slogan

Technology to Lead

FTKKI 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.

Management Committee
Faculty of Ocean Engineering Technology and Informatics

DEAN
Prof. Ir. Dr. Mohammad Fadhli Ahmad
PhD (Dundee University, Scotland), MSc (South Bank Univ. London), BEng (UiTM)
PEng, CEng, CMarTech, MIMarEST, MIEM, BEM
Coastal Engineering
(Modeling / Physical)

DEPUTY DEAN (ACADEMIC AND STUDENT AFFAIRS)
Assoc. Prof. Ts. Dr. Salisa Abdul Rahman
PhD (UTS Sydney), MSc, BEng (UTP)
Electrical and Electronic Engineering
(Energy Technology, Hybrid Electric Vehicle, Driving

DEPUTY DEAN (TALENT AND RESEARCH)
Assoc. Prof. Ts. Dr. Ahmad Nazri Dagang
PhD, MSc, BEng (Ehime, Japan)
Electrical Engineering
(Electrical Discharge Plasma, EM Radiation, Antenna)

HEAD OF PROGRAMME
BACHELOR OF APPLIED SCIENCE (MARITIME TECHNOLOGY) WITH HONOURS
Assoc. Prof. Ts. Dr. Suriani Mat Jusoh
PhD (UPM), MSc (UPM), BEng (UPM)
Materials Engineering and Marine Corrosion

HEAD OF PROGRAMME
BACHELOR OF MECHANICAL ENGINEERING TECHNOLOGY (NAVAL ARCHITECTURE) WITH HONOURS
Assoc. Prof. Dr. Mohd Asamudin A. Rahman
PhD (UWA, Aus), BEng (UTM)
Ocean Engineering

HEAD OF PROGRAMME
BACHELOR OF APPLIED SCIENCE (ELECTRONICS AND INSTRUMENTATION) WITH HONOURS
Assoc. Prof. Ts. Dr. Muhamad Zalani Daud
PhD (UKM), MEng (UoW, Aus), BEng (Ritsumeikan, Japan)
Electrical and Electronic Engineering
(Renewable Energy System, Energy Efficiency)

HEAD OF PROGRAMME
BACHELOR OF TECHNOLOGY (ENVIRONMENT) WITH HONOURS
Dr. Wan Rafizah Wan Abdullah @ Wan Abd. Rahman
PhD (UPM), MEng, BEng (UTM)
Nano Material and Nanotechnology

HEAD OF PROGRAMME
BACHELOR OF COMPUTER SCIENCE (SOFTWARE ENGINEERING)
WITH HONOURS
Ts. Dr. Wan Nural Jawahir Wan Yussof
PhD (UMT), MSc, BIT (KUSTEM)
Computer Vision and Image Processing

HEAD OF PROGRAMME
BACHELOR OF COMPUTER SCIENCE WITH MARITIME INFORMATICS
(HONOURS)
Assoc. Prof. Ts. Dr. Rosmayati Mohemad
PhD (UKM), MSc, BSc (UTM)
Decision Support System, Ontology Modelling & Knowledge Engineering

HEAD OF PROGRAMME
BACHELOR OF COMPUTER SCIENCE (MOBILE COMPUTING)
WITH HONOURS
Dr Farizah Yunus
PhD (UTM), BEng (UTM), DipEng (UTM)
Wireless Sensor Network, Wireless Communication, Network Communication Protocol

HEAD OF PROGRAMME
BACHELOR OF SCIENCE (FINANCIAL MATHEMATICS) WITH HONOURS
Assoc. Prof. Dr. Ahmad Termimi Ab Ghani
DSc (Tohoku University), MSc (UMT), BSc (KUSTEM)
Foundation of Mathematics (Logic of Games, Set Theory and Combinatorics) and
Algebra (Group Theory, Genetic Algebras and Evolution Algebras)

HEAD OF PROGRAMME
BACHELOR OF SCIENCE (APPLIED MATHEMATICS) WITH HONOURS
Dr. Shalela Mohd Mahali
PhD (Western Australia), MSc (UTM), BSc (KUSTEM)
Mathematical Modeling, Controlled Drug Delivery

HEAD OF PROGRAMME
BACHELOR OF SCIENCE (DATA ANALYTICS) WITH HONOURS
Assoc. Prof. Dr. Muhamad Safiih Lola
PhD (USM), MSc (UPM), BEc Hons (UUM)
Applied Statistics (Robust Statistics, Econometrics, Hybrid Statistics) and Data Analytics
(Forecasting Analysis)

CHAIR OF COMPUTER,
MASTER (COURSEWORK)
Ts. Dr. Arifah Che Alhadi
PhD (UMT), MIT, BIT (Hons) (UKM), DipIT (KUSZA)
Information Retrieval and Information System

CHAIR OF MATHEMATICS,
MASTER (COURSEWORK)
Dr. Fatimah Noor Harun
PhD (Wollongong), MSc, BAppSc (USM)
Mathematical Modelling, Linear and Nonlinear Waves

DEPUTY REGISTRAR
Mdm. Rohaida Haji Awang
MBA (UiTM), BBA (UIA)

SENIOR ASSISTANT REGISTRAR
Mr. Muhamad Safre Bin Muhamad Sani
BCOMM (UPM)

HEAD OF LABORATORY
Mr. Mohd Fadhil Bin Md Shukor
BASc Maritime Technology (UMT)

ACADEMICIANS
FIELD OF ENVIRONMENTAL TECHNOLOGY

Head of Programme
Bachelor of Technology
(Environment) with Honours

Dr. Wan Rafizah Wan Abdullah @ Wan Abd. Rahman
PhD (UPM), MEng, BEng (UTM)
Nanomaterials and Nanotechnology

Lecturers

Prof. Ts. Dr. Mohd Zamri Ibrahim
PhD (UKM), MSc (Warwick), BEng (Sunderland) PTech (MBOT)
Renewable Energy and Hydrogen Power System

Prof. Ts. Dr. Che Mohd Ruzaidi Ghazali
PhD (UniMAP), MSc (USM), BTech (USM), PTech (MBOT)
Materials Engineering

Prof. Ts. Dr. Nora'aini Ali
PhD (UKM), MEng (UMIST), BEng (UTM), PTech (MBOT)
Separation Technology, Waste Separation, and Recovery Technology

Assoc. Prof. Dr. Asmadi Ali @ Mahmud
PhD (UMP), MEng, BEng (UTM)
Separation Technology

Assoc. Prof. Dr. Mohamad Awang
PhD (USM), MSc (UPM), BSc (CU, New York)
Sustainable Materials

Assoc. Prof. Dr. Sofiah Hamzah
PhD, MSc (UMT), BEng
Separation Technology

Assoc. Prof. Dr. Nurul Adyani Ghazali
PhD, MSc, BEng (Hons) (USM)
Air and Noise Pollution, Air Pollution Control and Technology

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Assoc. Prof. Ts. Dr. Shahrul Ismail
PostDoc (TU Delft) PhD (Wageningen UR), MEng (UTM),
BTech (USM), PTech (MBOT), MyBIOGAS
Water and Wastewater Treatment Technology

Assoc. Prof. Ts. Dr. Samsuri Abdullah
PhD, BTech (UMT)
PTech (MBOT)
Air and Noise Pollution

Assoc. Prof. Dr. Nazaitulshila Rasit
PostDoc, PhD (UPM) MEng, BEng (UTM)
Solid Waste Management, Water and Wastewater
Treatment Technology

Ts. Dr. Hjh. Noor Zaitun Yahaya
PhD (UK), MSc (USM), BTech (UTM), AHEA(UK),
PTech (MBOT)
Civil Engineering, Transportation and Environment, Aerial
Modeling

Ts. Dr. Sunny Goh Eng Giap
PostDoc (NCSU), PhD (Meiji, Japan), MSc (CEU, Manchester,
Lund, Aegean), BTech (KUSTEM), PTech (MBOT)
Soil Physics

YM Dr. Tengku Azmina Engku Ibrahim
PhD (Aberdeen), MEnvMgmt (UKM), BTech (USM)
Industrial Hygiene

Dr. Mohd Sofiyan Sulaiman
PhD, MEng, BEng (UiTM)
Hydraulic and Water Resources

Dr. Wan Salida Wan Mansor
PhD (Bath, UK), MEng, BEng (UTM)
Nanomaterials and Nanotechnology

Gs. Ts. Dr. Aliashim Albani
PhD, M.Sc, B.Tech (UMT), P.Dip (UMP), CME (IET, Au),
PTech (MBOT), M-IGRSM, MREI
Renewable Energy, Environmental Technology, Applied
Geospatial

Dr. Nurul Ashraf Razali
PhD (Sheffield, UK), MEng (Belfast, UK)
Reuse of Carbon Dioxide, Catalyst

Dr. Md. Nurul Islam Siddique
PhD, MSc (UMP), BSc (KUET, Bangladesh)
Renewable Energy, Water and Wastewater Treatment
Technology

Dr. Mohamed Shahrir Mohamed Zahari
PhD (UMT), M.Sc., B.Tech. (USM)
PTech (MBOT), HRDCorp Certified Trainer
ISCC EU & PLUS, CePSWaM, OSH-C
Biofuels, Solid & Hazardous Waste Management

Dr. Rohani Mustapha
PhD (UTM), M.Sc, B.Tech (UMT)
Bio-based Composites, Nano-Composites

Ts. Dr. Mohammad Hakim Che Harun
PhD, MSc (Sheffield), Beng (Nottingham), PTech (MBOT)
Separation Technology, Fluid Dynamics (Microbubbles)

Mrs. Zalina Mat Nawi
MEng, BEng (UTM)
Optimisation and Energy Recovery

Vocational Training Officer

Ms. Nik Nur Fashihah Nik Mohd Nidzam
B.Tech (UMT)
Environment

ACADEMICIANS
FIELD OF MARITIME TECHNOLOGY & NAVAL ARCHITECTURE

***Head of Programme
Bachelor of Applied Science
(Maritime Tehnology)
with Honours***

Assoc. Prof. Ts. Dr. Suriani Mat Jusoh
PhD (UPM), MSc (UPM), BEng (UPM)
Materials Engineering and Marine Corrosion

***Head of Programme
Bachelor of Mechanical
Engineering Technology (Naval
Architecture) with Honours***

Assoc. Prof. Dr. Mohd Asamudin A. Rahman
PhD (UWA, Aus), BEng (UTM)
Ocean Engineering

Prof. Ir. Dr. Mohammad Fadhli Ahmad
PhD (Dundee University, Scotland), MSc (South
Bank Univ. London), BEng (UiTM)
PEng, CEng, CMarEng, CMarTech, MIMarEST, MIEM, BEM
Coastal Engineering (Physical/ Modelling)

Lecturers

Prof. Dr. Wan Mohd Norsani Wan Nik
PhD (UTM), MSc (Bath UK), BEng (GWU USA)
CSci, CMarSci, CMarEng, MIMarEST
Marine Corrosion, Fluid Power, Mechanical Engineering

Assoc. Prof. Dr. Ahmad Faisal Mohamad Ayob
PhD (UNSW, Sydney), BEng (UM)
MRINA, SNAME, MIMarEST
Mechanical Engineering, Marine Design, and
Instrumentation

Assoc. Prof. Ir. Dr. Eng. Ahmad Fitriadhy
DrEng (Hiroshima), MEng (UTM), BEng (UNHAS, Indonesia)
Naval Architecture

Assoc. Prof. Dr. Mohd Hairil Mohd
PhD (PNU, Busan) MEng, BEng (UTM)
Offshore Structure

Dr. Anuar Abu Bakar
PhD (Newcastle), BSc (ITTHO/UTM), Adv Dip (VUT, Aus)
PGDip (RMIT, Aus), Certificate (Polytechnics)
CEng, CMarEng, MIMarEST
Marine Structure

Dr. Mohd Azlan Musa
PhD (UMT), MEng, BEng (UTM) MIMarEST
Marine Technology (Ocean Energy)

Dr. Mohammad Fakhratul Ridwan Zulkifli
PhD, BSc (UMT)
Maritime Technology (Marine Corrosion)

Ts. Dr. Che Wan Mohd Noor Che Wan Othman
PhD (UMP), MEng, BEng (UTM), MBOT, MIMarEST, BEM, IEM
Marine Technology (Engine Combustion, Alternative fuel)

Dr. Wan Nurdiyana Wan Mansor
PhD (CSU, USA), MEng (UTHM), BEng (USM), BEM, IEM, MBOT
Engine's Performance and Emission

Ts. Dr. Mohd Faizal Ali Akbar
PhD (UMP), MEng (UTM), BEng (Yamanashi, JPN)
Mechanical Engineering

Ts. Dr. Shahrizan Jamaludin
PhD (UKM), MEng (UKM), BEng (UTeM)
Electronics & Computer Engineering

Dr. Sayyid Zainal Abidin Syed Ahmad
PhD (UTM-KL), MSc (UTM-JB), BET (UniKL-MIMET), Dip (UiTM)
Offshore Structural Analysis

Dr. Syed Mohd Saiful Azwan Bin Syed Hamzah
PhD (UTM), BET (UniKL-MIMET),
Materials Engineering & Manufacturing
(Composite material)

Vocational Training Officer

Mr. Sheikh Alif Ali
Diploma in Marine Engineering (PUO) (Second class Engineer officer of Unlimited trade voyage)
Marine Engineering

ACADEMICIANS
FIELD OF COMPUTER SCIENCE

**Head of Programme
Bachelor of Computer Science
(Software Engineering)
with Honours**

Ts. Dr. Wan Nural Jawahir Wan Yussof
PhD (UMT), MSc, BIT (KUSTEM)
Computer Vision and Image Processing

**Head of Programme
Bachelor of Computer
Science with Maritime
Informatics (Honours)**

Assoc. Prof. Ts. Dr. Rosmayati Mohemad
PhD (UKM), MSc, BSc (UTM)
Decision Support System, Ontology Modelling &
Knowledge Engineering

**Head of Programme
Bachelor of Computer
Science (Mobile Computing)
with Honours**

Dr. Farizah Yunus
PhD (UTM), BEng (Telecommunication)(UTM), DipEng
(Communication)(UTM)
Wireless Sensor Network, Wireless Communication,
Network Protocol

**Chair of Computer,
Master (Coursework)**

Ts. Dr. Arifah Che Alhadi
PhD (UMT), MIT, BIT (Hons) (UKM), DipIT (KUSZA)
Information Retrieval and Information System

Lecturers

Prof. Ts. Dato' Dr. Aziz Deraman FASc
PhD (UMIST), MAppSci (Glasgow), SmSn (Kep) (UKM)
Software Engineering and Management, Software
Quality, ICT & e-Community Strategic Planning

Prof. Ts. Dr. Muhammad Suzuri Hitam
PhD (Leeds), BTech (Hons) (USM)
Artificial Intelligence, Image Processing

Prof. Ts. Dr. Noor Maizura Mohamad Noor
PhD (Manchester), MSc, BSc (UPM)
Decision Support System and Information System

Assoc. Prof. Ts. Dr. Ahmad Shukri Mohd Noor
PhD (UTHM), MSc (KUSTEM), BSc (Conventry)
Distributed Computing, Internet of Things (IoT), and
Information Systems and IR4.0

Assoc. Prof. Ts. Dr. Amir Ngah
PhD (Durham), MSc (UPM), BSc (UTM)
Software Engineering, Software Maintennace and Testing

Assoc. Prof. Ts. Dr. Masita @ Masila Abdul Jalil
PhD (UKM), MSc, BEng (Hons) (Warwick)
Information Science and Software Engineering

Assoc. Prof. Ts. Dr. Mustafa Man
PhD (UTM), MSc, BSc (UPM)
Database, Internet of Things (IoT), Image Processing and
Data Mining

Assoc. Prof. Ts. Dr. Noraida Haji Ali
PhD (UKM), MIT, BSc (Hons)(UKM)
Software Engineering and Formal Modelling

Assoc. Prof. Dr. Engku Fadzli Hasan Syed Abdullah
Ph.D (Cardiff University), MSc (UTM), BMIS (IIUM)
Software Engineering, Embedded Programming,
Intelligent System, Internet of Things

Dr. Zuriana Abu Bakar
PhD (UQ, Australia), MSc (UPM), BSc (UTM)
Human and Computer Interaction, Information System,
Decision Support System, Data Mining

Dr. Rozniza Ali
PhD (Stirling) (Scotland), MSc (UiTM), BSc (KUSZA)
Pattern Recognition, Machine Learning and Image
Processing

Dr. Rabiei Mamat
PhD (UTHM) MSc (KUSTEM), BSc (UPM)
Cluster Computing and Machine Learning

Dr. Abdul Aziz K Abdul Hamid
PhD (UKM), MIT (UKM), BSc (Hons) (UKM)
Software Engineering and Image Processing

Dr. Noor Hafhizah Abd Rahim
PhD (Bristol) UK, MSc (UM), BSc (UKM)
Artificial Intelligence, Semantic Web, Natural Language
Processing, Machine Learning

Dr. Noor Azliza Che Mat
PhD (UMT), MIT, BIT (Hons) (UKM), DipIT (KUSZA)
Decision Support System and Multimedia

Ts. Dr. Ily Amalina Ahmad Sabri
PhD, MSc, BIT (UMT), DipIT (PSMZA)
Data Mining and Decision Support System

Dr. Mohamad Nor Hassan
PhD (UMT), MSc (UiTM), BSc (Liverpool)
Information System

Dr. Waheed Ali Hussein Mohammed Ghanem
PhD (USM), MSc (USM), BSc (AU)
Network Security, Artificial Intelligence, Machine Learning,
Swarm Intelligent, Optimization Algorithm

Dr. Rosaida Rosly
PhD, MSc, BSc, DipIT (UniSZA)
Machine Learning, Ensemble Method, Data Mining

Ts. Dr. Ashanira Mat Deris
Phd (UTM), MSc (UTM), BSc (UTM)
Applied Artificial Intelligence, Machine Learning, Modeling
and Optimization

Dr. Wiwied Virgiyanti
PhD (USM), MSc IT (Management)(UTM),
B.Eng. (Informatics)(Gunadarma University)
Knowledge Management, Project Management, Information
Systems, Organizational Behaviour

Ts. Dr. Sharifah Mashita Binti Syed Mohamad
PhD (UTS), MSc (USM), BIT (Hons) (UUM)
Software Reliability & Testing, Software Metrics &
Measurement, Software Engineering

Ts. Mohamad Aizat Basir
MSc (UUM), BIT (KUSTEM)
Artificial Intelligence and Machine Learning

Mr. Fakhrul Adli Mohd Zaki
MSc, BSc (USM)
Information Security

Vocational Training Officer

Mr. Mohd Arizal Shamsil Bin Mat Rifin
MSc, BIT (UMT)
Software Engineering

Mrs. Wan Fatin Fatihah Yahya
MSc, BIT (UMT)
Software Engineering

ACADEMICIANS
FIELD OF ELECTRONIC AND INSTRUMENTATION

Head of Programme
Bachelor of Applied Science
(Electronics and
Instrumentation)
with Honours

Assoc. Prof. Ts. Dr. Muhamad Zalani Daud
PhD (UKM), MEng (UoW, Aus), BEng (Ritsumeikan, Japan)
Electrical and Electronic Engineering
(Renewable Energy System, Energy Efficiency)

Lecturers

Prof. Ts. Dr. Mohammad Ismail
PhD (UoW, Aus), BSc (Malaya)
Solid State Physics, Advanced Materials
(Advanced Materials, Solid State Hydrogen Storage)

Assoc. Prof. Ts. Dr. Ahmad Nazri Dagang
PhD, MEng, BEng (Ehime, Japan)
Electrical Engineering
(Electrical Discharge Plasma, EM Radiation, Antenna)

Assoc. Prof. Ts. Dr. Salisa Abdul Rahman
PhD (UTS, Sydney), MSc, BEng (UTP)
Electrical and Electronic Engineering
(Energy Technology, Hybrid Electric Vehicle, Driving Cycle
Development)

Assoc. Prof. Ts. Dr. Nurul Hayati Idris
PhD (UoW, Aus), MSc, BSc (Malaya)
Computational Physics and Electronics
(Advanced Materials for Energy Storage)

Assoc. Prof. Datin Ts. Dr. Nurul Adilah Abdul Latiff
PhD (UniMAP), MSc (Newcastle), BEng (USM)
Electrical and Electronic Engineering
(Wireless Communications, Signal Processing)

Assoc. Prof Dr. Wan Mariam Wan Muda
PhD (UWA, Perth), MSc, BEng (USM)
Electrical and Electronics Engineering
(PV System, Control Theory)

Dr. Wan Hafiza Wan Hassan
PhD (Victoria, Melbourne), MSc (UPM), BEng (MMU)
Electronic Engineering
(Telecommunications, Optical and RF Communications)

Dr. Nur Farizan Munajat
PhD (KTH, Stockholm), MSc, BSc (UTM)
Industrial Physics
(Heat and Energy Technology, Energy Conversion Systems)

Pn. Hasiah Haji Salleh
MSc, BSc (UKM)
Physics
(Solid State Physics, Solar Energy)

Dr. Hidayatul Aini Zakaria
PhD (Queensland, Aus), BEng (Malaya)
Bio-medical Engineering
(Terahertz Technology, Drug Delivery)

Dr. Ahmad Zaki Annuar
PhD (Edinburgh), MEng (UTM), BEng (UiTM)
Electrical and Electronics Engineering
(Power Electronics, Wireless Sensor Network, Internet of Things)

Dr. Muhammad Syarifuddin Yahya
PhD (UMT), MEngSc (Curtin), BSc (UKM)
Nuclear Science
(Material Science, Solid State Hydrogen Storage, Hydrogen Production)

Dr. Nurul Shafikah Mohd Mustafa
PhD, MSc, BSc (UMT)
Physics Electronic and Instrumentations
(Material Science, Solid State Hydrogen Storage)

En. Mohd Fairuz Affandi Aziz
MSc, BSc (USM)
Medical Physics
(Radiation Silica, Activated Carbon)

Dr. Siti Norbakyah Jabar
PhD, MSc, BSc (UMT)
Physics Electronic and Instrumentations
(Energy Technology, Hybrid Vehicle)

Dr. Md. Rabiul Awal
PhD (UniMAP), MSc (IIUM), BSc (IIUC, BD)
Electrical and Electronics Engineering
(Wireless Power Transfer, Vibration Energy Harvesting)

Ts. Dr. Nurafnida Afrizal
PhD (Liverpool, UK), MSc (Strathclyde, UK), BEng (UniKL)
Electrical Engineering
(Electrical Measurement, Condition Monitoring, Signal Processing)

Dr. Zulkifli Mohd Yusop
PhD, B. Eng (UTM)
Electrical Engineering
(Control, Mechatronics and Robotics)

ACADEMICIANS
FIELD OF MATHEMATICS

Head of Programme Bachelor Science (Applied Mathematics) with Honours

Dr. Shalela Mohd Mahali
PhD (Western Australia), MSc (UTM), BSc (KUSTEM)
Mathematical Modeling, Controlled Drug Delivery

Head of Programme Bachelor of Science (Financial Mathematics) with Honours

Assoc. Prof. Dr. Ahmad Termimi Ab Ghani
DSc (Tohoku University), MSc (UMT), BSc (KUSTEM)
Foundation of Mathematics (Logic of Games, Set Theory and Combinatorics) and Algebra (Group Theory, Genetic Algebras and Evolution Algebras).

Head of Programme Bachelor Science (Data Analytics) with Honours

Assoc. Prof. Dr. Muhamad Safiih Lola
PhD (USM), MSc (UPM), BEc Hons (UUM)
Applied Statistics (Robust Statistics, Econometrics, Hybrid Statistics) and Data Analytics (Forecasting Analysis)

Chair of Mathematics, Master (Coursework)

Dr. Fatimah Noor Harun
PhD (Wollongong), MSc, BAppSc (USM)
Mathematical Modelling, Linear and Nonlinear Waves

Lecturers

Prof. Dr. Abd. Fatah Wahab
PhD (USM), MSc (UKM), MSc, BSc (Karachi, Pakistan)
Computational Modeling, Fuzzy Topology

Prof. Dr. Mohd Lazim Abdullah
PhD (UMT), BScEd (Hons) (Malaya)
Fuzzy Set, Social Statistics, Decision Science

Prof. Dr. Roslan Hasni @ Abdullah
PhD (UPM), MSc (UKM), BSc (USM)
Graph Theory

Prof. Dr. Zabidin Salleh
PhD (UPM), MSc (USM), BSc (Hons), Dip Ed (UM)
Topology, Functional Analysis, Dynamical System

Assoc. Prof. Dr. Norizan Mohamed
PhD (UTM), MSc, BSc (UKM)
Time Series Forecasting, Statistical Quality Control, Robust
Regression

Assoc. Prof. Dr. Gobithaasan Rudrusamy
PhD, MSc, BSc (USM)
Geometric Modelling, Scientific Visualization, Topological
Data Analysis

Assoc. Prof. Dr. Che Mohd Imran Che Taib
PhD (Oslo), MSc, BSc (KUSTEM)
Financial Mathematics, Finance & Insurance

Assoc. Prof. Dr. Zainidin Eshkuvatov
PhD (National Uni. of Uzbekistan) Uzbekistan, MSc, BSc
(Tashkent State Uni., Uzbekistan)
Numerical Analysis

Assoc. Prof Dr. Auni Aslah Mat Daud
PhD (Western Australia), BSc (UTM)
Mathematical Modeling, Dynamical Systems, Mathematical
Epidemiology

Prof. Madya Ts. Dr. Nur Aidya Hanum Aizam
PhD (Curtin), Msc (UKM), BSc (KUSTEM)
Operations Research

Ts. Dr. Mohamed Saifullah Hussin
PhD (Brussels), MSc, BSc (UUM)
Metaheuristics, Optimization and Operations Research

Dr. Binyamin Yusoff
PhD (Uni. Barcelona), MSc, BSc (UMT)
Fuzzy Set, Decision Science

Dr. Azwani Alias
PhD (Loughborough), MSc, BSc (UTM)
Mathematical Modelling, Linear and Nonlinear Waves

Dr. Chong Nyuk Sian
PhD (Uni. Ottawa), MSc (USM), BSc (Hons) (USM)
Mathematical Modeling in Epidemiology, Ordinary
Differential Equations

Dr. Ilyani Abdullah
PhD (UTM), MSc, BSc (UKM)
Fluid Dynamics, Differential Equations, Mathematical
Modelling

Dr. Hanafi A. Rahim
PhD (UiTM), MSc (UKM), BSc (UiTM)
Applied Statistics

Dr. Hanani Farhah Harun
PhD (IIUM), MSc, BSc
Option Pricing

Dr. Hassilah Salleh
PhD (Oslo), MSc (UKM), BSc (KUSTEM)
Stochastic Analysis, Financial Mathematics and Insurance

Dr. Loy Kak Choon
PhD (Uni. Ottawa), MSc (USM), BSc (KUSTEM)
Computational Fluid Dynamics, Numerical Analysis

Dr. Maharani Abu Bakar
PhD (Essex, UK), MSc, BSc (Gadjah Mada, Indonesia)
Numerical Analysis, Deep Learning, Artificial Neural Network

Dr. Mohamad Nazri Husin
PhD (UMT), MSc, Bsc (Hons)(USM)
Application of Graph Theory, Mathematical Modelling

Dr. Nur Baini Ismail
PhD (Bradford), MSc, BSc (USM)
Computer Aided Geometric Design

Dr. Nur Fadhilah Ibrahim
PhD (Curtin), MSc, BSc (UTM)
Operations Research, Optimization

Dr. Ruwaidiah Idris
PhD, MSc, BSc (UKM)
Fluid Dynamics, Convective Heat Transfer

Dr. Ummu 'Atiqah Mohd Roslan
PhD (Exeter), MSc, BSc (UMT)
Dynamical System

Dr. Syerrina Zakaria
PhD (USM), MSc, BSc (UKM)
Applied Statistics (Spatial Analysis)

Mrs. Siti Madhihah Abdul Malik
MSc (UKM), BSc (KUSTEM)
Mathematical Modeling

Mrs. Nor Azlida Aleng @ Mohamad
MSc, BSc (UKM)
Biostatistics, Applied Statistics

Vocational Training Officer

Dr. Mukminah binti Darus
PhD, MSc, BSc (UMT)
Mathematical Sciences, Financial Mathematics

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 andthe 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.

Course Exemption System

Students are allowed to apply for course exemption by completing Course Exemption Form AD-2 (12th version) through online Mynemo Student portal (subject to conditions and approval from Deputy Dean Academic and Students).

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	AlphabetGrade	Grade PointValue	Grade Description
80 – 100	A	4.00	
75-79	A-	3.75	Excellent
70-74	B+	3.50	
65-69	B	3.00	
60-64	B-	2.75	Good
55-59	C+	2.50	
50-54	C	2.00	Satisfactory
45-49	C-	1.75	
40-44	D	1.00	Poor
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 RULES FOR DRESS CODE AND STUDENT APPEARANCESUNIVERSITI 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 orassociation that might cause disharmony in campus
- All students are prohibited from showcasing any elements that might contradict with ethicsand 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 at thefront 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 be fitting 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 bandannas.
- 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 cross- dressing.

SECTION C

ACADEMIC
Programs Offers

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 taught by lecturers from different areas of expertise and each course is delivered 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 of study, every student will be given the opportunity to conduct 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 undergo an industrial training for 24 weeks at selected local or international organisations endorsed by the faculty in the field related to environmental technology. The training will enable students to combine their knowledge and soft skills gained to tackle the environmental issues at the workplace.

Programme Educational Objective (PEO)

The educational objective for this programme is to produce graduate technologist who has the following qualities:

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

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

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

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

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

Career Prospect

Graduates of this programme 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.

Total of Credit for Graduation

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

Categories	Credits	Percentages
University Core	18	15
Programme Core	77	58
University Elective	38	27
Total	**133**	**100**

University Core (18 Credit Hours)

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

Programme Core (77 Credit Hours)

Course Code	Course Name	Credit Hours	Pre-requisite
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
KAS49712	Industrial Training	12 (0+12)	None
KAS4983	Final Year Project I	3 (0+3)	None
KAS4993	Final Year Project II	3 (0+3)	KAS4983
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 have the freedom to enroll in any course that aligns with their interests and maturity level. In addition, they are required to complete a minimum of 21 credit hours from the elective courses listed below or obtain approval from the Head of Programme.

Course Code	Course Name	Credit Hours	Pre-requisite
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
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	Sustainable 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

COURSE SCHEME
BACHELOR OF TECHNOLOGY (ENVIRONMENT) WITH HONOURS

CODE	COURSE NAME	CREDIT	PRE-REQUISITE	CODE	COURSE NAME	CREDIT	PRE-REQUISITE
SEMESTER 1				**SEMESTER 2**			
MPU3143	Communicative Malay Language	3(3+0)	-	BBB3013	Academic Writing Skills	3(3+0)	-
KEJ3173	Mathematics for Technology	3(3+0)	-	BBB3023	Public Speaking	3(3+0)	-
KAS3013	Introduction to Environmental Technology	3(3+0)	-	MPU3132	Appreciation of Ethics amd Civilisations	2(2+0)	-
KAS3523	Environmental Law and Regulations	3(3+0)	-	KAS3023	Environmental Statistics	3(3+0)	-
KEJ3123	Materials Engineering	3(2+1)	-	KAS3032	Principles of Environmental Analysis	2(2+0)	-
MPU3352	Integrity and Anti-Corruption	2(2+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)	-	KAS3533	Environmental Management	3(3+0)	-
KEJ3163	Chemical Process Principles	3(3+0)	-	KAS3723	Hydrology and Water Resources	3(2+1)	-
KEJ3143	Fluid Mechanics	3(2+1)	-	KAS4413	Solid Waste Management	3(3+0)	-
KEJ3133	Engineering Drawing for Environmental Technology	3(1+2)	-	KAS3323	Meteorology and Environment	3(2+1)	-
	Elective 2	3	-		Elective 3	3	-
Total credit		**18**		**Total credit**		**18**	
SEMESTER 5				**SEMESTER 6**			
KAS4423	Hazardous and Scheduled Waste Management	3(3+0)	-	BBB3033	English for Occupational Purposes	3(3+0)	-
KAS3513	Occupational Safety and Health	3(3+0)	-	KAS4553	Environmental Impact Assessment	3(2+1)	-
KAS4113	Environmental Design	3(1+2)	KAS3223	KAS4983	Final Year 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 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** 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.

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 overview of environmental technology scopes. The topics covered in the course explain about the basic concepts of environmental technology, introduction to hydrology and ecosystem. The main emphasis is on the application aspect of pollution prevention and control strategies for protecting the quality of air, water and soil.

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 provide students with 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.

KAS3032   **Principles of Environmental Analysis**
Credit   **3 (3+0)**
Pre-requisite   **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.

KAS3213   **Water Treatment Technology**
Credit   **3 (3+0)**
Prerequisite   **None**

This course introduces the student to the theories and principles of water treatment. The topics covered include the characteristics, criteria, principles, theories related to water treatment and distribution techniques and their components. The course will also emphasize on compliance with standards, rules, laws and outlines. The discussion will also focused on the design aspect of water treatment technology.

KAS3223   **Wastewater Treatment Technology**
Credit   **3 (2+1)**
Prerequisite   **KAS3213**

This course discusses aspects of wastewater characterization, types of pollutants and basic principles for components in conventional and advanced wastewater treatment technology. It also emphasizes on issues related to the management of wastewater treatment systems such as the compliance with treated water discharge standards and sludge disposal. Students will conduct practicals to determine the content of pollutants in water as well as their treatment methods.

KAS3313   **Quality and Air Pollution**
Credit   **3 (3+0)**
Prerequisite   **None**

This course introduces the students to the causes, effects and control of air pollution. The topics covered include the general philosophy of air pollution and related regulations, environmental impacts, classification of air pollution and its source, air quality measurement, data monitoring, processing and modelling. This course also provides the knowledge of the latest rules and management methods in air pollution control based on the Clean Air Regulations, 1978.

KAS3323   **Meteorology and Environment**
Credit   **3 (2+1)**
Pre-requisite   **None**

This course aimed to expose to the students the occurrence of various meteorological phenomena, atmospheric circulations, weather system and techniques used in weather forecast. Topics to be discussed includes atmospheric structure, Earth weather and climate system, temperature, moisture, cloud and precipitation, atmospheric circulation, hydrological cycle, weather forecast and climate change. Basic knowledge in meteorology and climatology is very important in advanced courses related to air pollution control and hydrology.

KAS3513   **Occupational Safety and Health**
Credit   **3 (3+0)**
Prerequisite   **None**

This course introduces the students to the philosophy, principles and the rationale of Occupational Safety and Health 1994 for protecting the workers in Malaysia. This course discusses accidents at work, the nature of hazards and danger, techniques for evaluating and assessing hazards and the management of safety and health in the workplace.

KAS3523   **Environmental Laws and Regulations**
Credit   **3 (3+0)**
Prerequisite   **None**

This course requires students to gain knowledge regarding /about the introduction to the international environmental law and agencies that are responsible in Malaysia. This course will expose the students to the regulations under Environmental Quality Air 1974 in protecting and preserving the environment relating to air quality, control of emission from vehicle, noise pollution, water quality, scheduled waste and solid waste management. This course provides students to form the relationship between the regulations and environmental issues that is happening and provide solutions to solve the problems.

KAS3533   **Environmental Management**
Credit   **3 (3+0)**
Prerequisite   **None**

Environmental management is a discipline that integrates human and environmental interactions as well as management and science applications or solve problem and related issues. This course enables students to understand and explain the basic principles and aspect of pollution management and control, environmental protection, how pollutant media act (water, air, soil, noise) and how humans deal with and manage these resources and pollutants. This course also focuses the impacts of human activity towards environment and human health. Aspect of audit and environmental assessment will provide exposure to understand the aspect of protection, risk, audit and environmental pollution control as a whole.

KAS3723   **Hydrology and Water Resource**
Credit   **3 (2+1)**
Prerequisite   **None**

This course introduces hydrological cycle, hydrological components such as precipitation streamflow evaporation, evapotranspiration, infiltration and groundwater; hydrograph analysis and hydrological statistics; water resources; flood protection and watershed management. This course emphasizes collaborative learning and able to link theory, measurement technique, computation and prediction. Heutagogy approach is used to develop student's skill of data interpretation and identification of environmental problem.

KAS4113   **Environmental Design**
Credit   **3 (1+2)**
Prerequisite   **None**

This course enables the students to gain the insight to the concept in designing unit operations and processes related to the environmental engineering. The student will be guided to select appropriate methodology in project planning and design of water treatment system as well as the residual wastewater collection system. The course involves mini project implementation, project report and presentation.

KAS4413   **Solid Waste Management**
Credit   **3 (3+0)**
Prerequisite   **None**

This course exposes students to the principles of solid waste management and toxic waste in urban planning and industrial development in Malaysia. The students will learn intensively the characteristics and composition of solid waste generated from various sources. Topics discussed include an integrated management system in controlling manufacturing industry activities; treatment systems, methods of control, supervision and maintenance of industrial wastes in the context of increasing environmental pollution.

KAS4423   **Hazardous and Scheduled Waste Management**
Credit   **3 (3+0)**
Prerequisite   **None**

This course discusses the basic theories and principles of hazardous and scheduled waste management as well as waste control technology. It covers legislation, policies, sampling and managed waste storage procedures. This course also emphasizes on physical, chemical and biological treatment methods, stabilization treatments as well as the latest treatment methods namely incineration.

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.

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 programme 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.

KAS4983   **Final Year Project I**
Credit   **3 (0+3)**
Prerequisite   **None**

This course requires students to propose a research project related to Environmental Technology under the guidance of one or more lecturers at the school. Students will work individually to develop selected research projects based on scientific research methods. Students then prepare a project proposal report and present it in a seminar. Students are also required to prepare a draft of the research thesis covering Chapters 1, 2 and 3 to be evaluated by the appointed supervisor and examiner. To develop the capacity and abilities of students in research, this course emphasizes self-learning (Heutogogical approach) where students are given autonomy to develop and organize selected projects with minimal guidance from the appointed Supervisor. In addition, students will be exposed to the use of appropriate software or applications to manage reference materials as well as provide scientific reports in an effective and systematic format. Course evaluation, on the other hand, focuses on the development of 21st century skills, namely communication and critical and creative thinking.

KAS4993   **Final Year 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 is applied through presentation and thesis writing activities.

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, material failures and phase diagrams. The composition, properties, uses, and manufacture of materials such as metal alloys, polymers, composites and ceramics are also discussed. Other discussions include corrosion, types of corrosion and corrosion control methods. Practical activities are also implemented. The cybergogy approach is used to encourage student

involvements in blended teaching and learning activities. Web-based teaching and learning and online assessment are also implemented in this course.

KEJ3133   **Engineering Drawing for Environmental Technnology**
Credit   **3 (1+2)**
Pre-requisite   **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 explains the introduction and basic concepts of fluid mechanics. Static pressure and fluids, mass immortality, Bernoulli and energy. Internal flow–laminar, turbulent and loss. Measurement of velocity and flow rate. Practical lab. This course emphasizes 21st century skill elements in which students are encouraged to collaborate learning and the ability to relate theory to the application of equipment. The heutagogy approach is used to build students skill to understand fluid problems and find solutions. Web based teaching and learning, online activities and assessment are also used in this course.

KEJ3163   **Chemical Process Principles**
Credit   **3 (3+0)**
Prerequisite   **None**

This course is designed for providing the student with the basic knowledge about chemical process. The topics covered include the concepts and process variables, mass balance, properties of pure materials, the first law of thermodynamics, energy balance, and the basic concepts of heat transfer. 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)**
Pre-requisite   **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.

KAS4213   **Urban Drainage and Sewerage**
Credit   **3 (3+0)**
Prerequisite   **None**

This course is designed for introducing the student to the aspect of planning, designing, operation and management of urban drainage and sewerage systems. This course contains fundamental topics on drainage and sewerage, runoff quantity, sewer flow, sewerage design, flood detention pond, concrete basin and erosion and sedimentation control plan. The course will also highlight the urbanization impacts on hydrological processes and the generation of urban runoff.

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.

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. This course emphasizes the application of 21st century skill elements where students are encouraged to collaborate in learning and be able to relate theory to fieldwork.

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 Programme Criteria 4.0, this course encourages students to solve effluent monitoring problems based on the selected types of industrial effluents.

KAS4313   **Air Pollution Control Technology**
Credit   **3 (3+0)**
Prerequisite   **KAS3313**

This course discusses the classification of air pollution and its causes, its effects on humans, plants and other environments. Students are also exposed to sampling and control methods. Students will also be given exposure to air modeling methods, meteorology and air quality systems. In addition, a holistic approach guided by 21st century elements are applied to critically understand, evaluate and comment on the production of renewable energy.

KAS4323   **Indoor Air Quality**
Credit   **3 (3+0)**
Prerequisite   **KAS3313**

This course focuses on building systems, human reactions, indoor contaminants, IAQ assessment, strategy and prevention of IAQ problems in buildings, special indoor environments and risk and action assessments.

KAS4333   **Emission from Combustion Process**
Credit   **3 (3+0)**
Prerequisite   **None**

This course will equip the student with the knowledge of combustion engines and the pollution generated from their emission. 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**
Specifically, the course discusses the methods of monitoring and instruments used in the aspect of air quality. Students are exposed by the method of monitoring used by the Department of Environment, Malaysia at present to provide useful information to the public. The method used to measure the concentration of each criterion pollutants in Malaysia is also peeled, taking into account the aspect of quality assurance and precision calibration. A holistic approach based on 21st century elements is applied to understand, evaluate and review the suitability of instruments for observing air pollutant data in accordance with Industrial Technology 4.0.

KAS4353   **Environmental Noise and Vibration**
Credit   **3 (3+0)**
Prerequisite   **None**
This course focuses on the concept of environmental noise and vibration that includes research on the causes and impacts on humans and the environment. Proper sampling methods and control identification for environmental noise and vibrations are also discussed. Guidelines on environmental noise and vibrations issued by the Department of Environment Malaysia are also covered. 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.

KAS4513   **Geotechnical Engineering**
Credit   **3 (3+0)**
Prerequisite   **None**
This course discusses the analysis and property of soil classification. The law and fundamental of compression, shear, strain, stability and water seepage are discussed as well. 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 Programme 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 discusses the basic concepts of Industrial Hygiene which includes identifying, evaluating and controlling workplace conditions that may cause occupational injury or illness. Several topics will be covered such as introduction to industrial hygiene, structure and main functions of human organs that are often exposed to occupational diseases, basic concepts of risk assessment, types of exposure assessment, biological monitoring and the assessments to environmental hazards to include dust, noise, gas and vapours, lighting, thermal, radiation, biological and psychosocial agents.

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.

KAS4563   **Life Cycle Assessment**
Credit   3 (3+0)
Prerequisite   None

Products, services, and infrastructure cause environmental impacts throughout the life cycle - from raw material intake, consumption to waste management. The Life Cycle Analysis (LCA) method offers a systematic approach to analyzing the impact of products and systems from the beginning to the end of the product or system (cradle-to-grave). This course will cover an overview of various aspects of environmental life cycle analysis, constructing goals and scope of life cycle analysis, inventory, evaluation and interpretation. Sensitivity and uncertainty analysis using available data and impact assessment methods will be emphasized in conducting and interpreting the life cycle analysis of the product or service environment.

KAS4573   **Sustainable Operation and Management**
Credit   3 (3+0)
Pre-requisite   None

This course emphasize towards the development and application capabilities in promoting sustainable operation and management. Students will be introduced to the green technology procurement, environmental management practices (water, air and energy) and sustainability requirement. The overall knowledge will enable the students to fulfill sustainability criteria through modification in the operation process and also on the management aspect.

KAS4713   **Groundwater and Pollution**
Credit   3 (3+0)
Prerequisite   None

This course includes an introduction to groundwater groundwater hydraulics, well hydrodynamics, groundwater flow models, groundwater quality and pollution, as well as saltwater intrusion. This course emphasizes the application of 21st century skill elements where students are encouraged to work in groups and are able to relate theory to environmental problems.

KAS4723   **Surface Water Hydrology**
Credit   3 (3+0)
Prerequisite   None

This course introduces the students to the concepts of surface water hydrology which discusses the study of surface water movement and distribution of surface water in space and time. The topics covered include the concept and surface water process, catchment area hydrological data analysis and hydrological modeling. Hydrological foundations will be reviewed and applied through the use of the system. In addition, the students will be exposed to the skill to design hydrology system using modelling software.

KAS4733   **Coastal Environment**
Credit   3 (2+1)
Prerequisite   None

This course introduces the student to the theory and application of waves, tides, estuary, sediment transport and their application in the nearshore coastal zone. The topics covered include the introduction to the wave and tidal theories and design of wave breakers for coastal protection. The course put emphasize on the coastal problems and their impacts to the environment at large.

KAS4743   **Soil Physics**
Credit   3 (3+0)
Prerequisite   None

This course is an advanced course that allows students to gain knowledge by focusing on more specific environmental components namely movement processes such as water, gas, heat and pollutants in the soil. Students who take this course will be able to strengthen their knowledge of the physical processes of natural fluids in the soil.

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 provides the student with the basic knowledge of soil nature and properties which is important in the context of land use management and monitoring of soil pollution. The topics discussed in this course are the soil architecture and physical properties, soil water characteristics and behavior, soil aeration and temperature, soil erosion and its control, and chemical pollution.

KAS4773   **Applied Geographic Information System (GIS) for Environment**
Credit   3 (2+1)
Pre-requisite   None

This course aims to train students the environmental problem-solving skills using geographic information systems and related analytic techniques. This course covers the introduction of open-source GIS software, GIS principles, methods, and techniques relevant to and valuable for problem-solving in the environmental technology field.

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 equipment 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**

This course applies the concepts of reaction rate, stoichiometry and equilibrium to the analysis of chemical reacting systems. Derivation of rate expressions from reaction mechanisms and equilibrium or steady state assumptions. Design of chemical reactors via synthesis of chemical kinetics, transport phenomena, and mass and energy balances. Aided by Technology 4.0, students will be exposed to the relationship between chemical kinetics and design.

KEJ4133   **Heat Transfer**
Credit   **3 (3+0)**
Prerequisite   **None**

The course introduces the fundamental concepts of various modes of heat transfer. Some aspects of process design principles of various heat transfer equipment will be taken up in the later part of this course. Finally, to present a physical picture of the convection process, heat transfer in boundary layer flows will be addressed.

KEJ4143   **Mass and Energy Balances**
Rcuti Credit   **3 (3+0)**
Prerequisite   **None**

This course introduces the basic concepts in engineering design calculations to solve material and energy balance problems for industrial processes involving multiple unit operations under various conditions. Topics discussed include an introduction to engineering calculations, processes and process variables, material balance bases, single -phase systems, energy and energy balance, balance in non-reaction processes, and balance in reaction processes.

KEJ4513   **Engineering Economics**
Credit   **3 (3+0)**
Prerequisite   **None**

This course introduces the students to engineering economy concept for deciding the right investment projects in the engineering context. The topics discussed in this course include the introduction to engineering economy, time value of money, interest, present worth analysis, rate of return analysis, cost-benefit analysis, inflation, cost estimation, depreciation and taxes. The course will emphasize on the discussion on case study to evaluate the economic feasibility of an engineering project.

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 event. 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 problem 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   **Membrane Technology**
Credit   **3 (3+0)**
Prerequisite   **None**

This course describes in details membrane separation technology as part of the down-stream processing of various industries. The course covers general concept of separation technology, development of membrane technology, concept of membrane separation, membrane materials and their properties and various methods of membrane preparation and characterization. This course then focusing on pressure -driven polymeric membrane processes in the aspects of transport mechanisms, membrane design and configuration, fouling phenomenon and way to overcome the membrane processes limitations. Further, principles of various membrane processes such as Reverse Osmosis, Nano filtration, Ultra Filtration, Micro Filtration, and Forward Osmosis are covered along with their applications in various industries.

KEJ4633   **Clean Technology**
Credit   **3 (3+0)**
Prerequisite   **None**

This course discusses the technology and sustainability that includes the source and production of pollution (e.g.: gas, coal, fossils, solid waste and scheduled waste) as well as the impact of industrial development on the environment. Clean technology also allows students to understand the concepts and strategies of implementing clean technology such as clean energy, green chemistry and industrial ecology. This course also provides knowledge on the application of clean technology in agriculture, water and waste management, technological change through process integration and discuss the emerging clean technology.

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. Web-based teaching and learning and online assessment 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. 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.

KEJ4623   **Thermochemical Treatment and Biomass Recovery**
Credit   **3 (3+0)**
Prerequisite   **None**
This course provides a comprehensive summary of current thermochemical technologies that is being carried out or studied in the treatment and recovery of waste materials and biomass such as combustion, pyrolysis, gasification, torrefaction, hydrothermal dissolution and carbonization. It gives an understanding of the basics of these technologies while offering useful information on the design, operation and products of those technologies (process design and efficiency, operating parameters, technical considerations, distribution and product composition).

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 on 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 a 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 of energy systems, conventional energy technologies, renewable energy technologies, energy and environmental costs, introduction to carbon elements, climate change occurrence, climate change solutions and life cycle assessment (LCA) procedures. This course also discusses electricity generation activities in the first to the fourth industrial revolution and the impact of electricity generation in all four periods on global climate change.

KEJ4693   **Energy Management and Audit**
Credit   **3 (3+0)**
Prerequisite   **None**
This course discusses the introduction of energy management and audits, Basic of electrical system, energy loads, energy audit Instrumentation, energy audit methodology process, energy

costs, energy performance and environmentally friendly concepts, and energy modeling. The course also discussed the generation   and energy management activities of the era of the first industrial revolution until the fourth industrial revolution.

BACHELOR OF APPLIED SCIENCE (MARITIME TECHNOLOGY) WITH HONOURS

Introduction

The Bachelor of Applied Science (Maritime Technology) with Honours programme was first offered in the July 2006/2007 session by the Department of Maritime Technology, Faculty of Maritime Studies and Marine Science. This programme is offered full time and takes four (4) years or eight (8) semesterswhich includes 137 minimum credit hours for graduation.

Maritime Technology is an area focusing on the application of technology, operations, and systems used in the maritime, coastal and offshore engineering sectors. The programme is designed to produce graduates who will develop knowledge, contribute expertise to serve and lead shipping, shipbuilding, oil and gas companies, and government agencies related to the maritime industry locally and abroad.

Programme Educational Objective (PEO)

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

PEO1 : Graduates who are knowledgeable, applying the fields of scientific, numeracy and management leadership can submit brilliant ideas and wisely build careers in Maritime Technology at both local and global levels

PEO2 : Graduates who spearhead technical knowledge and digital, as well as practice lifelong learning in maritime technology

PEO3 : Graduates who are competitive, entrepreneurial characteristics, identify business opportunities in contributing expertise to the field of Maritime Technology and related on behalf of academic, industry, professional body and society

PEO4 : Graduates who are available, are able to communicate effectively and always capable individually and in groups as a Maritime Technology member

Job Prospects

This programme is suitable to be offered given the rapid development that is happening in the maritime industry. Careers in this programme involve job opportunities in government and private agencies, especially those directly or indirectly involved with the maritime industry. Graduates can serve as marine technological engineers, naval architects, technologists, marine surveyors, port officers, project planners, technical/ sales executives, QA/ QC officers, application technology engineers, university/polytechnics/matriculation/private colleges lecturers, research officer/ science officer (Research Institute) and others.

Total Credit for Graduation

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

Category	Credit	Percentage
University Core	18	13.2
Programme Core	81	59.1
University Elective	38	27.7
Total	**137**	**100**

University Core (18 Credit Hours)

Course Code	Course Name	Credit Hour	Pre-requisite
BBB3013	Academic Writing Skills	3 (3+0)	None
BBB3033	English for Occupational Purposes	3 (3+0)	None
BBB3023	Public Speaking	3 (3+0)	None
MPU3143	Communicative Malay Language	3 (3+0)	None
MPU3132	Appreciation of Ethics and Civilizations	2 (2+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 Hour
EDI3303	Fundamental of Physics	3 (3+0)
EDI3313	Engineering Mathematics I	3 (3+0)
EDI3323	Engineering Mathematics II	3 (3+0)
EDI3333	Basic Programming for Technologist	3 (2+1)
MMT3013	Engineering Mechanics	3 (3+0)
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	Mechanics Dynamics	3 (3+0)
MMT3112	Marine Technology Laboratory	2 (0+2)
MMT3123	Strength of Materials	3 (2+1)
MMT3133	Marine Engineering System	3 (2+1)
MMT3144	Marine Electronics and Instrumentation	4 (2+2)
MMT3154	Naval Architecture and Ship Construction	4 (3+1)
MMT4982	Final Year Project I	2 (0+2)
MMT4994	Final Year Project II	4 (0+4)

MMT49712	Industrial Training	12 (0+12)
MMS3513	Meteorology	3 (2+1)
MMM3763	Principle of Maritime Management	3 (3+0)
FIS3483	Principle of Seamanship and Navigation	3 (2+1)

University Elective (38 Credit Hours)

Students are required to register and pass any of the 38 elective course credits listed throughout their studies and subject to the permission and consent of the Head of Field.

Course Code	Course Name	Credit Hour
MMT4163	Marine Technology and Environmental	3 (2+1)
MMT4173	Marine Automation and Control	3 (2+1)
MMT4183	Advanced Naval 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	Power Plant and Ship Machinery	3 (2+1)
MMT4244	Ship Repair and Maintenance Systems	4 (3+1)
MMT4253	Marine Corrosion	3 (2+1)
MMT4263	Offshore Structure	3 (3+0)
MMT4273	Marine Hydrodynamics	3 (3+0)
MMT4283	Marine Conditioning and Refrigeration System	3 (2+1)
MMT4293	Ship Structure	3 (3+0)
MMT4313	Offshore Mooring and Riser	3 (3+0)
MMT4323	Offshore Pipeline	3 (3+0)
MMT4333	Maritime and Coastal Engineering	3 (3+0)

COURSE SCHEME
BACHELOR OF APPLIED SCIENCE (MARITIME TECHNOLOGY) WITH HONOURS

CODE	COURSE NAME	CREDIT	PRE-REQUISITE	CODE	COURSE NAME	CREDIT	PRE-REQUISITE
SEMESTER 1				**SEMESTER 2**			
MPU3143	Communicative Malay Language	3(3+0)	-	BBB3023	Public Speaking	3(3+0)	-
EDI3313	Engineering Mathematics I	3(3+0)	-	EDI3323	Engineering Mathematic II	3(3+0)	-
EDI3303	Fundamental of Physics	3(3+0)	-	MMT3023	Fluid Mechanics	3(2+1)	-
MMT3013	Engineering Mechanics	3(3+0)	-	MPU3132	Appreciation of Ethics and Civilizations	2(2+0)	-
MMT3033	Design and Graphics	3(0+3)	-	BBB3013	Academic Writing Skills	3(3+0)	
MPU3352	Integrity and Anti-Corruption	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 Technologist	3(2+1)	-
MMM3763	Principle of Maritime Management	3(3+0)	-	MMT3053	Thermodynamics	3(2+1)	-
MMT3063	Marine Fluid Power	3(2+1)	-	MMS3513	Meteorology	3(2+1)	-
MMT3093	Mechanics Dynamics	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)	-
MMT3073	Shipping and Port Technology	3(3+0)	-		Elective 1	3	-
FIS3483	Principle of Seamanship and Navigation	3(2+1)			Elective 2	3	
Total credit		**20**		**Total credit**		**20**	
SEMESTER 5				**SEMESTER 6**			
MMT3154	Naval Architecture and Ship Construction	4(3+1)	-	MMT4982	Final Year Project I	2(0+2)	-
MMT3133	Marine Engineering System	3(2+1)	-		Elective 5	3	-
MMT3144	Marine Electronics and Instrumentation	4(2+2)	-		Elective 6	3	-
BBB3033	English for Occupational Purposes	3(3+0)	-		Elective 7	3	-
	Elective 3	3	-		Elective 8	3	-
	Elective 4	2	-		Elective 9	3	-
Total credit		**19**		**Total credit**		**17**	
SEMESTER 7				**SEMESTER 8**			
MMT4994	Final Year Project II	4(0+4)	MMT4982	MMT49712	Industrial Training	12	
	Elective 10	3					
	Elective 11	3					
	Elective 12	3					
	Elective 13	3					
Total credit		**16**				**12**	
					TOTAL CREDIT FOR GRADUATION 137		

Notes:
1. Students are required to undertake the **Survival and Water Safety Program** 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.

EDI3303   **Physic Fundamental**
Credit   **3 (3+0)**
Prerequisite   **None**
This course provides a fundamental understanding of the main ideas and principles of Physics to students who only need a background of General Physics. This course covers almost the entire field of Physics especially mechanics, character traits of matter, heat, wave phenomenon, agriculture, grace and modern Physics. Titles will be discussed qualitatively with the use of simple calculus. The use of these concepts in applied sciences will be given widespread attention.

EDI3313   **Engineering mathematics I**
Credit   **3 (3+0)**
Prerequisite   **None**
This course discusses matrices 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 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.

EDI3333   **Basic Programming for Technologist**
Credit   **3 (2+1)**
Prerequisite   **None**
This course covers the basics of programming and programming language C; problem solving, transmission and refinement techniques of measures in Al-Khawarizmi; programming writing techniques and instructions for solving formal problems. Laboratory practical training to build relevant programmes will be done.

MMT3013   **Engineering Mechanics**
Credit   **3 (3+0)**
Prerequisite   **None**
Introduction and basic concepts force, resultant and resolution of forces. Particle equilibrium. Moment and Couple, Rigid body equilibrium. Centroid and center of gravity. Friction.

MMT3023   **Fluid Mechanics**
Credit   **3 (2+1)**
Prerequisite   **None**
This course explains introduction and basic concept of fluid mechanics. Fluid properties. Pressure and static fluid. Mass conservation, Bernoulli and energy. Inner flow – laminar, turbulent and loss. Velocity measurement and flow rate.

MMT3033   **Design and Graphic**
Credit   **3 (0+3)**
Prerequisite   **None**

This course covers geometry, orthographic and isometric, intersection, development, cross-sectional drawing and working drawing, computer aided command and computer aided design.

MMT3043   **Materials Engineering**
Credit   **3 (2+1)**
Prerequisite   **None**

This course introduces students to the relationship between the structure and properties of materials. It includes atomic structure and bonding, crystalline and molecular structure and imperfections as well as their relations to engineering properties. Other included topics are mechanical properties, various failure modes of materials, and phase diagram. Compositions, properties, applications and fabrications of several materials such as metal, polymer, composite and ceramics are also discussed.

MMT3053   **Thermodynamics**
Credit   **3 (2+1)**
Prerequisite   **None**

This course discusses the definition and concept of thermodynamics, the First Law of Thermodynamics, the Ideal gas property, the Second Law of Thermodynamics, the Power and cooling cycle and Laboratory.

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. Laboratory.

MMT3073   **Shipping and Port Technology**
Credit   **3 (3+0)**
Prerequisite   **None**

This course discusses the environmental factors that influence the choice of shipping and port technology. Specialization of cargo, cargo, type of operation, modes of transport and intermodal transport is also emphasized in addition to the current issue of technological developments in the shipping industry and ports.

MMT3082   **Machining Workshop and Welding**
Credit   **2 (0+2)**
Prerequisite   **None**

Work at the workshop includes "metal sheet" fabrication, cutting, formation and welding, basic amestorisation, running and fixture foundation. Basic equipment and methods for measuring. Understanding specifications, scale, engineering drawings. Safety in the laboratory and preparation of technical reports.

MMT3093 **Mechanics of Dynamics**
Credit   3 (3+0)
Prerequisite None
This course introduces basic engineering dynamic consisting mainly of linear, rotational motions, conservation of work, forces and kinetic energy, linear velocity and acceleration, general motion relative to rotating structures, mass moment of inertia.

MMT3112 **Marine Technology Laboratory**
Credit   2 (0+2)
Prerequisite None
The principle of Archimedes is related to floating, floating center, underwater gravity. Stability of the body in water. Understanding the ship lines plan. Calculation of cross sections, water planes, volume of targets, gravity centers (CG), floating centers (B) and floating centers extend (LCF) using Simpson's ruling with the help of a "spreadsheet" programme based on "ship lines plan". Ship stability and sting testing methods and oleng testing to determine GM. Test data analysis and provide technical reports. Electrical Circuit Basics (D.C. and AC) and ecteronic circuit base use COMLAB learning module).

MMT3123 **Strength of Materials**
Credit   3 (2+1)
Prerequisite None
The course discusses the strength of a material with an emphasis on the external load and the effect of loading. It covers basic static loading, the resulting stress and strain, the torsion of a circular bar, shear and bending moment, bending stress and combined loading. Understanding the basis of the loading and analysis for the reaction is the focus of this course. Practical for related topics are also enhanced.

MMT3133 **Marine Engineering System**
Credit   3 (2+1)
Prerequisite None
This subject introduces students the general knowledge of marine engineering terms, control systems, principles and operation of all the ship's machinery, type of main work which machinery and auxiliary machineries. It covers marine power plant, boiler, propulsion system, freshwater generator, steering gear, pumps system, refrigeration, marine sewage, incinerator, deck machineries and etc.

MMT3144 **Marin Electronics and Instrumentation**
Credit   4 (2+2)
Prerequisite None
Basics electricity and electronics. Voltage, current, resistance, impedance and power calculations. Standard symbols in electrical and electronic circuits, electronic components. Classification and usage of electronic instrumentation on board ships. Principles of operations of RADAR, echo-sounder, RDF, GPS, gyro-compass etc., in details. Specifications and selection of electronic equipment. Maintenance of electronic equipment. Laboratory.

MMT3154 **Naval Architecture and Ship Construction**
Credit   4 (3+1)
Prerequisite None
This subject will introduce students to several basic terms of the naval architecture and several

types of ships such as merchant ship, military ship and special ship design. This subject also introduces to calculate ship's form coefficient and apply Simpson rule to find the ship properties. Furthermore, the transverse statical stability is calculated under loading, discharging and transferring of cargoes on board ship. Role of ship's classification and maritime regulations on safety at sea especially related to ship design is explained. Features modern building materials including material strength, limitations and factors affecting the construction materials as appropriate. This subject also includes projects and assignments individually.

MMT4982   Final Year Project I
Credit   2 (0+2)
Prerequisite   None
Final Year Project I is design to train the students do, write and present the scientific research. Final year student must do one research project and supervise by a lecturer in the study area of Maritime Technology or related. The students should propose a title, prepare a research proposal and submit their pre-thesis to be evaluate for each semester the course is register. The students also need to do a presentation in a Final Year Project Seminar.

MMT4994   Final Year Project II
Credit   4 (0+4)
Prerequisite   MMT4982
Final Year Project II is continuing from PITA I and the students need to implement the research as propose in a research proposal, analyse data, and complete the thesis to be evaluate by the supervisor for each semester subject is register. The students also need to present in a final year project seminar and submit the hardbound thesis.

MMT49712   Industrial Training
Credit   12 (0+12)
Prerequisite   None
Students will be placed in government departments or private sectors for 24 weeks in Semester 8. Students will do a suitable daily duty under qualified supervisor in the industry and observed by supervisor from university.

MMT4163   Marine and Environmental Technology
Credit   3 (2+1)
Prerequisite   None
This course discusses the development and current issues in coastal and marine environment which involves applications of technologies including coastal erosion, pollution, exploration of resources and energy. Methods of bottom sampling, water pollution, seabed mapping and coastal erosion. Acoustic techniques of bottom mapping, and resource survey. Chemical and biological methods to rehabilitate living resources, water quality and marine environment. Current issues related to resource exploitation, alternative energy, water and sound pollution and shipping activities.

MMT4173   Marine Automation and Control
Credit   3 (2+1)
Prerequisite   None
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, transducers. Laplace transform, transfer function. Sensors for automation. Control software packages. Case studies and computer simulation.

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 the cargoes on board as referred to the transverse statical stability. Dam age stability and ship's stability during drydocking and grounding are also discussed accordingly. Furthermore, this subject also takes a fundamental approach to several components of ship resistances i.e., frictional, wave and other resistance components. In addition, the module also discusses powering and efficiency components.

MMT4193   **Maritime Engineering Design**
Credit   **3 (2+1)**
Prerequisite   **None**
Marine physical (weather, waves, tides) affecting the operation and designs of marine structures focusing on design philosophy, design process, requirement and analysis (technical and economics). Students are required to select a topic, prepare a proposal, analysis, write reports and make presentations. Group project covering 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, storage, trouble shooting and maintenance.

MMT4223   **Research Method in Technology**
Credit   **3 (3+0)**
Prerequisite   **None**
Student selects a research topic, prepare 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**
Elements related to ship machinery including steam plant, gas turbine, reciprocating plant, compressor. Auxiliary power plants and classification of power plants. Principles of operation of power plant. Power generation and transmission through mechanical, electrical and hydraulic systems including basic components. Trouble shooting and maintenance.

MMT4244   **Ship Repair and Maintenance Systems**
Credit   **3 (2+1)**
Prerequisite   **None**
Planning and organization of maintenance. Maintenance and ship repair concepts from engineering perspective. Static maintenance system, control and quality assurances. Control of materials for maintenance, maintenance schedule and programme, preparing maintenance job and schedule including cost estimation, job description, man-hours and tools. Assessment of information system guide, control of tools based on diagnostic technology. Slipway, techniques of docking. Scrapping

and paint technology. Safety at work sites.

MMT4253   **Marine Corrosion**
Credit   **3 (2+1)**
Prerequisite   **None**
Introduction to theory and practices in marine corrosion. Natural process of corrosion formation. Environmental factors affecting metal corrosion especially at sea. Finally, introduction to basic methods preventing corrosion such as cathode and anode, paint and metal plating.

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.

MMT4273   **Marine Hydrodynamics**
Credit   **3 (3+0)**
Prerequisite   **None**
This course discusses the fundamentals of fluid mechanics in the context of marine structures, vehicles, ocean science and engineering, transport theorem and conversation principles, hydrodynamic forces in potential flow and numerical method solutions technique for hydrodynamics problems.

MMT4283   **Marine Conditioning and Refrigeration System**
Credit   **3 (2+1)**
Prerequisite   **None**
Marine air-conditioning components and system, principles of heat transfer, applications, and installation of air conditioning systems including operating conditions, type and characteristics of refrigerants, troubleshooting, repair and maintenance of refrigeration system.

MMT4293   **Ship Structure**
Credit   **3 (2+1)**
Prerequisite   **None**
This course is required basic engineering mechanics and also an extension of material strength. It covers introduction 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 method is also among the topics to be included in the subject.

MMT4323   **Offshore Pipeline**
Credit   **3 (3+0)**
Prerequisite   **None**
This course introduces piping system and engineering covering principles of operation of underwater offshore piping, piping types, methods of protecting pipes. Different aspects to student. 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**
Introduction to theories of waves and tidal. Design coastal structure for the purpose of protection from beach erosion because of waves attack. Problems in coastal environment and the importance towards environmental.

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 Objective (PEO)

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

PEO1 : To produce competent Engineering Technologists who are able to apply principles of science, engineering and modern technology in solving current and future problems related to Naval Architecture & Marine Engineering

PEO2 : To produce Engineering Technologists in Naval Architecture & Marine Engineering field who perform work and duty ethically with high moral values and responsibility to God, nation and societies.

PEO3 : To produce creative and innovative Engineering Technologist in research and development as well as techno-entrepreneur in fulfilling the national and international requirements.

PEO4 : To produce Engineering Technologists who are able to communicate effectively with good leadership as well as able to function in teamwork environment.

PEO5 : To produce Engineering Technologists that show enthusiasm in engaging long-life learning through continuity of learning, technical practices and professional development.

Job Prospects

This programme is offered in view of the rapid development taking place in the shipping industry. Here are some career opportunities in the field of naval architecture:

- 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

Total Credit for Graduation

The minimum amount of credit to graduate is 140 credit hours. The distributionof credit hours by course category is as follows:

Category	Credit	Percentage
University Core	18	13
Programme Core	111	79
University Elective	11	8
Total	**140**	**100**

University Core (18 Credit Hours)

Course Code	Course Name	Credit Hour
BBB3013	Academic Writing Skills	3 (3+0)
BBB3033	English for Occupational Purposes	3 (3+0)
MPU3132	Appreciation of Ethics and Civilizations	2 (2+0)
BBB3023	Public Speaking	3 (3+0)
MPU3352	Integrity and Anti-Corruption	2 (2+0)
MPU3143	Communicative Malay Language	3 (3+0)
CCXXXXX	Co-Curriculum	2 (0+2)

Programme Core (111 Credit Hours)

Course Code	Course Name	Credit Hour
EDI3313	Engineering Mathematics I	3 (3+0)
EDI3323	Engineering Mathematics II	3 (3+0)
MNA3013	Engineering Drawing	3 (0+3)
MNA3203	Statics	3 (3+0)
MMT3023	Fluid Mechanics	3 (2+1)
EDI3353	Basic Programming for Technologist	3 (2+1)
MMT3043	Engineering Materials	3 (2+1)
MMT3053	Thermodynamics	3 (2+1)
MMT4253	Marine Corrosion	3 (2+1)
MMT3601	Shipping and Port Technology	3 (3+0)
MMT3112	Marine Technology Laboratory	2 (0+2)

Course Code	Course Name	Credit Hour
MNA3023	Dynamics	3 (3+0)
MMT3105	Marine Technology Laboratory 2	2 (0+2)
MMT3123	Strength of Materials	3 (2+1)
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)
SOE4024	Engineering Economics & Entrepreneurship	2 (0+2)
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)
MMT4293	Ship Structure	3 (2+1)
MNA3133	Ship Repair and Maintenance Systems	3 (2+1)
MNA3143	Naval Architecture IV	3 (2+1)
MNA3153	Marine Engineering System IV	3 (2+1)
MMT3144	Marine Electronics and Instrumentation	4 (2+2)
MNA3163	Automation & Control System	3 (2+1)
MNA3173	Engineering Statistics	3 (3+0)
MNA3183	Occupational Safety & Health	3 (3+0)
MNA3192	Engineers, Law and Society	2 (2+0)
MNA4982	Final Year Project I	2 (0+2)
MNA4994	Final Year Project II	4 (0+4)
MNA49712	Industrial Training	12 (0+12)

University Elective (11 Credit Hours)

Students are required to register and pass any of the 11 elective course credits listed throughout their studies and subject to the permission and consent of the Head of Programme.

Course Code	Course Name	Credit Hour
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 (3+0)
MMT4313	Offshore Mooring and Riser	3 (3+0)
MMT4323	Offshore Pipeline	3 (3+0)
MMT4333	Maritime and Coastal Engineering	3 (3+0)

COURSE SCHEME
BACHELOR OF MECHANICAL ENGINEERING TECHNOLOGY (NAVAL ARCHITECTURE) WITH HONOURS

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

Notes:
1. Students are required to undertake the **Survival and Water Safety Program** 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.

COURSE SYNOPSIS
BACHELOR OF MECHANICAL ENGINEERING TECHNOLOGY(NAVAL ARCHITECTURE) WITH HONOURS

EDI3353	**Basic Programming for Technologist**
Credit	**3 (2+1)**
Prerequisite	**None**

This course contains basic programming and programming language, problem solving technique, flow diagram and structured algorithm, programme coding techniques and instruction to solve formal problems. Hands on programming exercise will be given to strengthen students programming language.

EDI3313	**Engineering Mathematics I**
Credit	**3 (3+0)**
Prerequisite	**None**

This course discusses matrix and emphasizes on 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 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.

MNA3192	**Engineers, Law and Society**
Credit	**2 (2+0)**
Prerequisite	**None**

This course discusses the concepts of ethics, values and moral, and its relationships with engineering profession. The ethical concept in work including professionalism, accountability, organization and workers within the organization, law and current ethical law, and unlawful acts such as bribe, cheating, discrimination, and others.

MNA3113	**Project Management**
Credit	**3 (2+1)**
Prerequisite	**None**

This course introduces the fundamental 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.

MNA3173	**Engineering Statistics**
Credit	**3 (3+0)**
Prerequisite	**None**

This course exposes the students on general knowledge, method, theory and its application of statistic and probability in naval architecture marine engineering.

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.

MMT3043   **Engineering Materials**
Credit   3 (2+1)
Prerequisite   None

This course introduces students to the relationship between the structure and properties of materials. It includes atomic structure and bonding, crystalline and molecular structure and imperfections as well as their relations to engineering properties. Other included topics are mechanical properties, various failure modes of materials, and phase diagram. Compositions, properties, applications, and fabrications of several materials such as metal, polymer, composite and ceramics are also discussed.

MMT3023   **Fluid Mechanics**
Credit   3 (2+1)
Prerequisite   None

This course explains introduction and basic concept of fluid mechanics. Fluid properties. Pressure and static fluid. Mass conservation, Bernoulli, and energy. Inner flow – laminar, turbulent and loss. Velocity measurement and flow rate. Laboratory.

MMT3053   **Thermodynamics**
Credit   3 (2+1)
Prerequisite   None

Definition and concept of thermodynamics. The First Law of Thermodynamics. Ideal gas property. The Second Law of Thermodynamics. Power and cooling cycle. Laboratory.

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 practice of 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 course incorporates some important technical aspects in the field of marine engineering and naval architecture, which includes the provision of drawings of ship lines, understanding on hydrostatic, stability of floating objects, conduct tests. experiments / observations related to different aspects of electrical equipment found on board. The concepts are discussed understood through performing the actual tests / experiments using model ships and CBT in the laboratory.

Strength of Materials

MMT3123
Credit   3 (2+1)
Prerequisite   None

The course discusses the strength of a material with an emphasis on the external load and the effect of loading. It covers basic static loading, the resulting stress and strain, the torsion of a circular bar, shear and bending moment, bending stress and combined loading. Understanding the basis of the loading and analysis for the reaction is the focus of this course. Practical for related topics are also enhanced.

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, gyrocompass; 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 system, to become an expert mariner.

MMT4293   **Ship Structure**
Credit   3 (2+1)
Prerequisite   None

This course is required basic engineering mechanics and an extension of material strength. It covers introduction 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.

MMT4253   **Marine Corrosion**
Credit   3 (2+1)
Prerequisite   None

Introduction to theory and practices in marine corrosion. Natural process of corrosion formation and environment factors affecting marine corrosion. Introduction to basic methods preventing marine corrosion and lastly expose students to currently practices technique to marine corrosion control and prevention.

MNA4982   **Final Year Project I**
Credit   2 (0+2)
Prerequisite   None

Final Year Project I is design to conduct scientific studies, write reports and make scientific presentations. Final year students are required to carry out a research project under the guidance of one or more supervisors / lecturers in the field of study of Maritime Technology and related. Students are required to submit a title, prepare a research proposal, and complete a research pre-thesis for their respective assessments each semester when the subject is registered. Students are also required to present research proposals in the final year scientific project seminar I.

MNA4994   **Final Year Project II**
Credit   **4 (0+4)**
Prerequisite   **MNA4982**

Final Year Project II (PITA II) is continue from PITA I and the students need to implement the research as propose in a research proposal, analyse data, and complete the thesis to be evaluate by the supervisor for each semester subject is register. The students also need to present in a final year project seminar and submit the final thesis to PITA coordinator.

MNA3203   **Statics**
Credit   **3 (3+0)**
Prerequisite   **None**

The course includes an introduction and basic concepts of force, the resultant force and resolution power, the balance of particle, moment and couplings, rigid body balance, canter of gravity and centroid, and friction.

MNA3013   **Engineering Drawing**
Credit   **3 (0+3)**
Prerequisite   **None**

This course covers geometry, orthographic and isometric, projection of planes, points and lines, development of surfaces, machine drawing, computer aided command and computer aided design.

MNA3043   **Naval Architecture I**
Credit   **3 (3+0)**
Prerequisite   **None**

This course introduces students to basic terms on the naval architectural knowledge. This enables students to familiarize themselves with naval architectural terms and ship constructions and undertakes a briefly report of ship design and build during visiting in the shipyard. Several types of ships either merchant or military purposes, technology of ship design/marine engineering and ship fabrication in Malaysia are explained. In addition, the students should be able to describe an important role of ship classification and maritime regulation on safety at sea and carrier opportunities on maritime industries and government sectors especially in Malaysia.

MNA3053   **Marine Engineering Systems I**
Credit   **3 (2+1)**
Prerequisite   **None**

The subject introduces elements related to shipping machinery including steam plant, gas turbine, reciprocating plant, compressor. Auxiliary power plants and classification of power plants. Principles of operation of a power plant. Power generation and transmission through mechanical, electrical, and hydraulic systems including basic components. Troubleshooting and maintenance.

MNA3064   **Naval Architecture II**
Credit   **4 (2+2)**
Prerequisite   **None**

This course introduces students to have understanding on determining the ship's form ship's coefficient and calculation the hydrostatic properties using Simpson's rule. Furthermore, the transverse statical stability and list conditions of ship are discussed under loading, discharging and transferring of cargoes to have a better understanding on practical ship loading activities. In addition, modern building materials including material strength, limitations and factors affecting the construction materials is explained that enables the students to choose an appropriate material

according to the ship design. This subject also includes projects and assignments individually on the ship design exposing basic philosophy of the ship design processes.

MNA3073   **Marine Engineering Systems II**
Credit   **3 (2+1)**
Prerequisite   **None**
This subject introduces students to the general knowledge of marine engineering terms, control systems, principles and operation of all the ship's machinery and auxiliary machineries. It covers marine power plant, boiler, propulsion system, freshwater generator, steering gear, pumps system, refrigeration, marine sewage, incinerator, deck machineries etc.

MNA3103   **Marine Engineering Systems III**
Credit   **3 (2+1)**
Prerequisite   **None**
Marine refrigeration components and systems, the principles of heat transfer, application, installation, operation principles, types and characteristics of the refrigerant, trouble shoot, Maintenance and repair the cooling system on board.

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 discusses 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.

MNA3163   **Automation and Control Systems**
Credit   **3 (2+1)**
Prerequisite   **None**
This course discusses the dynamic system encountered in a variety of equipment and mechatronic systems. It will look at the system modeling and system response to disturbance. In addition, the control system uses dynamic feedback and control system design using different design techniques will be discussed.

MNA3153   **Marine Engineering Systems IV**
Credit   **3 (2+1)**
Prerequisite   **None**
This course discusses the dynamic system encountered in a variety of equipment and mechatronic systems. It will look at the system modelling and system response to disturbance. In addition, the control system uses dynamic feedback and control system design using different design techniques will be discussed.

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 manoeuvrability. 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 manoeuvring characteristics in horizontal plane motion-turning circle will be also discussed.

MNA3023   **Dynamics**
Credit   **3 (3+0)**
Prerequisite   **None**

This course introduces the basic dynamic engineering. It consists of plane motion straight, curved lines of motion, conservation work and kinetic and potential energy, velocity, and acceleration in a horizontal movement, relative to the general movement of the rotating frame, the mass moment of inertia.

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, price estimate, type of repair work, safety aspects, job inspection and the requirements of classification society.

MNA49712   **Industrial Training**
Credit   **12 (0+12)**
Prerequisite   **None**

Students will be placed in government departments or private sectors for 24 weeks in Semester 8. Students will do a suitable daily duty under qualified supervisor in the industry and observed by supervisor from university.

MNA3033   **Ship Constructions**
Credit   **3 (2+1)**
Prerequisite   **None**

This course introduces students the knowledge of the process of ship construction. It includes an introduction to the basics of ship construction, materials, facilities, machinery, and equipment used, the relevant agencies and regulatory bodies as well as the cost of the basic construction of the vessel

to be known by the students. This course emphasizes the students' ability to identify and solve problems related to shipbuilding and using the knowledge gained.

MMT4163   **Marine and Environmental Technology**
Credit   **3 (2+1)**
Prerequisite   **None**
This course discusses the development and current issues in coastal and marine environment which involves applications of technologies including coastal erosion, pollution, exploration of resources and energy. Methods of bottom sampling, water pollution, seabed mapping and coastal erosion. Acoustic techniques of bottom mapping, and resource survey. Chemical and biological methods to rehabilitate living resources, water quality and marine environment. Current issues related to resource exploitation, alternative energy, water and sound pollution and shipping activities.

MMT4193   **Maritime Engineering Design**
Credit   **3 (2+1)**
Prerequisite   **None**
Marine physical (weather, waves, tides) affecting the operation and designs of marine structures focusing on design philosophy, design process, requirement, and analysis (technical and economic). Students are required to select a topic, prepare a proposal, analysis, write reports and make presentations. Group project covering 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, storage, trouble shooting and maintenance.

MMT4223   **Research Method in Technology**
Credit   **3 (3+0)**
Prerequisite   **None**
Student selects a research topic, prepare 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.

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.

MMT4273   **Marine Hydrodynamics**
Credit   **3 (3+0)**
Prerequisite   **None**
This course discusses the fundamentals of fluid mechanics in the context of marine structures,

vehicles, ocean science and engineering, transport theorem and conversation principles, hydrodynamic forces in potential flow and numerical method solutions technique for hydrodynamics problems.

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 method is also among the topics to be included in the subject.

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

MMT4323   **Maritime and Coastal Engineering**
Credit   **3 (3+0)**
Prerequisite   **None**
Introduction to theories of waves and tidal. Design coastal structure for the purpose of protection from beach erosion because of waves attack. Problems in coastal environment and the importance towards environmental.

BACHELOR OF COMPUTER SCIENCE (SOFTWARE ENGINEERING) WITH HONOURS

Introduction

The field of Computer Science at FTKKI, UMT offers three programmes of study, namely;
1) Bachelor of Computer Science (Software Engineering) with Honours
2) Bachelor of Computer Science with Maritime Informatics (Honours)
3) Bachelor of Computer Science (Mobile Computing) with Honours

The Bachelor of Computer Science (Software Engineering) with Honours is offered to both local and international students with a particular emphasis on STPM, Matriculation, and Diploma graduates or their equivalents. This program aims to provide students with an understanding of development theory and the application of software systems. This includes skills in problem-solving, software system design, software testing and system maintenance. Aligned with the progress of the Industrial Revolution 4.0 (IR4.0), the fields of computer science and information technology are drivers of social development, capable of fostering an informed society. Both of these fields are crucial for industrial competitiveness. Therefore, digital talent in software engineering is highly required in various sectors to drive the economic growth of the country.

Programme Educational Objective (PEO)

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

PEO1 : Applying knowledge (LO1), technical (LO2) and digital (LO10) skills in Software Engineering in accordance with industry standards.

PEO2 : Ability to solve computing problem in team with accountability (LO5) and able to communicate (LO4) effectively with the rest of the team members and the client.

PEO3 : Ethical (LO6) with integrity in carrying out trust and current career.

PEO4 : Exhibit the ability in mastering management and lead computing project (LO9) by utilizing latest scientific, technical (LO3) and numerical (LO11) skills.

PEO5 : Ability to adapt to changes (LO7) of economy, politics, and social environment, while at the same time having entrepreneurship (LO8) skills in area related to information technology and communication.

Prospects for Career

Among the careers that can be pursued by graduates of computer science programmes are as follows:

- Software Engineers
- Software Developer
- Software Tester
- System Analyst
- Web Designer/Developer
- Programmer/Program Analyst
- System Administrator
- Network Administrator
- Database Administrator
- Information Technology Officer
- IT Consultant
- Network Engineer
- IT Lecturer
- IT Trainer
- Postgraduate Opportunity

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 Course	15	12
Programme Core Course	46	38
Specialization Core Course	30	25
Final Year Project	8	6
Industrial Training	12	10
University Elective Course	11	9
Total	**122**	**100**

University Core Course (UC)

Students must take all six courses at the University Core (UC) level that have been set, which amount to 15 credit hours.

No	Course Code	Course Name	Credit Hour	Pre-requisites
1	CCXXXXX	Co-Curriculum	2 (0+2)	None
2	BBB3023	Public Speaking	3 (3+0)	None
3	BBB3033	English For Occupational Purposes	3 (3+0)	None
4	MPU3132	Appreciation of Ethics & Civilizations	2 (2+0)	None
5	MPU3143	Communicative Malay Language	3 (3+0)	None
6	MPU3352	Integrity and Anti-Corruption	2 (2+0)	None

Programme Core Course (PC)

To meet the requirements for graduation, students must take and pass all 15 Programme Core (PC) courses totalling 46 credit hours.

No.	Course Code	Course Name	Credit Hour	Pre requisites
1.	CSF3003	Discrete Structure	3(3+0)	None
2.	CSF3013	Data Structure and Algorithm	3(2+1)	None
3.	CSF3023	System Thinking and Logic	3(3+0)	None
4.	CSF3034	Programming	4(3+1)	None
5.	CSF3043	Object-Oriented Programming	3(2+1)	None
6.	CSF3113	System Analysis and Design	3(2+1)	None
7.	CSF3123	Database	3(2+1)	None
8.	CSF3133	Web-Based Interface Design	3(2+1)	None
9.	CSF3143	Basics of Software Engineering	3(3+0)	None
10.	CSF3213	Operating System	3(3+0)	None
11.	CSF3223	Networking	3(2+1)	None
12.	CSF3233	Cyber Security	3(2+1)	None
13.	CSF3243	Computer Organisation and Architecture	3(3+0)	None
14.	CSF3253	Intelligent System	3(3+0)	None
15.	MTK3053	Introduction to Statistics	3(3+0)	None

Specialization Core Course (SC)

To meet the requirements for graduation, students must take and pass all 10 Specialization Core (SC) courses, which amount to 30 credit hours.

No.	Course Code	Course Name	Credit Hour	Pre-requisites
1.	CSE3023	Web-Based Application Development	3(2+1)	None
2.	CSE3203	Software Requirement Engineering	3(3+0)	None
3.	CSE3403	Software Project Management	3(2+1)	None
4.	CSE3413	Software Testing	3(3+0)	None
5.	CSE3423	Software Quality Assurance	3(3+0)	None
6.	CSE3433	Software Architecture	3(3+0)	None
7.	CSE3443	Software Maintenance and Evolution	3(3+0)	None
8.	CSE3453	Ethics and Professional Practices	3(3+0)	None
9.	CSE3953	Application System Development Project	3(0+3)	None
10.	CSM3313	IoT Computing	3(2+1)	None

Final Year Project (FYP)

Students must complete and pass 2 Final Year Project (FYP) courses for a total of 8 credit hours in order to graduate.

No.	Course Code	Course Name	Credit Hour	Pre requisites
1.	CSF4984	Final Year Project I	4(0+4)	None
2.	CSF4994	Final Year Project II	4(0+4)	CSF4984

Industrial Training (IT)

Students must complete and pass the Industrial Training (IT) course for a total of 12 credit hours in order to graduate.

No.	Course Code	Course Name	Credit Hour	Pre requisites
1.	CSF49712	Industrial Training	12(0+12)	None

University Elective Course (UE)

Students may select 11 credit hours from any of the courses listed as University Elective (UE) by the Center for Foundation and Continuing Education and related faculties.

Note:
1. 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 graduate qualifications and is not subject to the number of elective courses taken.
2. 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.

Credit Transfer
1. Student needs to refer to *Peraturan Pindah Kredit Diploma dan Sarjana Muda Universiti Malaysia Terengganu.*
2. In addition, the following three (3) Core Program courses are exempted from credit transfer:
    i. CSF3034 Programming
    ii. CSF3013 Data Structure and Algorithm
    iii. CSF3123 Database

COURSE SCHEME
BACHELOR OF COMPUTER SCIENCE (SOFTWARE ENGINEERING) WITH HONOURS

CODE	COURSE NAME	CREDIT	PRE-REQUISITE	CODE	COURSE NAME	CREDIT	PRE-REQUISITE
SEMESTER 1				**SEMESTER 2**			
CSF3003	Discrete Structure	3(3+0)	-	BBB3023	Public Speaking	3(3+0)	-
CSF3023	System Thinking and Logic	3(3+0)	-	CSE3203	Software Requirement Engineering	3(3+0)	-
CSF3034	Programming	4(3+1)	-	CSF3043	Object-Oriented Programming	3(2+1)	-
CSF3143	Basics of Software Engineering	3(3+0)	-	CSF3213	Operating System	3(3+0)	-
CSF3243	Computer Organisation and Architecture	3(3+0)	-	MPU3132	Appreciation of Ethics and Civilizations	2(2+0)	-
MPU3143	Communicative Malay Language	3(3+0)	-	MPU3352	Integrity and Anti-Corruption	2(2+0)	
				MTK3053	Introduction to Statistics	3(3+0)	-
Total credit		**19**		**Total credit**		**19**	
SEMESTER 3				**SEMESTER 4**			
CSF3013	Data Structure and Algorithm	3(2+1)	-	CSE3023	Web-Based Application Development	3(2+1)	-
CSF3113	System Analysis and Design	3(2+1)	-	CSE3413	Software Testing	3(3+0)	-
CSF3123	Database	3(2+1)	-	CSE3433	Software Architecture	3(3+0)	-
CSF3133	Web-Based Interface Design	3(2+1)	-	CSE3953	Application System Development Project	3(0+3)	-
CCXXXXX	Co-Curriculum	2(0+2)	-	CSF3223	Networking	3(2+1)	-
	Elective 1	3	-		Elective 3	3	-
	Elective 2	3	-				
Total credit		**20**		**Total credit**		**18**	
SEMESTER 5				**SEMESTER 6**			
BBB3033	English for Occupational Purpose	3(3+0)	-	CSE3443	Software Maintenance and Evolution	3(3+0)	-
CSE3403	Software Project Management	3(2+1)	-	CSE3453	Ethics and Professional Practices	3(3+0)	-
CSE3423	Software Quality Assurance	3(3+0)	-	CSF3233	Cyber Security	3(2+1)	-
CSF3253	Intelligent System	3(3+0)	-	CSF4994	Final Year Project II	4(0+4)	CSF4984
CSF4984	Final Year Project I	4(0+4)	-		Elective 4	2	-
CSM3313	IoT Computing	3(2+1)	-				
Total credit		**19**		**Total credit**		**15**	
SEMESTER 7							
CSF49712	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** 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

BACHELOR OF COMPUTER SCIENCE WITH MARITIME INFORMATICS (HONOURS)

Introduction
The field of Computer Science at FTKKI, UMT offers three programmes of study, namely;
1) Bachelor of Computer Science (Software Engineering) with Honours
2) Bachelor of Computer Science with Maritime Informatics (Honours)
3) Bachelor of Computer Science (Mobile Computing) with Honours

The Bachelor of Computer Science with Maritime Informatics (Honours) is offered to both local and international students with a particular emphasis on STPM, Matriculation, and Diploma graduates or their equivalents. This programme is an interdisciplinary programme that provides opportunities for students to apply their knowledge and skills in computer technology application development to the maritime industry. Apart from developing maritime applications, among other branches in maritime informatics that can be explored are maritime data management, maritime information systems, maritime analytics, and maritime data visualization. Along with the development of the Industrial Revolution 4.0, it is critical to empower digital technologies, robotics, artificial intelligence, and big data to support the maritime shipping and transportation sector. Therefore, there is an increasing demand for computer science graduates with maritime expertise. As such, the programme seeks to produce graduates who are holistic in meeting the needs of the high-tech industry and advancing development and research, particularly in the maritime industry.

Programme Educational Objective (PEO)

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

PEO1 : Having knowledge (LO1), technical (LO2) and digital (LO10) skills in Maritime Informatics in accordance with industry standards.

PEO2 : Ability to solve computing problem in team with accountability (LO5) and able to communicate (LO4) effectively with the rest of the team members and the client.

PEO3 : Ethical (LO6) with integrity in carrying out trust and current career.

PEO4 : Exhibit the ability in mastering management and leading computing project (LO9) by utilizing latest scientific, technical (LO3) and numerical (LO11) skills.

PEO5 : Ability to adapt to changes (LO7) of economy, politics, and social environment, while at the same time having entrepreneurship (LO8) skills in area related to information technology and communication.

Prospects for Career
Among the careers that can be pursued by graduates of computer science programmes are as follows :

- Maritime System Analyst
- Maritime Intelligence Analyst
- Maritime Business Development Specialist
- Web Designer
- Network Engineer
- Network Administrator
- Database Administrator

- Maritime Business Support System and Business Executives
- Software Developer
- Information Technology Officer
- IT consultant
- Program Analyst

- Software Tester
- IT Trainer
- System Administrator
- Computer Science/IT Lecturer
- Postgraduate Study Opportunities

Total Credit for Graduation

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

Category	Credit	Percentage
University Core Course	15	12
Programme Core Course	46	38
Specialization Core Course	30	25
Final Year Project	8	6
Industrial Training	12	10
University Elective Course	11	9
Total	**122**	**100**

University Core Course (UC)

Students must complete all six courses at the University Core (UC) level, which total 15 credit hours.

No.	Course Code	Course Name	Credit Hour	Pre-requisites
1.	CCXXXXX	Co-Curriculum	2(0+2)	None
2.	BBB3023	Public Speaking	3(3+0)	None
3.	BBB3033	English for Occupational Purposes	3(3+0)	None
4.	MPU3132	Appreciation of Ethics and Civilizations	2(2+0)	None
5.	MPU3143	Communicative Malay Language	3(3+0)	None
6.	MPU3352	Integrity and Anti-Corruption	2(2+0)	None

Programme Core Course (PC)

To meet the requirements for graduation, students must take and pass all 15 Programme Core (PC) courses totalling 46 credit hours.

No.	Course Code	Course Name	Credit Hour	Pre-requisites
1.	CSF3003	Discrete Structure	3(3+0)	None
2.	CSF3013	Data Structure and Algorithm	3(2+1)	None
3.	CSF3023	System Thinking and Logic	3(3+0)	None
4.	CSF3034	Programming	4(3+1)	None
5.	CSF3043	Object-Oriented Programming	3(2+1)	None
6.	CSF3113	System Analysis and Design	3(2+1)	None
7.	CSF3123	Database	3(2+1)	None
8.	CSF3133	Web-Based Interface Design	3(2+1)	None

No.	Course Code	Course Name	Credit Hour	Pre-requisites
9.	CSF3143	Basics of Software Engineering	3(3+0)	None
10.	CSF3213	Operating System	3(3+0)	None
11.	CSF3223	Networking	3(2+1)	None
12.	CSF3233	Cyber Security	3(2+1)	None
13.	CSF3243	Computer Organisation and Architecture	3(3+0)	None
14.	CSF3253	Intelligent System	3(3+0)	None
15.	MTK3053	Introduction to Statistics	3(3+0)	None

Specialization Core Course (SC)

To meet the requirements for graduation, students must take and pass all 10 Specialization Core (SC) courses, which amount to 30 credit hours.

No.	Course Code	Course Name	Credit Hour	Pre-requisites
1.	CSA3003	Maritime Informatics Technology and Professional Ethics	3(3+0)	None
2.	CSA3013	Modelling and Simulation	3(2+1)	None
3.	CSA3023	Web-Based Application Development	3(2+1)	None
4.	CSA3953	Application System Development Project	3(0+3)	None
5.	CSE3203	Software Requirement Engineering	3(3+0)	None
6.	CSE3403	Software Project Management	3(2+1)	None
7.	CSM3313	IoT Computing	3(2+1)	None
8.	MMM3763	Principle of Maritime Management	3(3+0)	None
9.	MMM3843	Global Shipping and Port Management	3(3+0)	None
10.	MMT3073	Shipping and Port Technology	3(3+0)	None

University Elective Course (UE)

Students may select 11 credit hours from any of the courses listed as University Elective (UE) by the Center for Foundation and Continuing Education and related faculties.

Note:

1. 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 graduate qualifications and is not subject to the number of elective courses taken.

2. 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.

Credit Transfer

1. Students needs to refer to *Peraturan Pindah Kredit Diploma dan Sarjana Muda Universiti Malaysia Terengganu.*

2. In addition, the following three (3) Core Program courses are exempted from credit transfer:
    i. CSF3034 Programming
    ii. CSF3013 Data Structure and Algorithm
    iii. CSF3123 Database

COURSE SCHEME
BACHELOR OF COMPUTER SCIENCE WITH MARITIME INFORMATICS (HONOURS)

CODE	COURSE NAME	CREDIT	PRE-REQUISITE	CODE	COURSE NAME	CREDIT	PRE-REQUISITE
SEMESTER 1				**SEMESTER 2**			
CSF3003	Discrete Structure	3(3+0)	-	CSA3003	Maritime Informatics Technology and Professional Ethics	3(3+0)	-
CSF3023	System Thinking and Logic	3(3+0)	-	CSE3203	Software Requirement Engineering	3(3+0)	-
CSF3034	Programming	4(3+1)	-	CSF3043	Object-Oriented Programming	3(2+1)	-
CSF3143	Basics of Software Engineering	3(3+0)	-	CSF3213	Operating System	3(3+0)	
CSF3243	Computer Organisation and Architecture	3(3+0)	-	MPU3132	Appreciation of Ethics and Civilizations	2(2+0)	-
MPU3143	Communicative Malay Language	3(3+0)	-	MPU3352	Integrity and Anti-Corruption	2(2+0)	-
				MTK3053	Introduction to Statistics	3(3+0)	-
Total credit		**19**		**Total credit**		**19**	
SEMESTER 3				**SEMESTER 4**			
CSF3013	Data Structure and Algorithm	3(2+1)	-	BBB3023	Public Speaking	3(3+0)	-
CSF3113	System Analysis and Design	3(2+1)	-	CSA3023	Web-Based Application Development	3(2+1)	-
CSF3123	Database	3(2+1)	-	CSA3953	Application System Development Project	3(0+3)	-
CSF3133	Web-Based Interface Design	3(2+1)	-	CSF3223	Networking	3(2+1)	-
CCXXXXX	Co-Curriculum	2(0+2)	-		Elective 2	3	-
MMM3763	Principle Of Maritime Management	3(3+0)	-		Elective 3	3	-
	Elective 1	3	-				
Total credit		**20**		**Total credit**		**18**	
SEMESTER 5				**SEMESTER 6**			
CSE3403	Software Project Management	3(2+1)	-	BBB3033	English for Occupational Purpose	3(3+0)	-
CSF3253	Intelligent System	3(3+0)	-	CSA3013	Modelling and Simulation	3(2+1)	-
CSF4984	Final Year Project I	4(0+4)	-	CSF3233	Cyber Security	3(2+1)	-
CSM3313	IoT Computing	3(2+1)	-	CSF4994	Final Year Project II	4(0+4)	CSF4984
MMM3843	Global Shipping and Port Management	3(3+0)	-		Elective 4	2	-
MMT3073	Shipping and Port Technology	3(3+0)	-				
Total credit		**19**		**Total credit**		**15**	
SEMESTER 7							
CSF49712	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** 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

BACHELOR OF COMPUTER SCIENCE (MOBILE COMPUTING) WITH HONOURS

Introduction

The field of Computer Science at FTKKI, UMT offers three programmes of study, namely;
1) Bachelor of Computer Science (Software Engineering) with Honours
2) Bachelor of Computer Science with Maritime Informatics (Honours)
3) Bachelor of Computer Science (Mobile Computing) with Honours

The Bachelor of Computer Science (Mobile Computing) with Honours is offered to all local and international students especially STPM leavers, Matriculation and Diploma graduates or equivalent. This programme prepares students with the knowledge and skills needed to develop mobile and web applications. The programme applies the 2u2i elements through the implementation of 2.5 years of study in the university (university component) and 1 year of study in the industry (industrial component). A total of 4 industry component courses in the form of Work Based Learning (WBL) are offered in the final year of study involving learning in a real industrial environment. The implementation of the 2u2i Mode will expose students to actual learning and practice directly from relevant industry practitioners. In addition to producing graduates who can fill current and future workforce needs, the programme can enhance graduates' career prospects and paths through new job functions that have emerged as a result of changes in the ICT landscape following the transition to mobile technology and IR4.0.

Programme Educational Objective (PEO)

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

PEO1 : Having knowledge (LO1), technical (LO2) and digital (LO10) skills in Mobile Computing in accordance with industry standards.

PEO2 : Ability to solve computing problem in team with accountability (LO5) and able to communicate (LO4) effectively with the rest of the team members and the client

PEO3 : Exhibit integrity values, endurance and high level work ethic (LO6) in organization.

PEO4 : Exhibit the ability in mastering management and lead computing project (LO9) by utilizing latest scientific, technical (LO3) and numerical (LO11) skills

PEO5 : Ability to adapt to changes (LO7) of economy, politics, and social environment, while at the same time having entrepreneurship (LO8) skills in area related to information technology and mobile computing.

Prospects for Career

Among the careers that can be pursued by graduates of computer science programmes are as follows:
- IoS Application Developers
- Android Application Developers
- Front-End/Full Stack Developer
- Software System Developer
- Software Engineer
- Web Designer
- System Analyst
- Programmer/Program Analyst
- Information Technology Officer
- System Administrator
- Database Administrator
- Network Administrator
- IT Consultant
- IT Lecturer
- IT Trainer
- Postgraduate Opportunity

Total Credit for Graduation

The minimum amount of credit to graduate is 123 credit hours. The distribution of credit hours by course category is as follows:

Category	Credit	Percentage
University Core Course	15	12
Programme Core Course	46	37
Specialization Core Course	35	28
Final Year Project*	8	7
Industrial Training*	8	7
University Elective Course	11	9
Total	**123**	**100**

University Core Course (UC)

Students must complete all six courses at the University Core (UC) level, which total 15 credit hours.

No	Course Code	Course Name	Credit Hour	Pre-requisites
1	CCXXXXX	Co-Curriculum	2 (0+2)	None
2	BBB3023	Public Speaking	3 (3+0)	None
3	BBB3033	English for Occupational Purposes	3 (3+0)	None
4	MPU3132	Appreciation of Ethics & Civilizations	2 (2+0)	None
5	MPU3143	Communicative Malay Language	3 (3+0)	None
6	MPU3352	Integrity and Anti-Corruption	2 (2+0)	None

Programme Core Course (PC)

To meet the requirements for graduation, students must take and pass all 15 Programme Core (PC) courses totalling 46 credit hours.

No	Course Code	Course Name	Credit Hour	Pre-requisites
1	CSF3003	Discrete Structure	3 (3+0)	None
2	CSF3013	Data Structure and Algorithm	3 (2+1)	None
3	CSF3023	System Thinking and Logic	3 (3+0)	None
4	CSF3034	Programming	4 (3+1)	None
5	CSF3043	Object-Oriented Programming	3 (2+1)	None
6	CSF3113	System Analysis and Design	3 (2+1)	None
7	CSF3123	Database	3 (2+1)	None
8	CSF3133	Web-Based Interface Design	3 (2+1)	None
9	CSF3243	Computer Architecture and Organization	3 (3+0)	None
10	CSF3213	Operating System	3 (3+0)	None
11	CSF3223	Networking	3 (2+1)	None
12	CSF3233	Cyber Security	3 (2+1)	None
13	CSF3143	Basics of Software Engineering	3 (3+0)	None
14	CSF3253	Intelligent System	3 (3+0)	None
15	MTK3053	Introduction to Statistics	3 (3+0)	None

Specialization Core Course (SC)

To meet the requirements for graduation, students must take and pass all 10 Specialization Core (SC) courses, which amount to 51 credit hours.

No	Course Code	Course Name	Credit Hour	Pre-requisites
1	CSE3203	Software Requirement Engineering	3 (3+0)	None
2	CSM3023	Web-Based Application Development	3 (2+1)	None
3	CSM3103	Front-End Programming	3 (2+1)	None
4	CSM3114	Framework based Mobile Application Development	4 (3+1)	None
5	CSM3123	Native Mobile Programming	3 (2+1)	None
6	CSM3313	IoT Computing	3 (2+1)	None
7	CSM4908-I	Industrial Project Management	8 (0+8)	None
8	CSM4918-I	Industrial Project Development	8 (0+8)	None
9	CSM4928-I	Integrated Industrial Project Management	8 (0+8)	None
10	CSM4938-I	Integrated Industrial Project Development	8 (0+8)	None

University Elective Course (UE)

Students may select 11 credit hours from any of the courses listed as University Elective (UE) by the Center for Foundation and Continuing Education and related faculties.

Note:

1. 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 graduate qualifications and is not subject to the number of elective courses taken.
2. 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.

Credit Transfer

1. Students needs to refer to *Peraturan Pindah Kredit Diploma dan Sarjana Muda Universiti Malaysia Terengganu.*

2. In addition, the following three (3) Core Program courses are exempted from credit transfer:
   i. CSF3034 Programming
   ii. CSF3013 Data Structure and Algorithm
   iii. CSF3123 Database

COURSE SCHEME
BACHELOR OF COMPUTER SCIENCE (MOBILE COMPUTING) WITH HONOURS

CODE	COURSE NAME	CREDIT	PRE-REQUISITE	CODE	COURSE NAME	CREDIT	PRE-REQUISITE
SEMESTER 1				**SEMESTER 2**			
CSF3003	Discrete Structure	3(3+0)	-	BBB3023	Public Speaking	3(3+0)	-
CSF3023	System Thinking and Logic	3(3+0)	-	CSE3203	Software Requirement Engineering	3(3+0)	-
CSF3034	Programming	4(3+1)	-	CSF3043	Object-Oriented Programming	3(2+1)	-
CSF3143	Basics of Software Engineering	3(3+0)	-	CSF3213	Operating System	3(3+0)	-
CSF3243	Computer Architecture and Organization	3(3+0)	-	MPU3132	Appreciation of Ethics and Civilizations	2(2+0)	-
MPU3143	Communicative Malay Language	3(3+0)	-	MPU3352	Integrity and Anti-Corruption	2(2+0)	-
				MTK3053	Introduction to Statistics	3(3+0)	-
Total credit		**19**		**Total credit**		**19**	
SEMESTER 3				**SEMESTER 4**			
CSF3013	Data Structure and Algorithm	3(2+1)	-	CSF3223	Networking	3(2+1)	-
CSF3113	System Analysis and Design	3(2+1)	-	CSM3023	Web-Based Application Development	3(2+1)	-
CSF3123	Database	3(2+1)	-	CSM3103	Front-End Programming	3(2+1)	-
CSF3133	Web-Based Interface Design	3(2+1)	-	CSM3313	IoT Computing	3(2+1)	-
CCXXXXX	Co-Curriculum	2(0+2)	-		Elective 3	3	-
	Elective 1	3	-		Elective 4	3	-
	Elective 2	2	-				
Total credit		**19**		**Total credit**		**18**	
SEMESTER 5				**SEMESTER 6**			
BBB3033	English for Occupational Purpose	3(3+0)	-	CSM4908-I	Industrial Project Management	8(0+8)	-
CSF3233	Cyber Security	3(2+1)	-	CSM4918-I	Industrial Project Development	8(0+8)	-
CSF3253	Intelligent System	3(3+0)	-				
CSM3114	Framework based Mobile Application Development	4(3+1)	-				
CSM3123	Native Mobile Programming	3(2+1)	-				
Total credit		**16**		**Total credit**		**16**	
SEMESTER 7							
CSM4928-I	Integrated Industrial Project Management	8(0+8)	-				
CSM4938-I	Integrated Industrial Project Development	8(0+8)	-				
Total credit		**16**					
						TOTAL CREDIT TO GRADUATE 123	

Notes:

1. Students are required to undertake the **Survival and Water Safety Program** 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

BACHELOR OF COMPUTER SCIENCE (SOFTWARE ENGINEERING) WTH HONOURS, BACHELOR OF COMPUTER SCIENCE WITH MARITIME INFORMATICS (HONOURS) AND BACHELOR OF COMPUTER SCIENCE (MOBILE COMPUTING) WITH HONOURS

CSA3003	**Maritime Informatics Technology and Professional Ethic**
Credit	**3 (3+0)**
Prerequisite	**None**

This course introduces students to the basic concepts of information and communication technology (ICT) in the maritime sector such as in the area of marine science, port and shipping management, logistics and security. Students are also exposed to ethics in digital security, intellectual property, and professional ethics. This course emphasizes students to apply information technology ethically and professionally to solve problems in Maritime Informatics.

CSA3013	**Modelling and Simulation**
Credit	**3 (2+1)**
Prerequisite	**None**

This course introduces the concept of modelling and simulation of dynamic systems. It includes the fundamentals of simulation, system dynamics, data collection and analysis methods, model building, model validation and verification, output analysis and subsequently comparing the performances of different system and its optimization. This main emphasis of this course is to expose students to the fundamental modelling and simulation methods used in problem solving.

CSA3023/CSE3023/ CSM3023	**Web-Based Application Development**
Credit	**3 (2+1)**
Prerequisite	**None**

The course provides all aspects of knowledge related to dynamic web development. Throughout this course, students will spend most of the time focusing on server-side components. Students will learn J2EE technologies such as Java Server Page (JSP), JavaBeans, Servlets and Java Database Connectivity (JDBC). They will also learn Model-View-Controller (MVC) design pattern using Java Servlet and will communicate with database for any kind of data transactions. Students will develop an interactive web-based application on the topic of their choice for the final project.

CSA3953/CSE3953	**Application System Development Project**
Credit	**3 (0+3)**
Prerequisite	**None**

This course strengthens the students' knowledge in programming by the group application development. Students are divided into small groups to develop certain applications. Focus is given to the knowledge transfer among students in the group through the application that will be built.

CSE3403	**Software Project Management**
Credit	**3 (2+1)**
Prerequisite	**None**

This course introduces the concept, functions, and responsibilities of a software management project and how to manage a software development project. The emphasis is on the production of quality product in time, meet the scope and within budget. It covers project scheduling and planning, cost estimation, risk management, human management, document production, quality management and software maintenance. This course is essential for providing an understanding of scope management methods, work scheduling,

time management, costs, and human resources in software project management.

CSE3413	**Software Testing**
Credit	**3 (3+0)**
Prerequisite	**None**

This course introduces basic concepts, principles and techniques related to software testing. Students will become acquainted with both the strengths and limitations of various functional and structural testing methods. Topics include black-box and white-box test case design strategies, incremental integration testing techniques, inspections and reviews. Students will have the opportunity to practice the techniques presented in class via project exercises and case studies.

CSE3423	**Software Quality Assurance**
Credit	**3 (3+0)**
Prerequisite	**None**

This course introduces function, procedure, and method that are exercised in controlling and assuring software quality. These include elements and the role of quality assurance, quality inspection, software testing and introduces some basic tools in software quality.

CSE3433	**Software Architecture**
Credit	**3 (3+0)**
Prerequisite	**None**

This course introduces students to aspects of software architectures. These include middleware architecture such as COM and CORBA, aspect-oriented architecture, model driven architecture, Service-Oriented Architecture (SOA), components and design patterns. Students are also exposed to the basics behind the software architecture process, design, and analysis.

CSE3443	**Software Maintenance and Evolution**
Credit	**3 (3+0)**
Prerequisite	**None**

This course covers fundamental aspects of software maintenance and evolution, including concepts and techniques, software changes and impact analysis, testing for software maintenance, process models for system evolution, software reuse and current issues in software maintenance.

CSE3453	**Ethics and Professional Practices**
Credit	**3 (3+0)**
Prerequisite	**None**

This course analyses ethical and societal issues in relation to the usage and development of information technology and communication (ICT). Brief introduction on the issues of theory, ethics, social and laws pertaining to ICT is given. Emphasis is also given on the specific problems such as privacy, reliability, security, responsibility in using ICT and also both the advantages and disadvantages of ICT. Students ought to be exposed to these issues prior to be qualified and ethical ICT practitioners and entrepreneurs. The development of ICT must be human-centered, beneficial to society and finally able to better the civilization of mankind. Concerns are also given to various ethical violations in using ICT. Cyber laws and acts in Malaysia are made known to educate students that the unethical used of ICT will invite problems. Professional code of ethics and responsibility in using the Internet and several solutions to the problems are discussed.

CSF3113   **System Analysis and Design**
Credit   3 (2+1)
Prerequisite   None

This course introduces object-oriented concepts in system development. Project management and planning, systems analysis, systems design, systems implementation and operation will be discussed in detail. The student also will be taught on analysis dan design the object-oriented design by using UML notation and particular tools. This course is necessary because it introduces object-oriented concepts in system modelling and development using the Unified Modified Language (UML) notation.

CSF3123   **Database**
Credit   3 (2+1)
Prerequisite   None

This course introduces database concepts (goals of DBMS, relationships, physical and logical organization, schema and subschema); data models, normalisation (until BCNF), canonical schema and data independence; data description language; query facilities, query functions; design and translation strategies; and data integrity and reliability. This course is important because it focuses on the fundamental concepts of integrated databases.

CSF3133   **Web-Based Interface Design**
Credit   3 (2+1)
Prerequisite   None

This course offers the knowledge of integrating a basic concept of Human Computer Interaction (HCI) with Web Design. This course also, practically, will expose students to the two (2) core technologies for building web sites which are Hypertext Markup Language (HTML) and Cascading Style Sheets (CSS). Before the end of this course, students will develop a simple web site by applying the principles and methods to the design of user-centred web sites. This course is critical for exposing students to the fundamentals of web interface design and web programming.

CSF3213   **Operating System**
Credit   3 (3+0)
Prerequisite   None

This course introduces operating system concepts as well as discusses the mechanisms necessary for the protection and security of computer systems. Major topics in operating systems cover process, thread, and multiprogramming concepts (scheduling, synchronization, deadlock etc.), memory management, storage management and file management. Students will also be exposed to the current technologies in operating system through a case study. By including this course as a core component of the Computer Science programme, students will gain exposure to the latest operating systems and their primary components.

CSF3223   **Networking**
Credit   3 (2+1)
Prerequisite   None

This course exposes students to the architecture, structure, functions, and components of the Internet and other computer networks. By the end of the course, students will be able to build simple LANs, perform basic configurations for routers and switches, and implement IP addressing schemes. This course is important for students in the Computer Science programme because it introduces them to protocols, data networks, and network configurations.

CSF3233   **Cyber Security**
Credit   **3 (2+1)**
Prerequisite   **None**

This course introduces cybersecurity, especially the Internet. The usage of the cryptography technique will be discussed. This course also introduces to the student the form of threat to the Internet. Several defense applications, such as firewall and network analysis tools will be introduced to the student. This course is essential as the core of the Computer Science programme because it introduces students to cybersecurity threats and techniques that can be used to improve cybersecurity.

CSF3243   **Computer Organization and Architecture**
Credit   **3 (3+0)**
Prerequisite   **None**

This course introduces the structure and organization of digital computers which includes Central Processing Unit (CPU), Main Memory (MM) and Input/Output (I/O). Functions and relationship between these components in instruction execution will also be discussed. In addition, students will also be exposed to basic digital logics, structure and organization of multiprocessors. The teaching and learning approach of this course incorporates Academic 4.0 criteria which is online learning environment (blended learning). This course is offered as the foundation of the Computer Science programme to introduce students to the architecture and organization of computer systems.

CSF3253   **Intelligence System**
Credit   **3 (3+0)**
Prerequisite   **None**

This course introduces the fundamental concept of intelligent system and its applications. It covers the fundamental topic in intelligent system such as expert system, fuzzy logic, artificial neural network, computer evolution, hybrid system, data mining and intelligent agent. This course is offered as the core of the Computer Science programme to introduce students to the concept of intelligent systems, how to use basic intelligent system techniques in solving a given problem, and how to apply the concept of intelligent systems in software design.

CSF3503   **Special Topics in Maritime Informatics**
Credit   **3 (3+0)**
Prerequisite   **None**

This course will introduce students to the latest technologies and issues of computing in maritime informatics. At the end of the course, students will be able to analyze and apply the latest methods, techniques and technologies in maritime informatics. This course is important as an elective of the Computer Science programme to introduce students to the latest technology in maritime informatics.

CSF3513   **Special Topics in Software Engineering**
Credit   **3 (3+0)**
Prerequisite   **None**

The content of this course depends on current development in computer science. Current issues will be discussed by the lecturers. Part of this course will be in a form of seminar. Students will prepare and present working papers based on certain selected topics. This course is important as an elective of the Computer Science programme to introduce students to the latest technology in software engineering.

CSF3523   **Information System**
Credit   **3 (3+0)**
Prerequisite   **None**

This course explores the different types of information systems (IS) and their roles in today's business. It also looks into the IS processes, organizations and infrastructure. Several aspects of IS will be discussed including ethical and social issues, emerging technology and trends, business intelligence and security.

CSF3533   **Multimedia Technology**
Credit   **3 (3+0)**
Prerequisite   **None**

This course exposes students to the current technology in multimedia. It involves the study of multimedia hardware and software, the standards used in multimedia industries, the importance of multimedia in various fields, multimedia applications, and multimedia elements such as text, graphics, pictures, sound, video and animation. It also covers on the development of multimedia project and multimedia project management.

CSF3543   **Digital Image Processing**
Credit   **3 (3+0)**
Prerequisite   **None**

This course introduces students to the basic concepts and methodologies of digital image processing using marine data. Among the topics covered are the basic of digital image processing, image enhancement in spatial domain, morphological image processing, image segmentation as well as image representation and description. This course is important to expose students to the use of image processing techniques that can be applied in a given case study.

CSF3553   **Information Retrieval**
Credit   **3 (3+0)**
Prerequisite   **None**

This course provides an overview of the important issues in information retrieval. The course emphasizes the technology used in information retrieval theories and concepts that underlie the appropriate applications. It will cover algorithm, design, and implementation of modern information retrieval systems. Topics include: retrieval system design and implementation, text processing techniques, retrieval models (e.g., Boolean, vector space, probabilistic, and learning- based methods), query languages, evaluation models, social search, and classification or clustering techniques. This course is important to expose students to the basics of accessing information and applying it in a given case study.

CSF3563   **Data Mining**
Credit   **3 (3+0)**
Prerequisite   **None**

This course is an introductory course on data mining. It introduces the basic concept of data mining such as data pre-processing, data warehousing as well as online analytical processing (OLAP). Students will be exposed to the data mining method and their implementations which focus to two major data mining functions i.e.: pattern discovery and cluster analysis.

CSF3573   **Computer Auditing**
Credit   **3 (3+0)**
Prerequisite   **None**

This course covers the technology and audit, knowledge of audit function, basic concepts of auditing and risks of Information Technology (IT), standards and guidelines for IT auditing, Knowledge of the concept of internal control, audit planning process, audit management, audit evidence process and follow-up of audit

reporting.

CSF3583   **Formal Method**
Credit   **3 (3+0)**
Prerequisite   **None**

This course introduces formal methods for designing software system requirements, provides formal Z method languages, semantic operations for programming languages. This course is important in exposing students to the basics of formal method specification for software requirements and applying it in a given case study.

CSF3593   **Computer Forensics**
Credit   **3 (3+0)**
Prerequisite   **None**

This course introduces students to the fundamentals and importance of digital forensics and investigations. Students are taught the tools and techniques to recover and analyse digital data from the crime scene to be used as evidence in court. The types and structures of virus and Malware together with their detection techniques will also be discussed. Students will also be exposed to the technique to prepare and report on the results of the investigation for court cases.

CSF3603   **Digital Commerce**
Credit   **3 (3+0)**
Prerequisite   **None**

This course focuses on principles of e-commerce, providing an overview of commercial platform development and technology topics, commercial web development, virtual value chains and social innovation and marketing strategies. In addition, this course also covers intellectual property rights, authentication, encryption, acceptable use policies and legal liabilities. Students will build their own presence and market it using an online platform.

CSF3613   **Machine Learning**
Credit   **3 (3+0)**
Prerequisite   **None**

This course is an introductory course for undergraduate students related to machine learning. The class will briefly cover topics in supervised learning, unsupervised learning, and reinforcement learning. Besides, this course also will familiarize students with models and algorithms for machine learning, and prepare students for research or industry application of machine learning techniques.

CSF3623   **Programming Paradigms**
Credit   **3 (3+0)**
Prerequisite   **None**

This course focuses on fundamental concepts of modern programming languages. The differences between paradigms: imperative, object-oriented, logic, functional and scripting. For each paradigm, related language will be covered.

CSF49712   **Industrial Training**
Credit   **12 (0+12)**
Prerequisite   **None**

This course exposes a student to the actual work environment. Students will carry out current duties appropriate to the Computer Science programme 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 and unconventional learning and teaching elements (situation learning and inquiries) in completing the mini projects entrusted. It will assess the aspects of cognitive, communication, interpersonal, ethics and professionalism, and leadership, autonomy and responsibility skills through final reports, presentations and feedback from both industrial and UMT supervisors.

CSF4984   **Final Year Project I**
Credit   **4 (0+4)**
Prerequisite   **None**
In this course, the student will work on a software development project, research project, or equivalent under the supervision of a lecturer. The student will conduct preliminary research on the chosen topic, analyze requirements, and design the system. Students will prepare several software development documentations. Offering this course is critical for allowing students to apply their newly acquired knowledge and skills with minimal supervision.

CSF4994   **Final Year Project II**
Credit   **4 (0+4)**
Prerequisite   **CSF4984 (WL)**
This course is an extension of CSF4984. The student will carry out a programming project or equivalent under the supervision of a lecturer. The student will focus on the implementation phase of project development. At the end of this course, the student will prepare a complete dissertation and present the dissertation for evaluation. The availability of this course is critical in allowing students to apply their knowledge and skills in software engineering to solve computing problems with minimal supervision.

CSM3103   **Front-End Programming**
Credit   3 (2+1)
Prerequisite   None
This course provides exposures to application development for mobile environment, specifically the front-end development. Topics covered include the design of dynamic and interactive user interface and interaction, server and database connectivity and event handling through JScript, jQuery, JSON, AJAX, PHP, RESTful web services and UI interface, Bootstrap. Hands on programming exercises and a group project will be given to strengthen students programming skills.

CSM3114   **Framework-Based Mobile Application Development**
Credit   **4 (3+1)**
Prerequisite   **None**
This course exposes students to JavaScript frameworks and their application in the development of mobile applications (frontend web application). Students will have hand-on experience in developing mobile applications based on JavaScript frameworks such as backbone.js and Angular.js. In addition, the hybrid application development experience through the use PhoneGap Cordova is also exposed to the students. Before the end of this course, students will undertake group project on framework based mobile application development by applying the methods they have learnt. This course is important for the development of mobile applications (frontend) based on Javascript framework.

CSM3123   **Native Mobile Programming**
Credit   **3 (2+1)**
Prerequisite   **None**
This course is an introduction to development of native applications for mobile environment. Topics covers include user interaction patterns, connectivity, interface design, software design pattern and application architectures within the context of mobile computing. Hands on programming exercises will be given to

strengthen students programming language. This course is important for exposing students to mobile applications in a native development environment.

CSM3313   **IoT Computing**
Credit   3 (2+1)
Prerequisite   None

This course introduces concepts and main components of the Internet of Things (IoT). The student will be exposed to the concept of IoT thru the network technology and protocol as well as the wireless environment. Students also will be exposed to data analytics in an IoT environment. Exposure to the selected IoT application development will be carried out in the lab to increase the student learning experiences. This course is essential for introducing students to the fundamentals of the IoT and its relationship to everyday life.

CSM4908-1   **Industrial Project Management**
Credit   8 (0+8)
Prerequisite   None

This course introduces students to the concepts and techniques used in managing a mobile application project development in industrial environment. Through this project, students will generate project plan and schedule, cost estimation, in addition 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.

CSM4918-1   **Industrial Project Development**
Credit   8 (0+8)
Prerequisite   None

Students will develop a mini application project under the supervision of an industrial supervisor and monitored by UMT. At the end of this course, the developed application will be evaluated by the appointed panels.

CSM4928-1   **Integrated Industrial Project Management**
Credit   8 (0+8)
Prerequisite   None

This course enables students to apply the concepts and techniques of managing a mobile application project in industrial environment. In addition to preparing project plan and schedule, emphasise is given to the aspect of risks and quality management as well as project documentations. This course will be supervised by industrial supervisor and monitored by UMT.

CSM4938-1   **Integrated Industrial Project Development**
Credit   8 (0+8)
Prerequisite   None

Students will develop a larger scale application in a team under the supervision of industry supervisors and monitored by UMT. Emphasis is also given to the ability to lead project development, manage resources, integrate modules and monitoring of progress and project costs. At the end of the course, the application will be evaluated by the appointed panel.

MMM3843   **Global Shipping and Port Management**
Credit   3 (3+0)
Prerequisite   None

This course is designed to provide an understanding and exposure to the concepts of port and shipping

management and administration, including port types, ship types, port operations, shipping operations, and port and shipping support services.

MMM3763	**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 the basic management with the example within maritime context.

MMM3073	**Shipping and Port Technology**
Credit	**3 (3+0)**
Prerequisite	**None**

Environmental factors affecting the choice of technology. Specialization in cargo form, containment, types of handling, method of transport and efficient intermodal interface. Choice of ship and port technology. Contemporary issues in technology development.

MTK3053	**Introduction to Statistics**
Credit	**3 (3+0)**
Prerequisite	**None**

This course is selected to expose students to important concepts in statistics that can be used to analyze data. The basic concepts of data description, probability theory, random variable, probability distribution, parameter estimation, hypothesis testing, correlation and linear regression will be introduced in this course. The mastery of this knowledge is crucial to preventing misuse of statistics in data analysis and decision making.

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 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 and be able to work effectively and brilliantly.

Students are also trained to use the instrumentations 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 Objective (PEO)

This programme is offered for students 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

Career Prospect

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 engineers 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.

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)

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

Programme Core (72 Credit Hours)

Course Code	Course Name	Credit Hours
EDI3183	Basic Programming for Technologist	3 (2+1)
EDI3013	Engineering Mathematics I	3 (3+0)
EDI3043	Digital Electronics	3 (2+1)
EDI3033	Electricity and Magnetism	3 (3+0)
EDI3023	Engineering Mathematics II	3 (3+0)
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)
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	2(0+2)
EDI4982	Final Year Research Project I	3(3+0)
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 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 electivecourses below or subject to the approval of the Head of Programme:

Course Code	Courses 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	PRE-REQUISITE	CODE	COURSE NAME	CREDIT	PRE-REQUISITE
SEMESTER 1				**SEMESTER 2**			
EDI3183	Basic Programming for Technologist	3(2+1)	-	BBB3023	Public Speaking	3(3+0)	-
EDI3043	Digital Electronics	3(2+1)	-	EDI3013	Engineering Mathematics I	3(3+0)	-
EDI3073	Electronics Devices	3(3+0)	-	EDI3083	Computational Technique	3(2+1)	-
MPU3143	Communicative Malay Language	3(3+0)	-	EDI3063	Sensors and Transducers	3(3+0)	-
CCXXXXX	Co-Curriculum	2(0+2)	-	EDI3123	Measurement System	3(3+0)	-
MPU3352	Integrity and Anti-Corruption	2(2+0)	-	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	3	-		Elective	3	-
	Elective	3	-		Elective	3	-
					Elective	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)	-
EDI4163	Control System	3(3+0)	-	EDI4173	Numerical Methods	3(3+0)	-
EDI4982	Final Year Research Project I	2(0+2)	-	EDI4994	Final Year Research Project II	4(0+4)	EDI4982
EDI4143	Electromagnetism	3(3+0)	-		Elective	3	-
	Elective	3	-		Elective	3	-
	Elective	3	-		Elective	3	-
	Elective	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** 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.

BACHELOR OF APPLIED SCIENCE (ELECTRONICS AND INSTRUMENTATION) WITH HONOURS

EDI3013	**Engineering Mathematics I**
Credit	**3 (3+0)**
Prerequisite	**None**

This course discusses matrix and emphasizes on 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 expose 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 the 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 an electromagnetism 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 in 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 emphasize on 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 involve 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 the sensor and transducer design, reliability, choice and economical aspects as well as calibration in the measurements system. Students will be introduced with non-destructive testings, and instrumentations based on electromagnetic radiations 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 technique, flow diagram and structured algorithm, program coding techniques and instruction 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 the 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 problem 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 programme 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 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 convers 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 organised 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 taught material is concerned 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 the 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 in 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 type 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 theories and laws on magnetic and magnetically coupled circuits. The principles behind electromechanical energy conversion also will be explored. The principles and characteristics of machines such as transformers, synchronous machines, induction machines and DC machines are also discussed.

EDI4503   **Wireless Communications**
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 an 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 begin 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 emphasize 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 Schrodinger 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 crystals 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 particular applications. They'll learn how to extract the best performance from all of 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 on the basic principle 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. It 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 these 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 start with the fundamental that underlies with the 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 hybrid, plug in hybrid, fuel cell 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 (3+0)**
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 teleommunication 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   **Batteries and Supercapacitors 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 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.

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 SCIENCE (APPLIED MATHEMATICS) WITH HONOURS

Introduction

The Bachelor of Science (Applied Mathematics) with Honours is a program formulated as an effort to produce graduates trained in the field of Mathematical Science who are able to apply their knowledge and expertise to meet the nation's manpower needs. The program curriculum has been fully integrated to meet the eleven domains of program learning outcomes recommended by the MOHE. This program basically trained the students to apply mathematical knowledge as well as related concepts in various areas of focus such as computing, optimization, geometry, physical science and so on. Students will also be exposed to knowledge and skills in various up-to-date mathematical methods as well as computer programming.

Along with the development of current technology and the needs of the industrial revolution (IR) 4.0, several courses in this program have been embedded with SAS modules that enable students to obtain a globally recognized SAS professional certificate. In addition, the program also trains students to think logically, structured and precise manner and thus enables them in finding effective solutions in related fields. At the end of the study, in the seventh semester, students will undergo Industrial Training for 24 weeks in the industry whether public or private, local or international sector. While in the industry, students will be supervised by supervisors from the industry and have the opportunity to practice the theories learned in the lecture room as well as go through real-world work experience in preparation for the next phase. The duration of study for this program is 7 semesters or three and a half years.

Program Educational Objective (PEO)

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

PEO1 : Knowledgeable and have practical skills in the field of Applied Mathematics in line with industry requirements.

PEO2 : Have effective communication and interpersonal skills and demonstrate good leadership qualities in the organization.

PEO3 : Ability to analyze and solve real problems using numeracy skills based on scientific methods and critical thinking without compromising on values and integrity.

PEO4 : Ability to access, manage and deliver information using the latest digital technology as well as demonstrate entrepreneurial skills as added value for career advancement.

Career Prospects

Based on an integrated education policy where the field of mathematics is offered along with various other disciplines, this program is able to produce Applied Mathematics graduates who are knowledgeable, efficient, and competent and can provide excellent services in various sectors. Among the careers that can be pursued are:

- Research Officer
- Science Officer
- Data Analyst
- Computerized Information System Manager
- Computer Model Designer
- Computer Programmer

- Mathematics Teacher/Lecturer
- Bank Officer
- Insurance Officer
- Executives
- Financial Planner
- Applied Mathematician

Total Credits for Graduation

The minimum number of credits to graduate is 120 credit hours. The distribution of credit hours by course category is as follows:

Category	Credit	Percentages
University Core	18	15
Program Core	70	58.33
University Elective	32	26.67
Total	**120**	**100**

University Core (18 Credit Hours)

Students can choose 18 credit hours from any course listed by the "Pusat Pendidikan Asas dan Lanjutan"as a University Core course.

No.	Course Code	Course Name	Credit Hours	Prerequisite
1.	BBB3013	Academic Writing Skills	3 (3+0)	None
2.	BBB3102	English for Occupational Purposes	3 (3+0)	None
3.	MPU3132	Appreciation of Ethic and Civilizations	2 (2+0)	None
4.	MPU3143	Communicative Malay Language	3 (3+0)	None
5.	BBU3023	Public Speaking	3 (3+0)	None
6.	MPU3352	Integrity and Anti-Corruption	2 (2+0)	None
7.	CCXXXXX	Co-Curriculum	2 (0+2)	None
		Total	**18**	

Program Core (70 Credit Hours)

To fulfill the graduation requirements, students must follow and pass all 18 Core Program courses with 70 credits.

No.	CourseCode	Course Name	Credit Hours	Prerequisite
1.	MTM3004	Linear Algebra	4 (3+1)	None
2.	MTM3014	Calculus	4 (3+1)	None
3.	MTM3024	Statistics	4 (3+1)	None
4.	MTM3034	Advanced Statistics	4 (3+1)	None
5.	MTM3044	Operations Research with SAS	4 (3+1)	None
6.	MTM3054	Programming Language	4 (3+1)	None
7.	MTM3003	Ordinary Differential Equations	3 (3+0)	None
8.	MTM3013	Real Analysis	3 (3+0)	None
9.	MTM4004	Optimization	4 (3+1)	None
10.	MTM49712	Industrial Training	12 (0+12)	None
11.	MTM4982	Final Year Research Project I	2 (0+2)	None
12.	MTM4994	Final Year Research Project II	4 (0+4)	None
13.	MKG3002	Principle of Mathematical Modelling	2 (2+0)	None
14.	MKG3003	Vector Calculus	3 (3+0)	None
15.	MKG3013	Modern Algebra	3 (3+0)	None
16.	MKG3023	Applied Mathematical Methods	3 (3+0)	None

No.	Course Code	Course Name	Credit Hours	Prerequisite
17.	MKG3033	Scientific Computing	3 (2+1)	None
18.	MKG3004	Numerical Analysis	4 (3+1)	None
		TOTAL	**70**	

University Elective (32 Credit Hours)

Students are free to register for any course offered as appropriate based on interest and maturity. However, students are encouraged to take at least 18 credit hours from the list of elective courses below with guidance from Mentor:

No.	CourseCode	Course Name	Credit Hours	Prerequisite
Applied Mathematics Group				
1.	MKG4003	Partial Deferential Equations	3 (3+0)	None
2.	MKG4013	Computational Methods for Differential Equations	3 (2+1)	None
3.	MKG4023	Mathematical Fluid Mechanics	3 (3+0)	None
4.	MKG4033	Introduction to Fuzzy Set Theory	3 (3+0)	None
Mathematical Analysis Group				
1.	MKG4043	Dynamical System	3 (3+0)	None
2.	MKG4053	Complex Analysis	3 (3+0)	None
3.	MKG4063	Functional Analysis	3 (3+0)	None
4.	MKG4073	Topology	3 (3+0)	None
Operations Research Group				
1.	MKG4004	Advanced Operations Research	4 (3+1)	None
2.	MKG4013	Computational Methods for Differential Equations	3 (2+1)	None
3.	MKG4083	Logic and Computation	3 (3+0)	None
4.	MKG4093	Heuristic Techniques for Combinatorial Optimization	3 (3+0)	None
Computer Based Geometry Design Group				
1.	MKG4013	Computational Methods for Differential Equations	3 (2+1)	None
2.	MKG4083	Logic and Computation	3 (3+0)	None
3.	MKG4103	Graph Theory	3 (3+0)	None
4.	MKG4113	Computer Aided Geometric Design	3 (2+1)	None

COURSE SCHEME
BACHELOR OF SCIENCE (APPLIED MATHEMATICS) WITH HONOURS

COURSE CODE	COURSE NAME	CREDIT HOURS	PRE REQUISITE	COURSE CODE	COURSE NAME	CREDIT HOURS	PRE REQUISITE
SEMESTER 1				**SEMESTER 2**			
MTM3004	Linear Algebra	4(3+1)	-	MTM3034	Advance Statistics*	4(3+1)	-
MTM3014	Calculus	4(3+1)	-	MTM3044	Operations Research with SAS*	4(3+1)	-
MTM3024	Statistics*	4(3+1)	-	MKG3013	Modern Algebra	3(3+0)	-
MPU3143	Communicative Malay Language	3(3+0)		BBB3013	Academic Writing Skills	3(3+0)	
CCXXXXX	Co-curriculum	2(0+2)	-	MPU3132	Appreciation of Ethic and Civilizations	2(2+0)	-
MPU3352	Integrity and Anti-Corruption	2(2+0)					-
Total credit		**19**		**Total credit**		**16**	
SEMESTER 3				**SEMESTER 4**			
MTM3003	Ordinary Differential Equations	3(3+0)	-	MKG3004	Numerical Analysis	4(3+1)	-
MTM3054	Programming Language	4(3+1)	-	MTM3013	Real Analysis	3(3+0)	-
MKG3002	Principle of Mathematical Modeling	2(2+0)	-	MKG3023	Applied Mathematical Methods	3(3+0)	-
BBB3023	Public Speaking	3(3+0)	-	MKG3033	Scientific Computing	3(2+1)	-
	Elective 1	2	-		Elective 4	3	-
	Elective 2	3			Elective 5	3	-
	Elective 3	3	-				
Total credit		**20**		**Total credit**		**19**	
SEMESTER 5				**SEMESTER 6**			
MTM4004	Optimization*	4(3+1)	-	MTM4994	Final Year Research Project II	4(0+4)	-
MTM4982	Final Year Research Project I	2(0+2)	-		Elective 8	3	-
MKG3003	Vector Calculus	3(3+0)	-		Elective 9	3	-
BBB3033	English for Occupational Purposes	3(3+0)	-		Elective 10	3	-
	Elective 6	3	-		Elective 11	3	-
	Elective 7	3	-				
Total credit		**18**		**Total credit**		**16**	
SEMESTER 7							
MTM49712	Industrial Training	12(0+12)	-				
Total credit		**12**					
					TOTAL CREDIT GRADUATE 120		

*Courses embedded with SAS certificate module.
Notes:
1. Students are required to undertake the **Survival and Water Safety Program** 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

Introduction

The Bachelor of Science (Financial Mathematics) with Honours program is a program developed to provide knowledge on the application of mathematical methods such as probability theory, statistics, optimization, stochastic analysis and economic theory in financial problems which encompass investment, insurance, Islamic finance, risk analysis etc. The curriculum for this program is designed to cover the eleven domains of program learning outcome recommended by the MOHE and to be taken during the study period of 7 semesters or three and a half years.

In addition, due to the development of the industrial revolution (IR) 4.0, SAS modules are integratedin several core courses of the program that provide SAS certification to graduates at the end of theprogram. This certification is an added value to graduates as it is recognized worldwide and has highindustry demands.

To ensure students acquire real working experience, a 24-week Industrial Training course is carriedout on the last semester (semester 7) in finance or other related industries. The knowledge learnedwhile on campus can then be applied during this training, other than gaining new knowledge in therelevant sector.

Program Educational Objective (PEO)

The students for this program are aimed to achieve the following objectives:

PEO1 : Knowledgeable and have practical skills in the field of Financial Mathematics in line with industry requirements

PEO2 : Have effective communication and interpersonal skills and demonstrate good leadership qualities in the organization

PEO3 : Ability to analyze and solve real problems using numeracy skills based on scientific methods and critical thinking without neglecting value and integrity

PEO4 : Ability to access, manage and deliver information using the latest digital technologies as well as demonstrate entrepreneurial skills as added value for career advancement

Career Prospects

Graduates of the Bachelor of Science (Financial Mathematics) program with honours can be involved in various fields of service and careers whether in the public or private sector. The main sectors that graduates can venture into are finance, insurance, banking or services. Among the careers that can be pursued are:

- Strategic Risk Officer
- Risk Models
- Investment Management Officer
- Actuarial Manager
- Mathematics Teacher/Lecturer

- Quantitative/Technical Analyst
- Data Analyst
- Researcher
- Science Officer
- Entrepreneurs

Total Credits for Graduation

The minimum number of credits to graduate is 120 credit hours. The distribution of credit hours by course category is as follows:

Category	Credit	Percentages
University Core	18	15
Program Core	70	58.33
University Elective	32	26.67
Total	**120**	**100**

University Core (18 Credit Hours)

Students can choose 18 credit hours from any course listed by the 'Pusat Pendidikan Asas dan Lanjutan" as a University Core course.

No.	Course Code	Course Name	Credit Hours	Pre-requisite
1.	BBB3013	Academic Writing Skills	3 (3+0)	None
2.	BBB3102	English for Occupational Purposes	3 (3+0)	None
3.	MPU3132	Appreciation of Ethic and Civilizations	2 (2+0)	None
4.	MPU3142	Communicative Malay Language	3 (3+0)	None
5.	BBU3023	Public Speaking	3 (3+0)	None
6.	MPU3352	Integrity and Anti-Corruption	2 (2+0)	None
7.	CCXXXXX	Co-Curriculum	2 (0+2)	None
		Total	**18**	

Program Core (70 Credit Hours)

To fulfill the graduation requirements, students must take and pass all 18 Program Core courses with 70 credits.

No.	Course Code	Course Name	Credit Hours	Pre-requisite
1.	MTM3004	Linear Algebra	4 (3+1)	None
2.	MTM3014	Calculus	4 (3+1)	None
3.	MTM3024	Statistics	4 (3+1)	None
4.	MTM3034	Advanced Statistics	4 (3+1)	None
5.	MTM3044	Operations Research with SAS	4 (3+1)	None
6.	MTM3054	Programming Language	4 (3+1)	None
7.	MTM3003	Ordinary Differential Equations	3 (3+0)	None
8.	MTM3013	Real Analysis	3 (3+0)	None
9.	MTM4004	Optimization	4 (3+1)	None
10.	MTM49712	Industrial Training	12 (0+12)	None
11.	MTM4982	Final Year Research Project I	2 (0+2)	None
12.	MTM4994	Final Year Research Project II	4 (0+4)	None
13.	MKW3003	Probability Theory in Finance	3 (3+0)	None
14.	MKW3023	Investment Mathematics	3 (3+0)	None
15.	MKW3013	Stochastic Modeling and Applications	3 (3+0)	None
16.	MKW4003	Introduction to Stochastic Differential Equations	3 (3+0)	None
17.	MKW4013	Financial Derivatives	3 (3+0)	None
18.	ECO3043	Macroeconomics	3 (3+0)	None
		TOTAL	**70**	

University Elective Course (32 Credit Hours)

Students are free to register for any courses offered appropriately based on student interest and maturity. However, students are encouraged to take at least 21 credit hours from the following list of elective courses with guidance from Mentor:

No.	Course Code	Course Name	Credit Hours	Pre-requisite
1.	MKW4023	Financial Forecasting	3 (3+0)	None
2.	MKW4033	Mathematical Theory in Insurance	3 (3+0)	None
3.	MKW4043	Optimization in Finance	3 (3+0)	None
4.	MKW4053	Financial Risk Analysis	3 (3+0)	None
5.	MKW4063	Financial Econometric	3 (3+0)	None
6.	MKW4073	Islamic Financial Mathematics	3 (3+0)	None
7.	MKW4004	Numerical Methods in Finance	4 (3+1)	None
8.	MKG3004	Numerical Analysis	4 (3+1)	None
9.	MKG4003	Partial Differential Equations	3 (3+0)	None

SCHEME COURSE
BACHELOR OF SCIENCE (FINANCIAL MATHEMATICS) WITH HONOURS

CODE	COURSE NAME	CREDIT HOUR	PRE-REQUISITE	CODE	COURSE NAME	CREDIT HOUR	PRE-REQUISITE
SEMESTER 1				**SEMESTER 2**			
MTM3004	Linear Algebra	4(3+1)	-	MTM3034	Advanced Statistics*	4(3+1)	-
MTM3014	Calculus	4(3+1)	-	MTM3044	Operations Research with SAS*	4(3+1)	-
MTM3024	Statistics*	4(3+1)	-	MKW3003	Probability Theory in Finance	3(3+0)	-
MPU3143	Communicative Malay Language	3(3+0)	-	BBB3013	Academic Writing Skills	3(3+0)	-
CCXXXXX	Co-Curriculum	2(0+2)	-	MPU3132	Appreciation of Ethics and Civilizations	2(2+0)	-
MPU3352	Integrity and Anti-Corruption	2(2+0)					-
	Total credit	**19**			**Total credit**	**16**	
SEMESTER 3				**SEMESTER 4**			
MTM3003	Ordinary Differential Equations	3(3+0)	-	MTM3013	Real Analysis	3(3+0)	-
MTM3054	Programming Language	4(3+1)	-	MKW3023	Investment Mathematics	3(3+0)	-
MKW3013	Stochastic Modelling and Applications	3(3+0)	-	ECO3043	Macroeconomics	3(3+0)	-
BBB3023	Public Speaking	3(3+0)	-		Elective 3	2	-
	Elective 1	3	-		Elective 4	3	-
	Elective 2	3	-		Elective 5	3	-
					Elective 6	3	
	Total credit	**19**			**Total credit**	**20**	
SEMESTER 5				**SEMESTER 6**			
MTM4004	Optimization*	4(3+1)	-	MTM4994	Final Year Research Project II	4(0+4)	-
MTM4982	Final Year Research Project I	2(0+2)	-	MKW4013	Financial Derivatives	3(3+0)	-
MKW4003	Introduction to Stochastic Differential Equations	3(3+0)	-		Elective 9	3	-
BBB3033	English for Occupational Purposes	3 (3+0)	-		Elective 10	3	-
	Elective 7	3	-		Elective 11	3	
	Elective 8	3	-				
	Total credit	**18**			**Total credit**	**16**	
SEMESTER 7							
MTM49712	Industrial Training	12(0+12)	-				
	Total credit	**12**					
					TOTAL CREDIT TO GRADUATE 120		

*Courses embedded with SAS certificate module.
Notes:
1. Students are required to undertake the **Survival and Water Safety Program** 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

MTM3004	Linear Algebra
Credit	**4 (3+1)**
Prerequisite	**None**

The course discusses the concepts of vector space including row space and column space, linear transformation including covering matrix representation and similarity matrices, orthogonality up to the Gram-Schmidt orthogonalization process, eigenvalues, eigenvectors, eigenspace and numerical linear algebra.

MTM3014	Calculus
Credit	**4 (3+1)**
Prerequisite	**None**

This course discusses the topics of limit and continuity, multivariable functions, partial derivatives, total derivative and multiple integration. In addition, this course also discusses the cylinder coordinate, spherical coordinate and the change of variables in multiple integration.

MTK3024	Statistics
Credit	**4 (3+1)**
Prerequisite	**None**

This course discusses basic concepts for statistics including probability, random variables, probability distributions of random variables, sampling distribution theory, estimation and hypothesis test.

MTM3034	Advanced Statistics
Credit	**4 (3+1)**
Prerequisite	**None**

This course discusses linear models, nonparametric methods, multivariate distribution and some approaches in applied multivariate.

MTM3044	Operations Research with SAS
Credit	**4 (3+1)**
Prerequisite	**None**

This course discusses the fundamental concepts of linear programming problems and the methods of solution. Topics also include simplex method, duality and its sensitivity analysis, transportation and network problems. The course also supports the industrial revolution through the application of SAS programming to solve optimisation problems.

MTM3054	Programming Language
Credit	**4 (3+1)**
Prerequisite	**None**

This course discusses an introduction to good programming style through examples, the modification of existing computer programming such as C++ codes to solve similar problems and the implementation of mathematical algorithms in a well-documented computer programming program. This course supports IR 4.0 by means of systematic thinking.

MTM3003	Ordinary Differential Equations
Credit	**3 (3+0)**
Prerequisite	**None**

This course is an introduction to techniques of solutions for differentiation equations that require a basis in calculus as well as algebra. Discussions on applications in real problems are also implemented. This course is necessary as the basis for the relevant advanced courses namely Applied Mathematical Methods and Partial Differential Equations.

MTM3013   **Real Analysis**
Credit   **3 (3+0)**
Prerequisite   **None**
This course discusses the concepts of real number space, bounded set, similar set, finite set and countable set. Point set topology on real line includes the ideas of openness and closeness, compact set and connected set. This course also discusses the properties of convergence sequences of real numbers including the pointwise convergence and uniform convergence of functions. Discussion on several important properties such as limit function, continuity, continuity on compact and connected sets and uniform continuity end this course.

MTM4004   **Optimization**
Credit   **4 (3+1)**
Prerequisite   **None**
This course discusses several mathematical techniques which are used in solving for unconstrained and constrained optimization problems. Unconstrained methods include Fibonacci search, Newton method, Secant method, gradient method and conjugate direction method. Meanwhile constrained methods include Lagrange condition and Karush-Kuhn-Tucker condition. Students also will solve optimization problems using software SAS.

MTM49712   **Industrial Training**
Credit   **12 (0+12)**
Prerequisite   **None**
Students who have met the requirements for practical training shall be located at suitable industries for a period of 24 weeks, after 6 semesters of studies. Each student is required to do a comprehensive report equivalent to 12 credits under the supervision of a lecturer decided upon by the coordinator for practical training and the supervisor in charge at the industry concerned.

MTM4982   **Final Year Project I**
Credit   **2 (0+2)**
Prerequisite   **None**
This course exposes the students with the basics in academic research, especially in writing the proposal of a scientific research project.

MTM4994   **Final Year Project II**
Credit   **4 (0+4)**
Prerequisite   **None**
This course is a direct continuation of the MTM4982 course which allows students to implement scholarly projects that have been systematically recommended. Among the areas of research thrust are pure mathematics, applied mathematics, statistics, optimization, fuzzy set theory, financial mathematics, computer-assisted graphic design, numerical analysis methods and operational research. An appropriate series of talks will be given to the students and further discussions on the topic of the talk will be conducted with their respective supervisors next. All students are required to write, submit and present the final report of their respective academic projects in chronological order as determined by the Program.

MKG3002   **Principle of Mathematical Modelling**
Credit   **2 (2+0)**
Prerequisite   **None**
This course discusses the topics involves introductory to mathematical modelling, dimension analysis, model approximation and verification and their applications.

MKG3003   **Vector Calculus**
Credit   **3 (3+0)**
Prerequisite   **None**
This course discusses the topics involves the vector and geometry of space, calculus for vector valued

functions and integration of vector valued function in two and three dimensional of space.

MKG3013   **Modern Algebra**
Credit   **3 (3+0)**
Prerequisite   **None**
This course discusses the concepts of sets, functions and the set of integers. It continues by discussing linear congruence and subsequently equivalence relations. The concepts on groups, rings and fields, which also include several basic theories relating to the topics which cover mappings, and the basic ideas on direct products of groups are also discussed. Discussion on theory of ideals and basic operation involving ideals end this course.

MKG3023   **Applied Mathematical Methods**
Credit   **3 (3+0)**
Prerequisite   **None**
This course discusses mathematical methods and techniques commonly used in solving science, technology and engineering problems. It begins with a series solution for differential equations involving the power series method and the Frobenius method. Later, Fourier analysis which is one of the methods often used in solving real world problems is also discussed in this course. At the end of the course, the partial differential equations involving the Heat, Wave and Laplace equations is introduced and solved using the mathematical methods and techniques learned in this course.

MKG3033   **Scientific Computing**
Credit   **3 (2+1)**
Prerequisite   **None**
This course discusses the basics elements of scientific computing, in particular the methods for solving or approximating the solution of calculus and linear algebra problems associated with real world problems. Using a sophisticated scientific computing and 121isualization environments, students are introduced to the basic computational concepts of stability, accuracy and efficiency. New numerical methods and techniques are introduced to solve more challenging problems.

MKG3004   **Numerical Analysis**
Credit   **4 (3+1)**
Prerequisite   **None**
This course presents numerical methods for solving mathematical problems. Both theoretical and computer implementation of the methods are discussed in this course. It covers solution of nonlinear equations, interpolation and approximation, numerical integration and differentiation and solution of ordinary differential equations.

MKW3003   **Probability Theory in Finance**
Credit   **3 (3+0)**
Prerequisite   **None**
The course introduces probability theory, mainly the one that are used in finance. It elaborates important topics; namely set and function, measure theory, random variables, probability distribution and conditional expectation which underly the area of financial mathematics. This knowledge of relevant probability theory is essential in understanding the development of stochastic calculus used in finance.

MKW3023   **Investment Mathematics**
Credit   **3 (3+0)**
Prerequisite   **None**
This course provides an introductory analysis of investments from a quantitative viewpoint. It draws together many of the tools and techniques required by investment professionals, focuses mainly to the interest rate theory. Using these techniques, simple analyses of a number of securities including fixed interest bonds, equities, and real estates are discoursed. Discussions on the real return ends the course.

MKW3013   **Stochastic Modelling and Applications**
Credit   **3 (3+0)**
Prerequisite   **None**

This course discusses the concept of Markov chain in discrete and continuous times. This course begins with basic definitions and properties of the Markov chain including transition probability and continues with limiting distribution as the long-term behavior of Markov chain. The Poisson process is also highlighted. Some examples of real applications will also be discussed in this course.

MKW4003   **Introduction to Stochastic Differential Equations**
Credit   **3 (3+0)**
Prerequisite   **None**

The course discusses some basic concepts of calculus for the development of stochastic differential equations which is widely used in finance, other than application in engineering, physics and biology. Explanation on Brownian motion, the main continuous process used in stochastic calculus, is done before stochastic integral and related Ito process are described. Next, the application of Ito formula for Brownian motion and Ito process, also several other cases are illustrated. The course ended with the derivation of stochastic differential equation from ordinary differential equation and solution for few types of stochastic differential equations by using Ito formula.

MKW4013   **Financial Derivatives**
Credit   **3 (3+0)**
Prerequisite   **None**

This course discussed on the fundamentals of financial derivatives, covering the basic properties and the pricing fundamentals of futures, options and swaps. It also explores trading and hedging strategies involving financial derivatives. Finally, time permitting special topics such as exotic options are explored. The course provides the foundation of financial derivatives and lays the ground for a rigorous risk management course.

ECO3043   **Macroeconomics**
Credit   **3 (3+0)**
Prerequisite   **None**

This course explains in depth the concepts of national income accounting, employment, inflation and unemployment; macroeconomic policies and macroeconomic models.

MKG4003   **Partial Differential Equations**
Credit   **3 (3+0)**
Prerequisite   **None**

This course discusses partial differential equations and its applications in physics. This course introduces partial differential equations of the first and second order and the solutions using the method of characteristics. This course also discusses main three partial differential equations in physics, namely the heat equation, the wave equation and the Laplace equation and their solutions using the method of separation of variables and integral transforms.

MKG4013   **Computational Methods for Differential Equations**
Credit   **3 (2+1)**
Prerequisite   **None**

This course pursues numerical approach modeling natural phenomena that often cannot be solved analytically. This course is divided into two parts. The first part discusses about finite- difference and shooting method to solve linear and nonlinear ordinary differential equations with boundary values. The second part discusses about various numerical approaches to solve hyperbolic, parabolic and elliptic partial differential equations. Students are exposed to solve a wide variety of real problems in science, engineering, and other fields using numerical methods.

MKG4023   **Mathematical Fluid Mechanics**
Credit   **3 (3+0)**
Prerequisite   **None**

This course discusses the basic concepts of fluid mechanics consisting the definition and scope of fluid mechanics, the basic equations involved, methods of analysis and classification of fluids. This course continues with fluid statics, basic equations in integral form and differential analysis of fluid motions. Applications in incompressible flow are considered by introducing to Euler and Bernoulli equations.

MKG4033   **Introduction to Fuzzy Set Theory**
Credit   **3 (3+0)**
Prerequisite   **None**

This course discusses the concept of uncertainty and its solution techniques using fuzzy set theory, fuzzy expansion and fuzzy logic. This course also provides a fuzzy modeling method of fuzzy approach to solve the problem of uncertainty. Fuzzy logic systems and application of fuzzy set theory are discussed through case studies.

MKG4053   **Dynamical Systems**
Credit   **3 (3+0)**
Prerequisite   **None**

This course discusses nonlinear ordinary differential equations from an analytical point of view and involves significant use of a number of concepts, including equilibrium points, orbits, phase portraits and limit cycles. Several methods such as linearization are discussed to determine existence and stability of equilibrium points and analyze nonlinear differential equations such as. An introduction to chaos theory is also presented. The techniques will be applied to nonlinear differential equations from physics, engineering, biology, ecology.

MKG4053   **Complex Analysis**
Credit   **3 (3+0)**
Prerequisite   **None**

This course discusses the following topics: algebra of complex numbers, analytic functions, elementary functions and mapping by elementary functions, complex integration, Cauchy's theorem and integration formula, Liouville's theorem and maximum modulus theorem. Discussion on fundamental theorem of algebra, power series, Taylor's series, zeroes and poles, residues, the residue theorem, and evaluation of contour integrals end this course.

MKG4063   **Functional Analysis**
Credit   **3 (3+0)**
Prerequisite   **None**

This course discusses the concepts of metric spaces, normed spaces as well as topological concepts such as ideas of openness and closeness, compact set, and continuity in metric, normed and inner product spaces. Banach and Hilbert spaces will be discussed in more detail. This course also discusses the properties of convergence including strong and weak convergences, and uniform boundedness. Discussion on several important properties such dual spaces, LP spaces, spectrum theory and compact linear operators end this course.

MKG4073   **Topology**
Credit   **3 (3+0)**
Prerequisite   **None**

This course discusses the basic concepts such as functions, countability of sets, cardinality, partially ordered sets, definition of topological space, neighbourhoods, sequences, bases and subbases. This course also discusses the continuity of functions, homeomorphisms, topological properties, first and second countable spaces, Lindelöf's theorems, hereditary properties and some separation axioms. Discussion continues on compact spaces, compactification, connected spaces, components and simply connected spaces. In addition, some selected topics from fields related to topology ended this course.

MKG4083   **Logic and Computation**
Credit   **3 (3+0)**
Prerequisite   **None**

This course pursues numerical approach modeling natural phenomena that often cannot be solved analytically. This course is divided into two parts. The first part discusses about finite-difference and shooting method to solve linear and nonlinear ordinary differential equations with boundary values. The second part discusses about various numerical approaches to solve hyperbolic, parabolic and elliptic partial differential equations. Students are exposed to solve a wide variety of real problems in science, engineering, and other fields using numerical methods.

MKG4093   **Heuristic Techniques for Combinatorial Optimization**
Credit   **3 (3+0)**
Prerequisite   **None**

Optimization using heuristic techniques is one of the frequently used methods for solving various real-world problems. This technique is often used for solving NP-hard problem, for example in transportation, scheduling, network, and bioinformatics. Since there are numerous possible applications using this method, it is important for students to understand it and to be able to apply it in real world applications.

MKG4103   **Graph Theory**
Credit   **3 (3+0)**
Prerequisite   **None**

This course discusses the basic concepts in Graph Theory including Eulerian and Hamilton graphs and their application, graphs and subgraphs, connectivity of graphs, tours and matchings. Graph colouring, planar graph and directed graphs end this course.

MKG4113   **Computer Aided Geometric Design**
Credit   **3 (2+1)**
Prerequisite   **None**

This course discusses the principles of geometric modeling focusing on Bezier and B-Splines curves and surfaces. Clear comprehension of the underlying mathematics of curve and surface design may prepare the students to explore various applications such scientific visualization, manufacturing design and computer graphics.

MKG4004   **Advanced Operations Research**
Credit   **4 (3+1)**
Prerequisite   **None**

This course expands the explanation on the application of methods in operations research for real problems. It emphasizes more on the topic of integer programming, linear and non-linear programming. Solution using SAS will also be discussed in the course.

MKW4023   **Financial Forecasting**
Credit   **3 (3+0)**
Prerequisite   **None**

This course discusses the introductory of forecasting, forecasting using regression analysis, forecasting using exponential smoothing, forecasting using Box-Jenkins method and modelling univariate GARCH.

MKW4033   **Mathematical Theory in Insurance**
Credit   **3 (3+0)**
Prerequisite   **None**

The course gives the students exposure to various types of life insurance and annuities. By applying knowledge from the interest rate and probability theories, the values for net single premium and net premium for each type of life insurance and annuities are formulated. The formulas are then employed in solving the related practical insurance problems.

MKW4043   **Financial Optimization**
Credit   **3 (3+0)**
Prerequisite   **None**
This course is a continuation of the optimization course. It discusses and provides a platform for students to apply linear and nonlinear optimization knowledge for solving problems in finance.

MKW4053   **Financial Risk Analysis**
Credit   **3 (3+0)**
Prerequisite   **None**
This course is designed to foster a basic understanding of risk management through a Value at Risk (VaR) approach. The main focus of this course is on the measurement and application of the VaR method. This understanding is important for students and financial practitioners to understand the latest revolution in financial risk management. Topics covered including financial risk measurement, VaR calculation, risk and correlation forecasting and stress testing. Each student will involve in VaR calculation project using real financial data. Students are assumed familiar with the concepts in probability including probability distributions, expectations and quantiles.

MKW4063   **Financial Econometrics**
Credit   **3 (3+0)**
Prerequisite   **None**
This course discusses several topics in financial econometrics such as the return predictability and the effect markets hypothesis, event study analysis, portfolio choice and testing the capital asset pricing model, multifactor pricing model, volatility and vector autoregressive models.

MKW4073   **Islamic Financial Mathematics**
Credit   **3 (3+0)**
Prerequisite   **None**
This course emphasizes the need and importance of Islamic economics in the world economic system. The needs and interests are clarified by discussions on the principles, fundamental and methods of Islamic economics. Discussion on mathematical models for Islamic financial instruments ended the course.

MKW4004   **Numerical Methods in Finance**
Credit   **4(3+1)**
Prerequisite   **None**
This course explains the use of numerical methods in finance through programming aids. The main focus is option pricing through the Monte Carlo method and finite variance. This method is important for solving the problem of calculating the price of an option that has no analytical form. Topics discussed include financial theory, numerical methods and option pricing. Students are assumed to have an understanding of numerical analysis and the basis of option pricing.

Introduction

The Bachelor of Science (Data Analytics) with Honours is designed to provide a program of study that combines data science, statistics, machine learning, and mathematics that is in line with the Industrial Revolution 4.0. The program applies the 2u2i elements through the implementation of 2.5 years of study in the university (university component) and 1 year of study in the industry (industrial component). Upon completion of this program, the students will also obtain SAS Certificate known as "SAS Academic specialization in Data Analytics".

The program curriculum has been fully integrated to meet the increasing need for highly skilled data analysts who can analyze the growing amount of data in a variety of disciplines and transform it into usable information for use in decision-making. The program also aims to address the high industry demand for business and data analysts. Graduates will be trained in the latest data analytics methods, concepts and tools used to make sense of data that are available in various forms through knowledge, skills, and abilities.

Students will have an opportunity to work with the industry through their 4 industry component courses in the form of Work Based Learning (WBL) that are offered in the final year of study. This involves learning in a real-life industrial environment project related to IR4.0. The implementation of the 2u2i mode will expose students to actual learning and practice directly from relevant industry practitioners. Such training will add value to their qualification and increase their employment opportunities.

Programme Education Objective (PEO)
The students for this programme are aimed to achieve the following objectives:

PEO1	:	Able to apply knowledge (PLO1) and technical skills (PLO2) as well as practical skills supported by intellectual skills (PLO3) in the field of Data Analytics in line with the Industrial Revolution 4.0 (IR4.0)
PEO2	:	Able to communicate effectively in various levels of autonomy (PLO4) as well as the ability to plan, manage relationships in teams and in organizations of different political, cultural and social backgrounds (PLO5)
PEO3	:	Practicing knowledge in an ethical and professional manner, with integrity and accountability (PLO6)
PEO4	:	Able to solve problems in an IR 4.0 environment effectively with the spirit of "*esprit de corps*" (PLO7) and able to make decisions critically and analytically in various levels of autonomy in the organization (PLO9)
PEO5	:	Able to sharpen the entrepreneurial mindset related to IR 4.0 (PLO8) by leveraging knowledge and digital technology skills (PLO10) supported by quantitative skills to analyze and manage economic, political, social environment and climate change in IR 4.0 environment (PLO11)

Career Prospects

Graduates of the Bachelor of Science (Data Analytics) programme with honours can be involved in various fields and service of big data or industrial revolution 4.0 whether in the public or private sector such as finance, insurance, banking, investment, transportation, manufacturing, mining, health, marketing, sport, research and development and many more. Among the careers that can be pursued are:

- Data Scientist
- Data Analyst
- Data Engineer
- Data Manager
- Data Architect
- Business/ Marketing Analyst
- Quantitative analyst

- Financial analyst
- Systems Analysts
- Information Security Analyst
- Research & Development
- Business Consultant
- Database developer or administrator

Total of Credits for Graduation

The minimum number of credits to graduate is 125 credit hours. The distribution of credit hours by course category is as follows:

Category	Credit	Percentages
University Core Course	18	14.4
Programme Core Course	68	54.4
Specialization Core Course	22	17.6
University Elective Course	17	13.6
Total	**125**	**100**

University Core (18 Credit Hours)

Students can choose 18 credit hours from any course listed by the "*Pusat Pendidikan Asas dan Lanjutan*" as a University Core course.

No	Course Code	Course Name	Credit Hours	Pre-requisite
1.	BBB3013	Academic Writing Skills	3(3+0)	None
2.	BBB3033	English For Occupational Purposes	3(3+0)	None
3.	MPU3132	Appreciation of Ethic and Civilizations	2(2+0)	None
4.	MPU3143	Communicative Malay Language	3(3+0)	None
5.	BBU3032	Public Speaking	3(3+0)	None
6.	MPU3352	Integrity and Anti - Corruption	2(2+0)	None
7.	CCXXXXX	Co-Curriculum	2(0+2)	None
		TOTAL	**18**	

Programme Core (68 Credit Hours)

To fulfill the graduation requirements, students must follow and pass all 15 Core Programme courses with 68 credits.

No	Course Code	Course Name	Credit Hours	Pre-requisite
1.	MDA3003	Introduction to Data Science	3(2+1)	None
2.	MDA3044	Industrial Programming Language	4(3+1)	None
3.	MDA3053	Introduction to Machine Learning	3(2+1)	None
4.	MDA3023	Multivariate Calculus	4(3+1)	None

No	Course Code	Course Name	Credit Hours	Pre-requisite
5.	MTM3004	Linear Algebra	4(3+1)	None
6.	MDA3103	Topological Data Analysis	3(2+1)	None
7.	MDA3123	Data Visualisation	3(2+1)	None
8.	MDA3133	Network Science	3(2+1)	None
9.	CSF3013	Data Structure and Algorithm	3(2+1)	None
10.	CSF3123	Database	3(2+1)	None
11.	MDA4003	Scientific Research	3(3+0)	None
12.	MDA4908-I	Industrial Project I	8(0+8)	None
13.	MDA4918-I	Project Management I	8(0+8)	None
14.	MDA4928-I	Industrial Project II	8(0+8)	None
15.	MDA4938-I	Project Management II	8(0+8)	None
		TOTAL	**68**	

Note: *Courses that come with SAS certification module

Specialization Core Course (22 Credit Hours)

To fulfill the graduation requirements, students must take and pass all 7 Specialization Core courses with 22 credits.

No	Course Code	Course Name	Credit Hours	Pre-requisite
1.	MDA3014*	Probability and Statistics for Data Analytics	4(3+1)	None
2.	MDA3033*	Applied Linear Statistical Models	3(2+1)	None
3.	MDA3063	Experimental Design	3(3+0)	None
4.	MDA3073	Survey Sampling Methods	3(3+0)	None
5.	MDA3083*	Predictive Analytics	3(3+0)	None
6.	MDA3093*	Bayesian Statistics	3(3+0)	None
7.	MDA3113*	Multivariate Statistics	3(3+0)	None
		TOTAL	**22**	

University Elective Course (17 Credit Hours)

Students are free to register for any courses offered appropriately based on student interest and maturity. However, students are required to take at least 17 credit hours from the following list of elective courses, or subject to the approval of the Head of Programme:

No	Course Code	Course Name	Credit Hours	Pre-requisite
1.	MKG3033	Scientific Computing	3(2+1)	None
2.	MKG4083	Logic and Computation	3(3+0)	None
3.	MKG4093	Heuristic Techniques for Combinatorial Optimization	3(3+0)	None
4.	MKG4103	Graph Theory	3(3+0)	None
5.	CSF3563	Data Mining	3(3+0)	None
6.	MGM3323-E	Philosophy of Management	3(3+0)	None
7.	ECO3003	Principles of Economic Thinking	3(3+0)	None
8.	MMS3103	Oceans, Atmosphere and Climate	3(3+0)	None
9.	MMS3603	Introduction To Marine Science	3(3+0)	None
10.	MMS3633	Approaches to Marine Management and Policy	3(3+0)	None
11.	MMS3653	Marine Scientific Data Analyses	3(3+0)	None
12.	MMS3663	Fundamental of Marine Science	3(3+0)	None
13.	MKG3002	Principle of Mathematical Modelling	2(2+0)	None
14.	MMT3112	Marine Technology Laboratory	2(0+2)	None
15.	KAS3032	Principles of Environmental Analysis	2(2+0)	None
		TOTAL	**17**	

COURSE SCHEME
BACHELOR OF SCIENCE (DATA ANALYTICS) WITH HONOURS

COURSE	COURSE	CREDIT HOURS	PRE-REQUISITE	COURSE	COURSE	CREDIT HOURS	PRE-REQUISITE
SEMESTER 1				**SEMESTER 2**			
MDA3003	Introduction to Data Science	3(2+1)	-	MDA3033*	Applied Linear Statistical Models	3(2+1)	-
MDA3014*	Probability and Statistics for Data Analytics	4(3+1)	-	MDA3044	Industrial Programming Language	4(3+1)	-
MDA3024	Multivariate Calculus	4(3+1)	-	MDA3053*	Introduction to Machine Learning	3(2+1)	-
MTM3004	Linear Algebra	4(3+1)	-	MPU3352	Integrity and Anti-Corruption	2(2+0)	
MPU3143	Communicative Malay Language	3(3+0)	-	BBB3013	Academic Writing Skills	3(3+0)	
CCXXXXX	Co-Curriculum	2			Elective 1	3	-
Total credit		**20**		**Total credit**		**18**	
SEMESTER 3				**SEMESTER 4**			
MDA3063	Experimental Design	3(3+0)	-	MDA3083*	Predictive Analytics	3(3+0)	-
MDA3073	Survey Sampling Methods	3(3+0)		MDA3093*	Bayesian Statistics	3(3+0)	
CSF3013	Data Structure and Algorithm	3(2+1)	-	MDA3103	Topological Data Analysis	3(2+1)	-
CSF3123	Database	3(2+1)	-	MPU3132	Appreciation of Ethic and ivilizations	2(2+0)	-
BBB3023	Public Speaking	3(3+0)			Elective 4	3	
	Elective 2	3			Elective 5	3	
	Elective 3	2	-				
Total credit		**20**		**Total credit**		**17**	
SEMESTER 5							
MDA3113*	Multivariate Statistics	3(3+0)	-				
MDA3123*	Data Visualisation	3(3+0)	-				
MDA3133	Network Science	3(2+1)	-				
MDA4003	Scientific Research	3(3+0)	-				
BBB3033	English for Occupational Purposes	3(3+0)					
	Elective 6	3	-				
Total credit		**18**					
SEMESTER 6				**SEMESTER 7**			
MDA4908-I	Industrial Project I	8(0+8)	-	MDA4928-I	Industrial Project II	8(0+8)	
MDA4918-I	Project Management I	8(0+8)		MDA4938-I	Project Management II	8(0+8)	
Total credit		**16**		**Total credit**		**16**	
					TOTAL CREDIT TO GRADUATE 125		

*Courses embedded with SAS certificate module

Notes:
1. Students are required to undertake the **Survival and Water Safety Program** 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

Core Course

MDA3003	**Introduction to Data Science**
Credit	**3 (2+1)**
Pre-requisite	**No**

This course introduces the student to the collection, preparation, data acquisition, cleaning, aggregation, exploratory data analysis, modelling and visualization of data, feature engineering, and model creation and validation covering both conceptual and practical issues. Examples from diverse fields will be presented, and hands-on use of statistical and data manipulation software will be included.

MDA3024	**Multivariate Calculus**
Credit	**4 (3+1)**
Pre-requisite	**No**

This course discusses the topics like the limit and continuity, multivariable functions, partial derivatives, total derivative and multiple integration. In addition, this course discusses the cylinder coordinate, spherical coordinate and the change of variables in multiple integration.

MTK3004	**Linear Algebra**
Credit	**4 (3+1)**
Pre-requisite	**No**

The course discusses the concepts of vector space including row space and column space, linear transformation including covering matrix representation and similarity matrices, orthogonality up to the Gram-Schmidt orthogonalization process, eigenvalues, eigenvectors, eigenspace and numerical linear algebra.

MDA3044	**Industrial Programming Language**
Credit	**4 (3+1)**
Pre-requisite	**No**

This course contains basic programming and programming language; Problem solving techniques; flow diagram and structured algorithm; Program coding techniques and instructions to solve formal problems. Hands-on programming exercises will be given to expose students on integration of SQL, TensorFlow, and many other useful functions and libraries for data science and machine learning.

MDA3053	**Introduction to Machine Learning**
Credit	**3 (2+1)**
Pre-requisite	**No**

This course discusses the basics of machine learning which include introduction to machine learning, various concepts and methods in machine learning, classification of machine learning algorithms, various types of machine learning such as "Neural Networks", "Support Vector Machine" and ending with language learning

MDA3103	**Topological Data Analysis**
Credit	**3 (2+1)**
Pre-requisite	**No**

This course introduces fundamental elements of the emerging science of Topological Data Analysis (TDA) with the underlying principles from computational geometry, algebraic topology, data analysis,

and many other related scientific areas. The application of topological techniques to complex data has opened up new opportunities in exploratory data analysis and data mining. This course is intended to cover theory, algorithm and application of TDA for identifying topological signatures of complex datasets, not just massive in size, but rich in features.

MDA3123   **Data Visualization**
Credit   **3 (2+1)**
Pre-requisite   **No**
This course introduces to the principles and basic data visualization design; visualization representation methods and techniques including charts, tables, graphics, effective presentations, multimedia content, animation, and dashboard design for visualizing multivariate, temporal, text-based, geospatial, hierarchical and network data. Hands-on visualization exercises based on common data domains will be given to experience designing data graphics and visualizations, and reporting findings using data visualization tool.

MDA3133   **Network Science**
Credit   **3 (3+0)**
Pre-requisite   **No**
This course introduces fundamental elements of the emerging science of complex networks, with emphasis on social and information networks. Students will learn about mathematical and computational methods used to visualize & analyse networks, methods used to understand and predict behaviour of networked systems, and theories used to reason about network dynamics. Students will also be exposed to current trend in the field, and derive insights on complex structures.

CSF3013   **Data Structure and Algorithm**
Credit   **3 (2+1)**
Pre-requisite   **No**
This course introduces programming methods to solve problems. Topics for this course include the introduction to data structure such as linked list, stack, queue, tree, graph, sorting techniques and searching methods. Emphasis will be given on modular programming technique. This course also introduces algorithm time complexity as a measuring technique of an efficient algorithm. In addition, the time complexity algorithm as an efficient algorithm measurement technique will also be introduced.

CSF3123   **Database**
Credit   **3 (2+1)**
Pre-requisite   **No**
This course introduces database concepts (goals of DBMS, relationships, physical and logical organization, schema and subschema); data models, normalisation (until BCNF), canonical schema and data independence; data description language; query facilities, query functions; design and translation strategies; and data integrity and reliability.

MDA4003   **Scientific Research**
Credit   **3 (3+0)**
Pre-requisite   **No**
This course exposes students to the systematic scientific research, writing good dissertation and effective presentation

MDA4908-I   **Industrial Project I**
Credit   **8 (0+8)**
Pre-requisite   **No**

This course introduces the student to the basic requirement of industrial project particularly data science projects at industrial environment.

MDA4918-I	**Project Management I**
Credit	**8 (0+8)**
Pre-requisite	**No**

This course introduces students to the concepts and techniques used in managing a project particularly data science projects in industrial environment. Through this project, students will generate project plan and schedule, cost estimation, in addition to preparing the related documents. 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.

MDA4928-I	**Project Industry II**
Credit	**8 (0+8)**
Pre-requisite	**No**

This course is a continuation from the Industrial Project I (MDA49781). Through this course, students will be implementing the concepts and techniques used in the Industrial Project I in terms of real industrial environment. The aspect that will be accessed here is students' ability in managing project development with minimum supervision by industrial and UMT supervisors.

MDA4938-I	**Project Management II**
Credit	**8 (0+8)**
Pre-requisite	**No**

This course is a continuation from the Project Management I (MDA49782). Through this course, students will be implementing the concepts and techniques used in the Project Management I in terms of real industrial environment such as the project plan and schedule, cost estimation, in addition to preparing the related documents. The aspect that will be accessed here is students' ability in managing project development with minimum supervision by industrial and UMT supervisors.

Specialization Core Course

MDA3014	**Probability and Statistics for Analytical Data**
Credit	**4 (3+1)**
Pre-requisite	**No**

This course introduces the student to the important concepts in probability and statistics such as probability, random variables, probability distribution random variables, sampling distribution theory, estimation and hypothesis testing. Examples data from marine and aquatic will be presented, and hands-on use of statistical and data manipulation software will be included.

MDA3033	**Applied Linear Statistical Models**
Credit	**3 (2+1)**
Pre-requisite	**No**

In this course, we will learn how to develop linear models via simple and multiple linear regression. Mastery of this knowledge is important because statistical methods are widely used today that involve real data and big data.

MDA3063	**Experimental Design**
Credit	**3 (3+0)**
Pre-requisite	**No**

This course begins with Basic principles of experimental design; Randomization;

Completely randomized design; Randomized blocks, Latin Squares, Factorial design; Blocking in factorial design; 2k factorial design; Extension of 2k factorials; Blocking and confounding in 2k factorials; Fractional factorial designs; Blocking in fractional factorials; Nested and split-plot designs; Replicated and un-replicated designs; Random effects model.

MDA3073   Survey Sampling Methods
Credit   3 (3+0)
Pre-requisite   No
The course introduces the student to a set of principles of survey and data analytics that are the basis of standard practices in these fields. This course begins with how to do survey research for data analytics, quality of data, modes of survey data collection, data generation from other sources, sampling technique such as simple random, probability sampling, stratified sampling, ratio and regression estimation, cluster and systematic sampling, two-stage sampling, estimating the population size, total survey error, writing reports and managing the survey process. Examples from diverse fields will be presented, and hands-on.

MDA3083   Predictive Analytics
Credit   3 (3+0)
Pre-requisite   No
This course introduces student to the knowledge of widely-used forecasting technique, such as the forecasting problem, an introduction to time series methods, time series methods, data reduction and big data. Examples data from marine and aquatic will be presented, and hands-on use of forecasting methods and data manipulation will be included.

MDA3093   Bayesian Statistics
Credit   3 (3+0)
Pre-requisite   No
The course begins with a brief overview of the probabilities and is followed by Statistics. Topics to be covered in this course include one-parameter models, multiparameter models, Marke Monte Carlo chains and model comparisons

MDA3113   Multivariate Statistics
Credit   3 (3+0)
Pre-requisite   No
This course covers introduction to multivariate data, multivariate data visualization, application of multivariate models such as principal component analysis, multidimensional scaling, factor analysis and group analysis.

Elective Course

MKG3033   Scientific Computing
Credit   3 (2+1)
Pre-requisite   No
This course presents the basics elements of scientific computing, in particular the methods for solving or approximating the solution of calculus and linear algebra problems associated with real world problems. Using a non-trivial model problem, sophisticated scientific computing and visualizations environments, students are introduced to the basic computational concepts of stability, accuracy and efficiency. New numerical methods and techniques are introduced to solve more challenging problems.

MKG4083   **Logic and Computation**
Credit   **3 (3+0)**
Pre-requisite   **No**

This course pursues numerical approach modeling natural phenomena that often can not be solved analytically. This course is divided into two parts. The first part discusses about finite-difference and shooting method to solve linear and nonlinear ordinary differential equations with boundary values. The second part discusses about various numerical approaches to solve hyperbolic, parabolic and elliptic partial differential equations. Students are exposed to solve a wide variety of real problems in science, engineering, and other fields using numerical methods.

MKG4093   **Heuristic Techniques for Combinatorial Optimization**
Credit   **3 (3+0)**
Pre-requisite   **No**

Optimization using heuristic techniques is one of the frequently used methods for solving various real-world problems. This technique is often used for solving NP-hard problem, for example in transportation, scheduling, network, and bioinformatics. Since there are numerous possible applications using this method, it is important for students to understand it and to be able to apply it in real world applications.

MKG4103   **Graph Theory**
Credit   **3 (3+0)**
Pre-requisite   **No**

This course discusses the basic concepts in Graph Theory including Eulerian and Hamilton graphs and their application, graphs and subgraphs, connectivity of graphs, tours and matchings. Graph colouring, planar graph and directed graphs end this course.

CSF3311   **Data Mining**
Credit   **3 (3+0)**
Pre-requisite   **No**

This course is an introductory course on data mining. It introduces the basic concept of data mining such as data pre-processing, data warehousing as well as online analytical processing (OLAP). Students will be exposed to the data mining method and their implementations which focus to two major data mining functions i.e.: pattern discovery and cluster analysis.

MGM3323-E   **Philosophy of Management**
Credit   **3 (3+0)**
Pre-requisite   **No**

Analyze key management theories, principles, techniques and tools with a focus on management activities related to areas or functions for a business and non-business organization. Emphasis will also be given to the systematic approach.

ECO3100   **Principles of Economic Thinking**
Credit   **3 (3+0)**
Pre-requisite   **No**

This course aims to provide students with an understanding of the fundamental concepts and theories of the economy in order to connect and apply the knowledge learned in real life. This course covers selected topics in microeconomics and macroeconomics. Modern pedagogy approaches particularly heutagogy, pedagogy and cybergogy will be implemented in this course.

MMS3103   **Oceans, Atmosphere and Climate**
Credit   **3 (3+0)**
Pre-requisite   **No**
This course introduces the fundamentals of atmospheric processes with special emphasis on ocean-atmosphere interactions and their role in the global climate change. Topics include atmospheric composition and structure, solar radiation and heat budget, hydrologic cycle, ocean and atmospheric circulation, climate system, natural climate variability of ENSO and MJO, and the ocean`s role in response to climate change. Theory is complemented by a series of tutorial and student-led discussion based on global historical climate data and the recent IPCC report.

MMS3603   **Introduction to Marine Science**
Credit   **3 (3+0)**
Pre-requisite   **No**

MMS3633   **Approaches to Marine Management and Policy**
Credit   **3 (3+0)**
Pre-requisite   **No**
This course exposes students to the policies, law and management of marine resources at the national and international levels. Students will understand the formulation of marine related policies, legislation and management as well as the concepts and models adopted, for example the United Nations Convention on the Law of the Sea (UNCLOS). Through understanding the concepts and models used internationally, students will be able to identify their national and regional significance.

MMS3653   **Marine Scientific Data Analyses**
Credit   **3 (3+0)**
Pre-requisite   **No**
This course provides exposure to the basics of marine data interpretation, scientific data analysis and presentation of results. Topics of this course include the introduction of the concept of measurement, data collection, data analysis using appropriate statistical analysis, processing and presenting data. Different statistical software is also disclosed to students. In addition, students are also given the experience to explore the data collected or observed in the environment as well as the scope of various statistical techniques appropriate to specific analytical needs.

MMS3663   **Fundamental of Marine Science**
Credit   **3 (3+0)**
Pre-requisite   **No**
This course provides a basic understanding of world ocean science, the interaction among marine chemical, biological, geological and physical system on Earth. This course describes the main environment of the oceans, from the coast to the oceans and at the different depths, linking the relationship between humans and the oceans, the importance of the oceans in supplying mineral, food and energy resources. Students also learn how global weather affects the oceans and oceans' function as buffer system. This course also provides an initial exposure to the basics of fieldwork as well as methods of using sampling instruments.

MKG3002   **Principle of Mathematical Modelling**
Credit   **2 (2+0)**
Pre-requisite   **No**
This course discusses the topics involves introductory to mathematical modelling, dimension analysis, model approximation and verification and their applications

MMT3112   **Marine Technology Laboratory**
Credit   **2 (2+0)**
Pre-requisite   **No**
This course incorporates some important technical aspects in the field of marine engineering and naval architecture, which includes the provision of drawings of ship lines, understanding on hydrostatic, stability of floating objects, conduct tests. experiments / observations related to different aspects of electrical equipment found on board. The concepts are discussed understood through performing the actual tests / experiments using model ships and CBT in the laboratory

KAS3032   **Principles of Environmental Analysis**
Credit   **2 (2+0)**
Pre-requisite   **No**
This course covers the general topics on the analysis of pollutants in environmental matrices including the instrumentations, theory and techniques for their measurements. The knowledge gained from this course will be useful for mastering other advance courses including air quality and pollution, water and wastewater treatment technology.

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