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MATERIALS MIND

Issue 34

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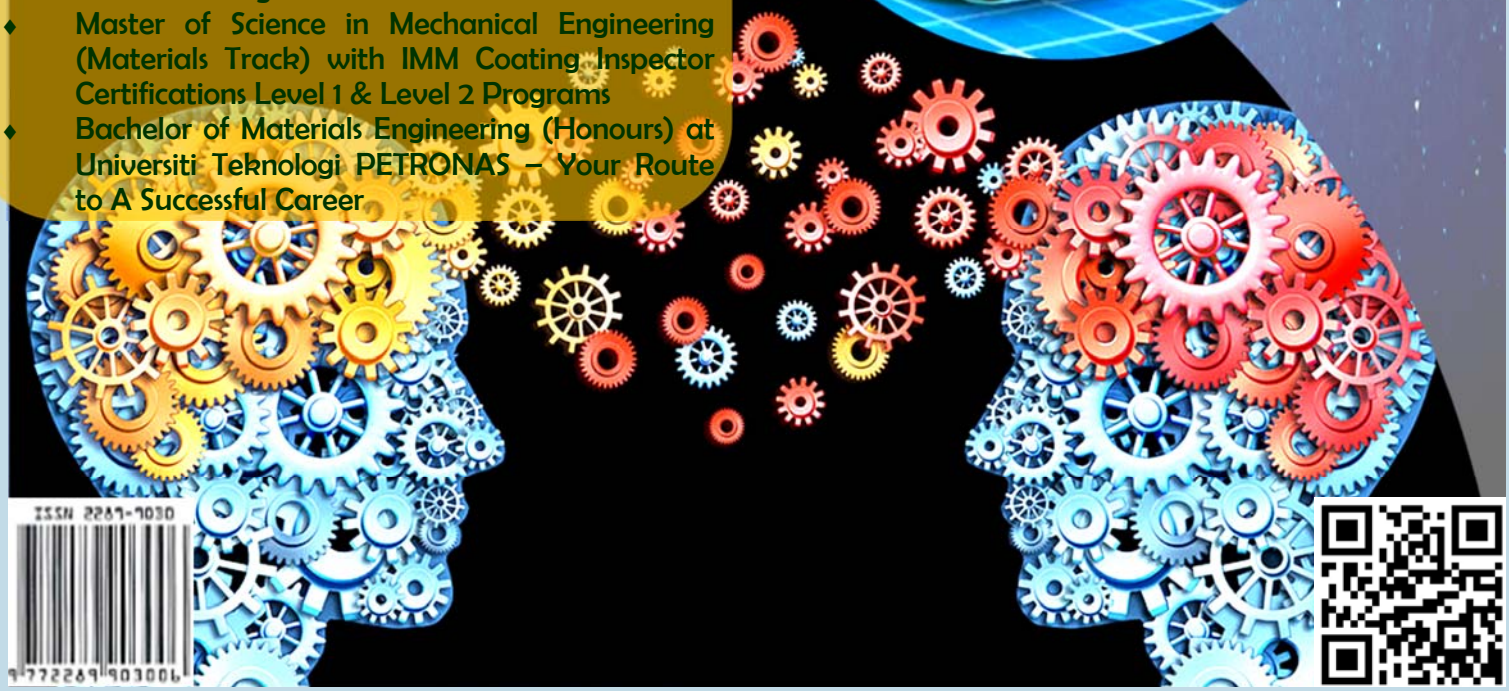
Institute of Materials, Malaysia

HIGHLIGHTS

- IMM Education Committee Encourages Materials Education to Incorporate STEEAM
- IMM Education Committee Proposes to Develop Materials Testing & Failure Investigation Practitioners Certification Scheme
- Innovative Mechanical Engineering Design
- Cathodic Protection Practitioner Certification for Master Degree
- Master of Science in Mechanical Engineering (Materials Track) with IMM Coating Inspector Certifications Level 1 & Level 2 Programs
- Bachelor of Materials Engineering (Honours) at Universiti Teknologi PETRONAS – Your Route to A Successful Career



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Institute of Materials, Malaysia

APRIL 2022 Issue 34

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UCE

UNIVERSAL CORROSION ENGINEERING (M) SDN BHD

In 2017, the IMM Education Committee introduced the concept of **STEEAM** to academia in Malaysia for incorporation into Materials Engineering Programs due to the poor interest in Materials Science and Engineering Careers.

STEEAM stands for

SCIENCE
TECHNOLOGY
ENGINEERING
ENTREPRENEURSHIP
ARTS
MATHEMATICS

Many of the younger generation today are keen on engaging in business opportunities in addition to their scientific or engineering skills. Universities need to adapt to the society's needs of today.

Many fresh graduates had ventured into the business of producing some product or setting up a trading company to sell products and services. Unfortunately, many failed in their business venture within 2 years. Students cannot acquire practical skills in entrepreneurship by attending a few hours of theoretical subjects in financial management or management economics during their university years.

Entrepreneurship development needs time and practice in addition to understanding the theories of business management such as Company establishment, Business Licenses, Sales, Finance, Basic Accounting & Commerce, Logistics, Cashflow Management, and Personnel Management. Students should be allocated time as interns in an organization to "learn the ropes" from production/warehousing/QA/QC to sales, delivery and payment collection. In addition, students should be encouraged to volunteer and participate in activities organized by professional scientific & engineering societies and non-government organizations involved in community development & environmental sustainability. Students should be encouraged to join working committees in professional societies or NGOs to improve their social behaviour, communication and networking skills. Materials engineering studies can become attractive to young budding entrepreneurs who dream of setting up their own business producing or selling unique design metal or non-metallic products and services. Of course, not all graduates will want to set up their own business but having acquired entrepreneurial skills during their academic years will provide them with the extra capabilities which traditional engineers do not possess.

Figure 1 *Engagement and participation of students in various activities organized by non-government organizations (Source: https://www.iomm.org.my/materials-mind/)*

Besides Entrepreneurship, students should also be exposed to Arts & Culture during their academic studies. Students should be encouraged to participate in socio-economic and cultural activities as volunteers to network with government, industry and the community. Such participation during their academic years will empower the students with networking and communication skills which cannot be acquired by just attending lectures and speech practices in the classroom. Technical graduates have often lacked skills in sales, negotiation, and persuasion techniques, leading to performance challenges within their work environments. Exposure through active participation in some form of Arts and Culture relating to, for example, environment preservation and heritage conservation during their academic years will provide the students with intangible benefits during their working careers.

Universities facing poor student intake for Materials Engineering programs should be progressive towards the new era of graduate education to attract students to pursue a program which is dynamic, innovative and evolving, allowing students to partake in multi-disciplinary activities throughout their program. Today's academic programs must prepare their graduates to be "ready-to-work immediately" upon graduation, with additional skills and experience gained through collaborations with professional skills training bodies.

encourages Materials Education to Incorporate

T E E A M

The IMM Education Committee is pleased to acknowledge the participation of Universiti Teknologi Malaysia (UTM) and Universiti Tun Hussein Onn Malaysia (UTHM) in IMM's Skills Certification Schemes. UTM will be incorporating the IMM Coating Inspector Certification Scheme into their Masters in Materials Engineering Program while UTHM will be incorporating the IMM Cathodic Protection Practitioner Certification Scheme into their Master in Materials Engineering Program. Both universities will work with IMM to enhance the teaching capabilities of their lecturers as well as provide industry linkages for their students to gain field experiences to be ready to work upon their graduation.

University education should no longer be strictly academic. University education must prepare the students who have reached adulthood to be pro-active, independent, innovative, and dynamic. This can only be achieved if universities in Malaysia regard their students as adults who are enroute to become future leaders.

Figure 2 *Participation of UTM (above) and UTHM (below) in IMM's Skills Certification Schemes*

IMM EDUCATION COMMITTEE
List of Members for 2022-2024 Term

	FULL name with Title	Affiliation
(1) Chairman	Ir. Max Ong Chong Hup	Norimax Sdn. Bhd.
(2) Deputy Chairman	Assoc. Professor Ts. Dr. Muhamad Azizi Mat Yazid	Universiti Teknologi Malaysia
(3)Secretary-cum-Treasurer	Assistant Professor Dr. Maxine Yee Swee Li	University of Nottingham Malaysia
(4)	Ts. Dr. Chew Khoon Hee	Tunku Abdul Rahman University College
(5)	Professor Ir. Dr. Rajkumar Durairaj	Universiti Tunku Abdul Rahman
(6)	Assoc. Professor Dr. Agus Geter Edy Sutjipto	Universiti Malaysia Pahang
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(10)	Assoc. Professor Dr. Andri Andriyana	Universiti Malaya
(11)	Assistant Professor Ts. Dr. Yu Lih Jiun	UCSI University
(12)	Dr. Mahmood Anwar	Curtin University Malaysia
(13)	Dr. Amirah Amalina Binti Ahmad Tarmizi	Universiti Teknologi MARA
(14)	Dr. Nazatul Liana Binti Sukiman	Universiti Malaya
(15)	Ts. Wan Mohd Arif Bin Wan Ibrahim	Universiti Malaysia Perlis
(16)	Dr. Sharifah Adzila Binti Syed Abu Bakar	Universiti Tun Hussein Onn Malaysia
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(18)	Dr. Choong Wai Heng	Universiti Malaysia Sabah
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(20)	Assoc. Professor Dr. Puteri Sri Melor Binti Megat Yusoff	Universiti Teknologi PETRONAS
(21)	Ir. Ong Hock Guan	Sarawak Shell Berhad
(22)	Ir. Raymond Lam Choong Meng	PETRONAS Carigali
(23)	Puan Siti Haslina	PETRONAS GTS
(24)	Puan Nurjaimi Ali	PETRONAS GTS

IMM Education Committee Proposes Practitio

1. Background of IMM Education Committee

The IMM Education Committee was set up with two objectives:

1. To improve the employability of graduates of Universities and Polytechnics in the field of Materials, Corrosion, Vibration, and Insulation.
2. To provide confidence to fresh graduates so that they can be "ready to work" upon graduation, with added IMM Skills Certification.

The committee is chaired by Ir. Max Ong Chong Hup and deputized by Assoc. Prof. Ts. Dr. Muhamad Azizi Mat Yazid. There are currently 28 members from both industry and academia serving on the committee.

The committee acts as a bridge to link Universities and Polytechnic Institutions with the Institute of Materials, Malaysia (IMM) to facilitate the graduates from these institutions to obtain IMM Skills Certification via classroom lectures and practical workshops. Training is conducted in-house within the university/polytechnic by lecturers from the institutions, while practical skills training includes part-time industry trainers. Universities/ polytechnics are required to invest in the minimum training equipment as recommended by IMM.

2. Milestones

In 2021, the IMM Education Committee successfully finalized the incorporation of two programs:

- The IMM Coating Inspector Level 1 & 2 Certification Programs into the Universiti Teknologi Malaysia (UTM) Masters in Materials Engineering Program.
- The IMM Cathodic Protection Practitioner Level 1 & 2 Certification Programs into the Universiti Tun Hussein Onn Malaysia (UTHM) Masters and Bachelors in Materials Engineering Program.

IMM Education Committee also collaborated with the French CETIM Mechanical Engineering Consortium to provide access to a series of webinars covering areas such as Additive Manufacturing, Non-Destructive Testing, and Flange Bolting, thus providing value-added services to IMM members.

Figure 2 *IMM members are able to access useful training webinars from CETIM-MatCor*

3. Next Task: Materials Testing & Failure Investigation Practitioners (MTFIP) Certification

For the 2022-2024 term, the IMM Education Committee has decided to embark on the ambitious task of developing a Skills Certification Program for Materials Testing & Failure Investigation Practitioners (MTFIP). Currently, there is no other similar type of certification scheme available either locally or internationally. This certification enables interested Materials Testing and Failure Investigation (MTFI) personnel to have their skills defined and verified. A new IMM Skill Standard for Certification of MTFI Personnel will be developed plus all the certification documents over the next 15-20 months.

Figure 1 *UTM (left) and UTHM (right) are the first two Malaysian Universities to have incorporated IMM Certification Programs into their Masters in Materials Engineering Programs*

s to Develop Materials Testing & Failure Investigation ners Certification Scheme

3.1 Materials Testing and Failure Investigation (MTFI)

Materials testing and failure investigation of engineering components is an extremely important aspect of engineering. Materials testing provides understanding and quantifiable information whether a specific material or treatment is suitable for a particular application. Failure investigation provides information to establish the causes of failures, leading to recommendations for improvements in design, operating procedures, and the use of components. Determination of the cause of failure can play a pivotal role in establishing liability in litigation.

3.2 Framework for MTFI Personnel

MTFI personnel typically carry out a series of destructive and non-destructive testing of materials, which involve physical and chemical analyses, using a variety of analytical instruments and techniques. MTFI personnel are expected to possess a wide range of technical skills and acquire the relevant knowledge as well as practical work experience in order to carry out their professional roles with full competence. Currently, there is a lack of a framework to establish the competency levels, including the minimum requirements for an MTFI personnel to be classified as a Specialist or Expert in the field.

The MTFIP certification scheme aims to provide practitioners of MTFI a platform to certify their skills and expertise, leading to professional credibility, both nationally and internationally.

3.3 Target Industries

The competence levels are developed to be applicable to all sectors in all industries, including but not limited to construction, electronics, automotive, paper and board, medical, foundries, polymers, oil & gas, textiles, rubber, packaging, pharmaceuticals, wood, academia, engineering consultancies, and government departments.

Traditionally, failure analysis was based on the strong fundamental understanding of metallurgical principles and practices. However, over time, the types of materials studied in MTFI has broadened to include polymeric and ceramics-based structural components. The rise of the Digital Age also opened up the field of failure investigation of electronic materials and components, many of which consist of semiconducting materials.

3.4 Benefits to candidates who undertake the MTFIP Certification

Currently, MTFI personnel come from various levels of academic and/or vocational training background, armed with diplomas/degrees in disciplines such as Metallurgy, Materials Engineering, Mechanical Engineering, Chemistry or Physics. Practitioners work in diverse industries, eg. oil & gas, foundries, manufacturing, and testing laboratories. Their roles may cover routine QA & QC work or may encompass asset integrity, engineering consultation and scientific research. MTFI personnel are considered as materials specialists in their areas of expertise, be it in steels, non-ferrous alloys, rubbers, polymers, ceramics, composites, or semiconductors.

A career as an MTFI practitioner is demanding, yet extremely rewarding. Due to the limited enrolment and output of graduates in this specialized field, the number of current practitioners is very low in contrast to the total number of engineers and engineering technicians. Nevertheless, there is strong industrial demand for skilled MTFI practitioners. This situation is expected to further increase with the emergence of new industrialized economies in the SEA region and across the globe. The number of firms and people involved in this segment is expected to continue to grow.

A competent MTFI Practitioner will need to ensure their theory & practical knowledge is up to date. Their expertise will cover all the major classes of materials and the testing methods to characterize the material's chemical and mechanical properties. This information will form the basis for the MTFI Expert to make solid recommendations for the proper use of the material. This makes the MTFIP skills certification program a timely and valuable asset for all practitioners who wish to obtain recognition of their knowledge and skill sets.

Figure 3 *A materials engineering graduate student undergoing practical training with Field Emission Scanning Electron Microscope (FESEM) and Energy Dispersive X-ray (EDX) analysis at the University of Nottingham Malaysia*

3.5 Certification Levels, Responsibilities and Minimum Requirements

With the MTFIP certification scheme, MTFI practitioners have a framework to plan their professional advancement according to the Competence Levels from Level 1 of Materials Tester, moving upwards to Materials Testing Practitioner, Materials Failure Investigation Analyst, Materials Failure Investigation Specialist, and Materials Failure Investigation Expert (Level 5, the highest Competence Level).

The MTFIP certification scheme also guides and protects personnel by establishing the lists of tasks for which they hold the responsibility. Higher Level personnel (Level 3 and above) retains the responsibility of work performed by lower level personnel (Levels 1 and 2).

A set of minimum requirements are spelled out to establish the MTFI practitioner's level of competence before the candidate undergoes the examination. At the same time, employers or clients of Certified MTFI Practitioners are assured of the competency of their employee.

Figure 4 *The proposed Materials Testing and Failure Investigation Practitioner Certification Scheme Levels*

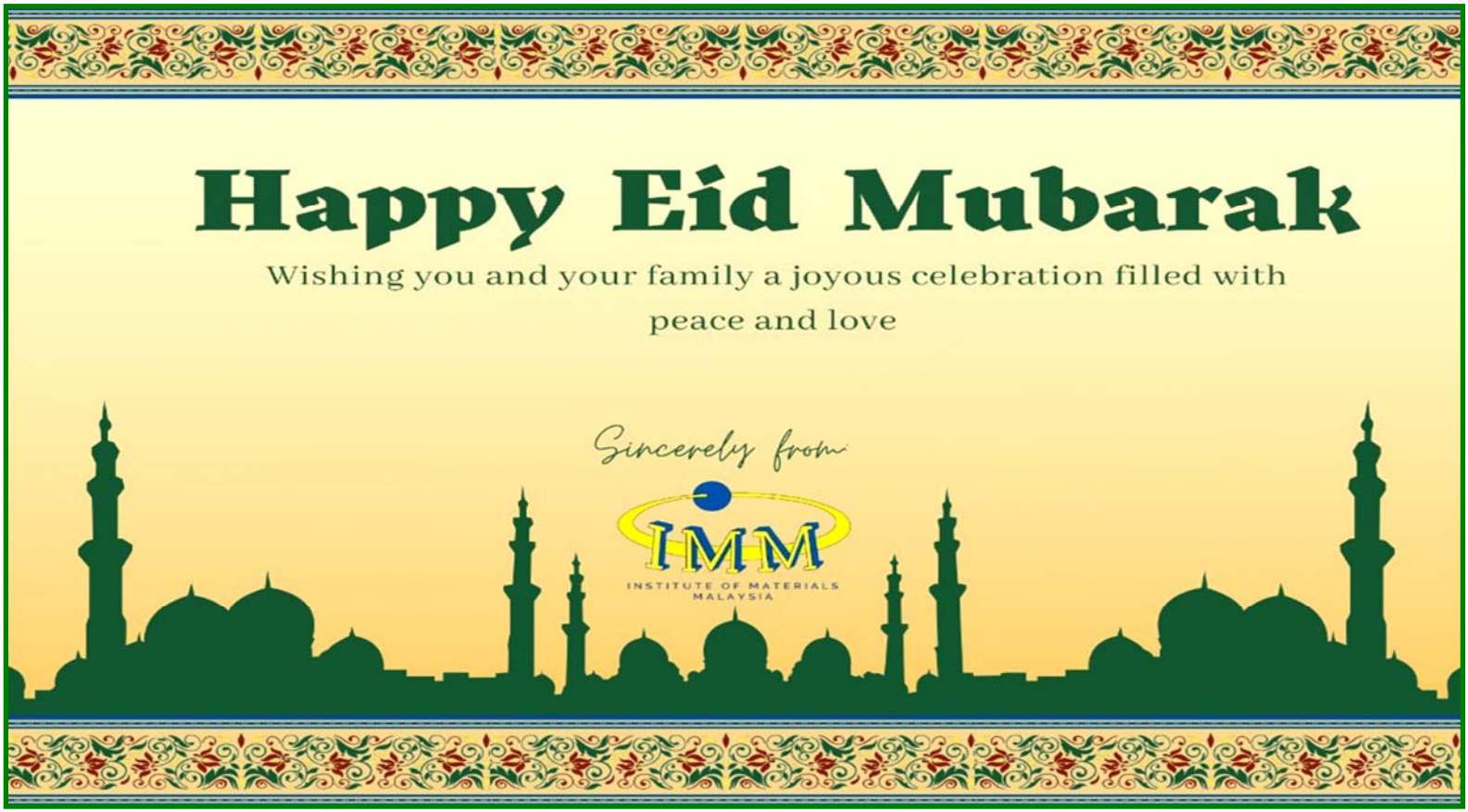
3.6 Knowledge Categories

The MTFIP certification scheme compiles a list of Knowledge Categories which constitute a common core list of titles and topics for certification examination/ assessment for all levels. These Knowledge Categories will form the basis for the pre-requisite training programs. The Knowledge Categories include:

- Properties of Metallic Materials
- Properties of Non-metallic Materials
- Behaviour and Characterization of metals and non-metals
- Corrosion principles and methods of corrosion control
- Manufacturing processes
- Mechanical testing of materials
- Metallography and microscopy
- Chemical analysis of materials
- Electrochemical testing of materials
- Spectroscopy testing
- Non-destructive testing
- Principles of failure investigation
- Failure investigation techniques and strategies
- Root cause analysis
- Fracture mechanics
- Materials selection
- Standards and Codes of Practice relevant in MTFI
- Health, Safety and Environmental Issues relating to MTFI
- Code of Ethics and Professional Conduct of MTFI personnel
- Interpersonal Communication Skills

4. Summary

The IMM Education Committee is currently focused on the single aim of developing the MTFIP Certification Scheme so that it is ready to be presented to all stakeholders by the middle of 2023. The work ahead is heavy, and the timeline is extremely tight. However, all committee members are committed in developing this new Skills Certification Standard for the benefit of all practitioners in the materials testing and failure investigation field.



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	Ir. Ts. Dr. Tan Kim Seah (Oryx Advanced Materials Sdn Bhd)
	Asst. Prof. Ts. Dr. Yu Lih Jiun (UCSI University)

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Northern	Ts. Wan Mohd Arif Wan Ibrahim	Universiti Malaysia Perlis

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Coating	Devinakumar Ratanam (Chairperson)	Topfields Borneo Sdn Bhd
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	Daniel Anak Sagoh (Co-Chairperson II)	Mui Lee Enterprise Sdn Bhd
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	Ir. Ts. Dr. Tan Kim Seah (Co-Chairperson)	Oryx Advanced Materials Sdn Bhd
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Certification Panel	Ts. Brian Lim Siong Chung	Geopolitan Sdn Bhd
Examination Panel	TBA	TBA
IMM-MBOT Assessment Panel	Ts. Wan Mohd Arif Wan Ibrahim	Universiti Malaysia Perlis
Impartiality	Kang Kim Ang	CorrTrol Synergy Sdn Bhd
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Student Chapter	Assoc. Prof. Dr. Lim Teck Hock	Tunku Abdul Rahman University College
Young Professionals	Mohd Fairuz Mohd Salleh	Serba Dinamik Group Berhad

Compiled by: IMM Secretariat,
The information was updated as of 15 April 2022

INSTITUTE OF MATERIALS, MALAYSIA

IMM CPD Application Form

FOR APPLICANT	
Description of Activity:	
Organizer/Committee:	
Date:	**Time:**
Venue:	
Topics covered:	
No. of Activity Hours Applied:	
Submitted by: **Signature:** ..... **Date:** ..... **Name of Applicant:** ..... *** A copy of itinerary of the event/brochure shall be submitted together with this form.*	
FOR IMM SECRETARIAT	
Professional Development: **Activity Code**	
No. of CPD Points Granted:	
IMM Secretariat: **Signature:** ..... **Date:** ..... **Name:**	

Remark:

_____

_____

Professional Development Activity Code	Professional Development Activity Scope	Weightage Factor
A	Attending Training Courses/Workshop/ Working Sub-committee Activity on Development of Examinations and/or Training Courses	4
B	Course Trainer/Facilitator/Examiner/ Conference Presenter	3
C	Attend Seminar/Conference/Webinars	2
D	Paper Author Main Author (max 30 hours/year) Co-author (max 10 hours/year)	2
E	Attend Committee Meeting	1

Introduction of IMM's Continuing Professional Development ("CPD") Scheme for Certified Personnel.

With effect from 1st January 2023, all IMM Certified Personnel will be required to submit their yearly Continuing Professional Development (CPD) report to qualify for renewal of their certification upon expiry. The objective of CPD is to encourage Certified Personnel to regularly improve themselves and keep themselves updated with latest developments in their industry. As such, IMM certified personnel must commence collecting CPD Points during the year 2022 to meet the required one-year CPD Points by January 2023.

CONTINUING PROFESSIONAL DEVELOPMENT ("CPD")
LOG TEMPLATE
(Supporting documents to be submitted wherever applicable)

Date or Period	Professional Development Activity Code & Description	Role	No. of Activity Hours	Weightage	No. of CPD Points

The CPD points calculation shall be based on the weightage factor shown below for each Activity Code.

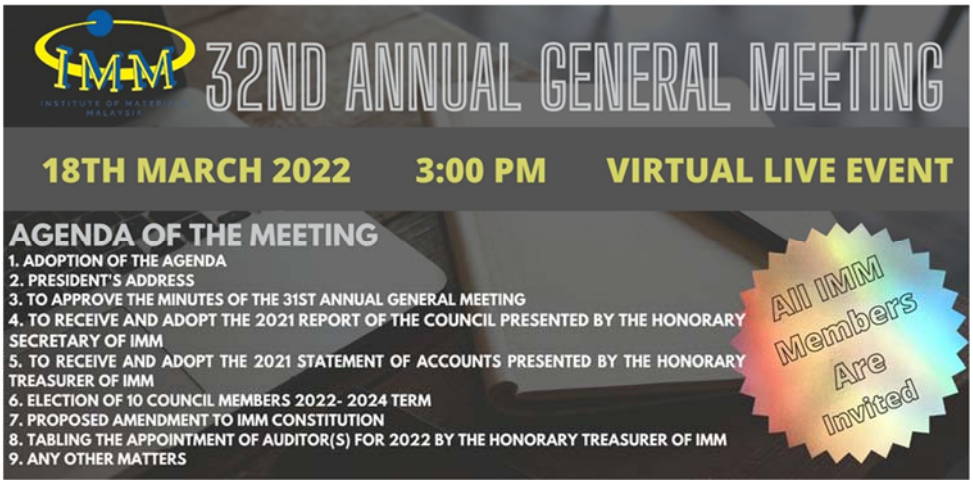
Professional Development Activity Code	Professional Development Activity Scope	Weightage Factor
A	Attend Training Courses/Workshops/Working Sub-Committee Activity on Development of Examinations and/or Training Courses	4
B	Course Trainer/Facilitator/Examiner/ Conference Presenter	3
C	Attend Seminar/Conference/Webinars	2
D	Paper Author Main author (max 30 hours/year) Co-author (max 10 hours/year)	2
E	Attend Committee Meeting	1

The minimum number of CPD Points per year shall be **10 points**.
The minimum number of CPD Points per 5 year for re-certification shall be **100 points**.

32nd Annual General Meeting



Prepared by Aberamy Dayalam (IMM Secretariat)
Reviewed by Wong Wing Kiong (General Manager of IMM Secretariat) and Prof. Ts. ChM. Dr. Melissa Chan Chin Han (Honorary Secretary of IMM Secretariat)



The meeting was kicked off with the President's address. The President, Dato' Dr. Ir. Ts. Haji Mohd Abdul Karim Abdullah welcomed and thanked all the members who were present and expressed his appreciation to the Management Committee, Council members, the Chairmen and members of the various committees and all members for their support and contribution to IMM.

The 2021 Annual Report of IMM was then presented by Prof. Ts. ChM. Dr. Melissa Chan Chin Han, the Honorary Secretary of IMM. She highlighted several activities of IMM and the various committees and these included:

- the Accreditation to MS ISO/IEC 17024
- the activities of the technical and working committees
- the IMM events
- the collaborations with university and training bodies
- the training, examination and certification

The Honorary Secretary's presentation was followed by the statement of accounts tabled by the Honorary Treasurer of IMM, Ts. Dr. Mohamed Ackiel Mohamed which was then received and accepted by the assembly.

Then, the election of 10 Council members for 2022 - 2024 term was held. The elected Council members for the term 2022 – 2024 was subsequently announced by the Hon. Secretary.

The Honorary Secretary of IMM, Prof. Melissa then tabled several proposed amendments to the IMM constitution and amongst these were the changes on the provisions relating to non-citizens (membership and election to Council), editorial revision on the cross-referenced clause numbers, changes on the membership-related clauses and changes on the IMM Secretariat office address. The proposed changes were unanimously accepted by the members present.

This was then followed by the normal business of appointing internal auditor for 2022 and any other business before the AGM was adjourned.

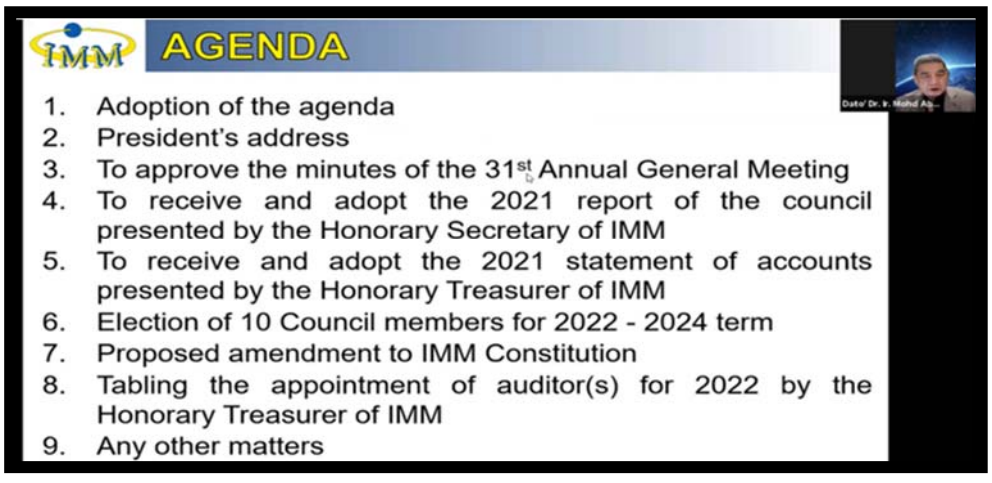


Figure 1 *Opening remarks by the IMM President, Dato' Dr. Ir. Ts. Haji Mohd Abdul Karim Abdullah*

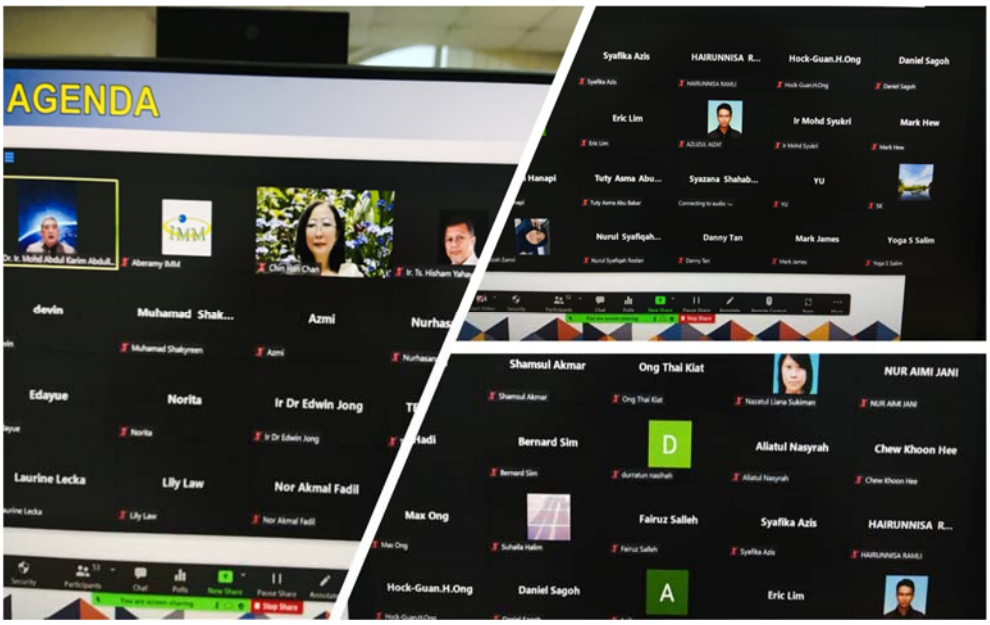


Figure 2 *Members of IMM*

IMM website link: https://www.iomm.org.my/pre-assessment-briefing-notes/

Direct link: https://heyzine.com/flip-book/d8bf93a7f9.html

Offshore Technology Conference Asia (OTC Asia) 2022

Prepared by Edayue Muhammad Fanashim Benson (IMM Secretariat)
Edited by Wong Wing Kiong (General Manager of IMM Secretariat) and Prof. Ts. ChM. Dr. Melissa Chan Chin Han (Honorary Secretary of IMM Secretariat)

Date : 22nd – 25th March 2022
Venue : Kuala Lumpur Convention Centre

Founded in 1969, the Offshore Technology Conference (OTC) organizes the world's foremost events for the development of offshore resources in the fields of drilling, exploration, production, and environmental protection. The flagship OTC is held annually in Houston, Texas, U.S.A. Meet the demand for technical information to support the growth of the offshore oil and gas industries in Asia. Provide opportunities for industry professionals and their employers to share their applied technologies and best practices with other producing areas in the world. To create opportunities to institute and strengthen intersociety collaboration and cooperation with member societies based in Asia. Offshore Technology Conference Asia (OTC Asia) is where energy professionals, such as PETRONAS, PTTEP, MMHE, Baker Hughes, Dialog, MISC, Aker Solutions, Kaefer, ABL and Bureau Veritas, meet to exchange ideas and opinions to advance scientific and technical knowledge for offshore resources and environmental matters.

Prof. Ts. ChM. Dr. Melissa Chan Chin Han and Ir. Ong Hock Guan are the Technical Chairs as well as the Session Chairs of Technical Session 27: Materials, Corrosion, Insulation and Inspection for OTC-Asia 2022 at Kuala Lumpur Convention Centre. Mr. Leow Chun Ho presented an oral talk entitled "Corrosion Management of Wet Gas Sour Gas Carbon Steel Pipeline with Corrosion Inhibitor and Mono-Ethylene-Glycol in NACE Region 3".

IMM promoted MS2376:2022 Coating fingerprinting overall procedures for paints using FTIR and other related methods (previously known as IMM FP01) and the related coating fingerprinting certification programs during OTC-ASIA 2022. SIRIM QAS International Sdn Bhd and Eurofins NM Laboratory Sdn Bhd promoted their third-party laboratory services based on MS2376:2022.

IMM's **VISION** is to become the **Authority on Materials Science, Technology and Engineering in Malaysia**. Our **MISSIONS** are to provide the route to attaining professional status as Materials Specialist and to become the ***CENTRE*** for Materials Information in Malaysia. Hence, OTC Asia is a great platform for IMM to promote its certified training programs.

In OTC Asia 2022, IMM being one of the (77) participating exhibitors for the event, our IMM Booth located at G-405 successfully attracted more than 350 visitors. Among the visitors' inquiries, Coating Inspector and Protective Coating Technician are the two most popular IMM Certified Programs.

Figure 2 *IMM Members visiting the IMM Booth G-405 on 22nd March 2022 at the OTC Asia 2022 (KLCC) during the Soft Lunch of the IMM Insulation Standards (IMM IN01:2022)*

Figure 1 *Ir. Ong Hock Guan (IMM Corrosion Chairperson) (3rd from Left), Speaker, Mr. Leow Chun Ho (2nd from Left), Prof Melissa (IMM Honorary Secretary) (Centre) and Other Guests during the Technical Session at OTC Asia 2022*

Figure 3 *Ir. Ong Hock Guan (Corrosion Committee Chairperson) (Far Left), Ir. Max Ong Chong Hup (Council Member 2020-2022) (Centre) & Dr. Maxine Yee Swee Li (University Of Nottingham Malaysia) (Far Right) at IMM Exhibition Booth*

Figure 4 *IMM Associate Training Partner (ATP) En. Ikmal (MTE Sales & Training Programs Manager) (Far Left) and some visiting guests at IMM Exhibition Booth*

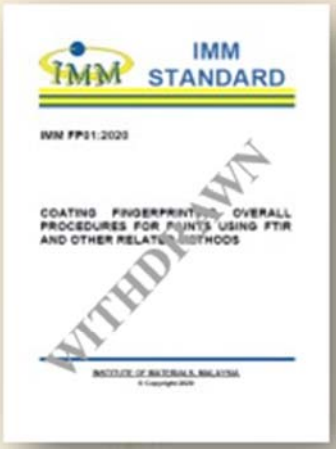
Figure 5 *IMM Immediate Past President, Ts. Mohd Azmi Mohd Noor (Far Left), IMM Insulation Committee Chairperson, Mr. Danny Tan Kim Chew (Centre Left), IMM Insulation Committee Co-Chairperson, En. Nik Khairil Azman Nik Abdullah (Centre Right), IMM Deputy President, Ts. Dr. Chew Khoon Hee (Far Right)*

On the Opening Day (22 March 2022) of the OTC Asia 2022, IMM Insulation Committee took the opportunity to soft launch the IMM Insulation Standards – General Requirements for Industrial Thermal Insulation (IMM IN01:2022). The IMM Insulation Standards (IMM IN01:2022), which are being developed by IMM Insulation Committee and IMM Standard Development Committee, will be served as a basic insulation guide for the industries. The first official publication of the standard is expected to be released in the 3rd Quarter of 2022.

Figure 6 *IMM Insulation Committee members at IMM Exhibition Booth at OTC Asia 2022*

MIGRATION OF IMM STANDARD (FP01) TO MALAYSIAN STANDARD

Institute of Materials, Malaysia (IMM) is delighted to announce the successful migration of **IMM Standard FP 01:2020** on ***Coating Fingerprinting Overall Procedures for Paints using FTIR and Other Related Methods*** to **Malaysian Standard (MS2736:2022).**



This Standard emphasizes the evaluation of the manufacturer's paint fingerprint with the aim of reaffirming the consistency of the paint supplied with reference to the qualified paint. This Standard covers the fingerprint requirement of both single-pack and multi-pack paints for qualification quality control and verification.

- ✓ This Standard includes:
  - i. Coating fingerprinting qualification
  - ii. Test method to fingerprint the paint supplied in the manufacturer's container
  - iii. Criteria and execution of Coating Fingerprint Certificate

User's requirement on Coating Fingerprint Certificate is listed here:

- ✓ Shell Global Solutions International B.V. (Shell GSI), Design and Engineering Practice (DEPs) (Technical Specification) (2017) (**DEP30.48.00.31Gen**) on Protective Coatings for onshore and offshore facilities
- ✓ PETRONAS Technical Standards (2019) (**PTS15.20.03**) (Protective coatings and linings)

Scan here to view the standard

https://mysol.jsm.gov.my/search-catalogue?keyword=fingerprinting

Prepared by:
Hairunnisa Ramli, Nurul Fatahah Asy qin Zainal, Suhaila Iday u Abdul Halim & Melissa Chan Chin Han
Universiti Teknologi MARA,
Coating Fingerprinting Committee

Institute of Materials, Malaysia

Coating Fingerprint Certification Programs

Coating Fingerprint Foundation Course **[Code: FPF]**

Certified Coating Fingerprint Quality Controller Level 1 **[Code: FP1]**

Certified Coating Fingerprint Quality Controller Level 2 **[Code: FP2]**

Certified Coating Fingerprint Trainer **[Code: FPT]**

Coating Fingerprint Quality Controller Refresher Course **[Code: FPR]**

Available in virtual and physical modes!

Why Coating Fingerprinting?

The paint & coatings and oil & gas industries have initiated the requirement for a polymeric Coating Fingerprint Certificate (similar to a Mill Certificate for metals) to improve quality assurance and quality control. The authentication Fourier Transform Infra-Red (FTIR) analysis has been selected in addition to other physical tests which are regularly conducted by the paint & coating manufacturers, as the appropriate method to provide the requirement for fingerprinting. Hence, IMM offers an inclusive Coating Fingerprint Certification scheme and training course to meet the requirements and needs of the industries in Malaysia.

Scan here for more details

Coating Fingerprinting Committee

www.iomm.org.my

Insight into Polymer Processing and Analysis

Prepared by: Ts Dr. Chew Khoon Hee, Chairman Polymer Committee
Edited by: Nurul Fatahah Asyqin Zainal, Universiti Teknologi MARA

Date: 18th March 2022
Venue: DKE, Tunku Abdul Rahman University College (TAR UC) and Google Meet

"How is Standard Malaysian Rubber (SMR) 20 produced?"
"How to produce a defect-free injection moulded product?"
"What are the dos and don'ts while conducting tensile test?"

In order to answer the above questions, IMM Polymer Committee has jointly organised a half-day seminar with the Faculty of Engineering and Technology (FOET), Tunku Abdul Rahman University College (TAR UC) on 18th March 2022 where "Insight into Polymer Processing and Analysis" was the theme of the seminar.

In view of the uncertainty due to the Covid-19 pandemic, the Polymer Committee decided to organise the seminar in a hybrid mode where participants could either choose to attend the seminar physically at DKE, TAR UC or join via the online platform, Google Meet. The seminar was also broadcasted through FOET's Facebook.

In order to add more value to this seminar, each participant would get 2 CPD hours from the Board of Technologists Malaysia (MBOT) as well as from IMM. This seminar has attracted 400 participants and around 1.1k viewers via the Facebook live.

Ts. Dr. Chew Khoon Hee, Deputy President of IMM cum Chairman of IMM Polymer Committee, kicked start the seminar by delivering his welcoming speech. In his speech, Ts. Dr. Chew emphasised that to meet the demand of the polymer industry, besides the theoretical knowledge gained from tertiary education, it is vital to learn from those having practical experiences and IMM provides a platform for interaction between academia and industrial practitioner.

Rubber products are no stranger to us as we use various rubber products in our daily life, such as tyres and gloves. However, not everyone is familiar with the process of making dry rubber. The first speaker, Mr. Mohd Ikram Mohammad of Malaysian Rubber Board (MRB) shared with the participants the processes of producing SMR 20, starting from the collection of cup lumps to the packing of SMR 20. Besides, Mr. Mohd Ikram also talked about the various efforts taken by MRB to address the environmental issue caused by the rubber processing factory.

Moving from natural rubber to thermoplastic, Ts. William Lee Kin Weng, Principal Consultant of Metalloy Consulting Services, shared his practical experiences related to the operation of the injection moulding process. For easy illustration, Ts. William summarised the factors responsible for moulding defects into **5 M** which are **M**anufacturable design, **M**aterials selection, **M**ould performance, **M**achine choice and **M**ethod of processing. He also highlighted various factors that need to be considered at each stage in order to minimise the defective products.

Tensile test is one of the common tests known to Materials Scientists as this test is conducted daily in some factories for quality assurance or as out-going inspection purposes. However, besides measuring the dimension of the dumbbell specimen and fixing the cross-head speed of the tensile tester, are there any other factors that need to be considered while performing the tensile test? In his talk titled "Plastic Mechanical Testing: Devils in the Details", Mr. Ng Phooi Sang of GT Instrument Sdn Bhd highlighted the four sources of uncertainty, *i.e* test specimen, test system, environment and test procedure. Besides, Mr. Ng also highlighted various requirements of ISO and ASTM standards which are frequently overlooked by Materials Scientists.

At the Q&A session, various questions were raised to the speakers and the seminar ended at 12:30 pm.

Figure 1 *Ts. Dr. Chan Meng Yeng (above) and Ts. Dr. Sara Lee Kit Yee (below) were coordinating the Q&A session.*

Figure 2 *Speaker, Ts William Lee Kin Weng gave his talk.*

Figure 3 *Mr. Ng Phooi Sang was explaining how to minimise the uncertainty of mechanical testing for plastic.*

Figure 4 *Mr. Mohd Ikram Mohammad gave his talk on the future of natural rubber processing*

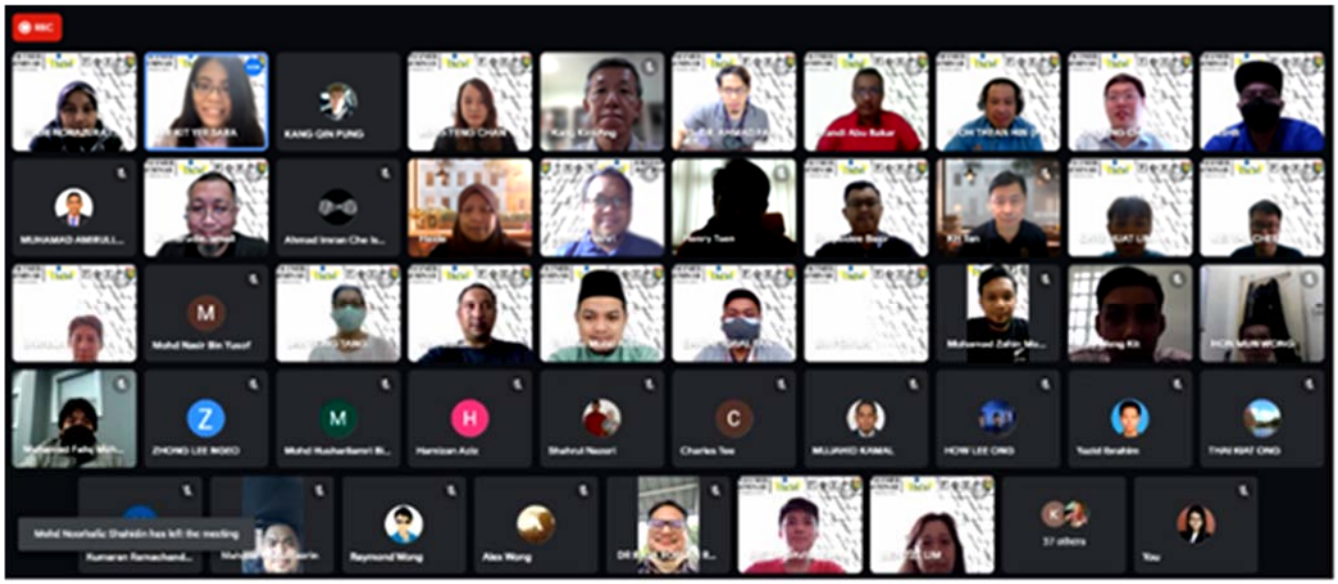


Figure 5 *The online participants*

IMM TRAINING AND CERTIFICATION PROGRAM OVERVIEW

The Institute of Materials, Malaysia (IMM) offers engineering & technical professionals and practitioners a range of Certification Schemes and technical training courses to meet the requirements of the oil & gas, refining, petrochemical, transport, construction and other industries. Our programs have been developed together with the industry, academia and relevant stakeholders to ensure that the technical training and certification provided meet the relevant industry standards and requirements.

PROGRAM: COATING

IMM Certification Schemes and Courses	Technical Training Courses (Non-certification)
• Certified Protective Coating Technician (Blaster and/or Painter) Level 1 and Level 2 • Certified IMM-B1/B2 Assistant Blaster & Painter • Certified Coating Inspector Level 1 • Certified Coating Inspector Level 2 • Certified Blasting and Painting Supervisor • Certified Thermal Spray Coating Applicator • Certified Coating Quality Control Technician	• Refresher Course of Certified Protective Coating Technician (Blaster and/or Painter) Level 1 and Level 2 • Refresher Course of Certified Coating Inspector • Basic Knowledge on Corrosion Protection for Technicians and Engineers • Corrosion Control by Protective Coating • Basic Corrosion & Coating Course

PROGRAM: COATING FINGERPRINTING

IMM Certification Schemes and Courses	Technical Training Courses (Non-certification)
• Certified Coating Fingerprint Quality Controller Level 1 • Certified Coating Fingerprint Quality Controller Level 2 • Certified Coating Fingerprint Trainer	• Coating Fingerprint Foundation Course • Refresher Course of Certified Coating Fingerprint Quality Controller Level 1/Level 2

PROGRAM: CORROSION

IMM Certification Schemes and Courses	Technical Training Courses (Non-certification)
• Certified Corrosion Monitoring Practitioner Level 1 • Certified Corrosion Monitoring Practitioner Level 2 • Certified Corrosion Monitoring Practitioner Level 3 • Certified Cathodic Protection Practitioner Level 1 • Certified Cathodic Protection Practitioner Level 2 • Certified Cathodic Protection Practitioner Level 3 • Certified Cathodic Protection Engineer	• Corrosion Control by Cathodic Protection

PROGRAM: VIBRATION

IMM Certification Schemes and Courses	Technical Training Courses (Non-certification)
• Certified Vibration Practitioner Category 1 • Certified Vibration Practitioner Category 2 • Certified Vibration Specialist Category 3 • Certified Vibration Specialist Category 4	-

PROGRAM: MECHANICAL JOINT INTEGRITY (MJI)

IMM Certification Schemes and Courses	Technical Training Courses (Non-certification)
• Certified Technician in Mechanical Joint Integrity (MJI) for Flange Bolted Connection • Certified Technician in Mechanical Joint Integrity (MJI) for Small Bore – Piping, Tubing, Valves	• Mechanical Joint Integrity • Pressure Safety Valve • Small Bore Tubing

PROGRAM: THERMAL INSULATION

IMM Certification Schemes and Courses	Technical Training Courses (Non-certification)
• Certified Thermal Insulation Installer	• Introduction to Thermal Insulation

PROGRAM: WELDING

IMM Certification Schemes and Courses	Technical Training Courses (Non-certification)
• Certified Welding Inspector • IMM-JWES Certified Associate Welding Engineer • IMM-JWES Certified Welding Engineer • IMM-JWES Certified Senior Welding Engineer	• Repair Welding of Pressure Equipment in Refineries & Chemical Plants • Welding & Joining Technology for Non-Welding Personnel • Steel Technology for Non-Technical Personnel

MISCELLANEOUS MATERIALS SCIENCE AND TECHNOLOGY (NON-CERTIFICATION) COURSES

Technical Training Courses	Technical Training Courses
• Materials Selection & Corrosion • Metallurgical Failure Investigation • Basic Course on Operation of Mobile Air Compressor • Competent Mobile Industrial Compressor Operator • Competent Mobile Industrial Equipment Inspector • Practical Approach to Inspection and Maintenance of Steam Turbine	• Practical Approach to Precision Alignment Methods • Practical Approach to Precision Balancing Methods • Reciprocating Compressors: Operations, Maintenance, Inspection and Troubleshooting • Troubleshooting Techniques for Rotating Equipment • Valve Operations, Maintenance and Inspection Including Flange Breaking

Note: A certifcate of attendance will be issued to all participants of non-certifcation professional development training courses while candidates who pass the assessment/examination of IMM-certification schemes will be certified with the issue of IMM competency certificate and IMM certification ID card in addition to the certificate of attendance.

More information on training and certification is available on IMM's website at www.iomm.org.my.

For further enquiries:
Call : +603 7661 1591
Email : secretariat@iomm.org.my
WhatsApp : +6018 911 3480

INSTITUTE OF MATERIALS, MALAYSIA
Suite 1006, Level 10, Block A, Kelana Centre Point, No. 3 Jalan SS 7/19,
47301 Petaling Jaya, Selangor.

IMM AUTHORIZED TRAINING BODY (ATB)/ AUT
TRAINING PARTNER (ATP) FOR I

AUTHORISED TRAINING BODIES (ATBs)

(Offer IMM Certification Training Programs and Courses)

ATBs	Training Programs & Courses
	Coating
Seacademy Sdn. Bhd. (Sarawak) **Topfields Borneo Sdn. Bhd.** (Sarawak) **Sabah Skills & Technology Centre** (Sabah) **SRC Global Resources Sdn. Bhd.** (Peninsular Malaysia) **Advance Multiskills Training Centre Sdn. Bhd.** [Excludes courses marked with *] (Sarawak)	Certified Assistant Blaster & Painter Level 1 & Level 2 Certified Protective Coating Technician (Blaster and/or Painter) Level 1 & Level 2 Certified Blasting and Painting Supervisor Certified Coating Inspector Level 1 & Level 2 Certified Quality Control Technician* Certified Thermal Spray Coating Applicator* Basic Knowledge on Corrosion Protection for Technicians and Engineers* Corrosion Control by Protective Paints* Corrosion Control by Protective Coating*
	Mechanical Joint Integrity
Sabah Skills & Technology Center (Sabah) **SRC Global Resources Sdn. Bhd.** (Peninsular Malaysia)	Certified Mechanical Joint Integrity for Small-bore Piping, Tubing and Valves Certified Mechanical Joint Integrity for Flange Bolted Connections
	Thermit Welding
Prasarana Malaysia Berhad (Malaysia)	Certified Thermit Welding Practitioner (Level 1) Certified Thermit Welding Senior Practitioner (Level 2)

Note: The respective coverage area is indicated in brackets.

AUTHORISED TESTING CENTRE (ATC)

(Offers IMM Examination and Assessments)

ATC: JOTAC Academy Sdn. Bhd.
(Peninsular Malaysia)

Certification Examination/Assessments

- Certified Protective Coating Technician (Blaster and/or Painter) Level 1 & Level 2
- Certified Coating Inspector Level 1 & Level 2
- Certified Corrosion Monitoring Practitioner Level 1
- Certified Cathodic Protection Practitioner Level 1

HORIZED TESTING CENTRE (ATC)/ AUTHORIZED IMM COURSES & CERTIFICATION

ASSOCIATE TRAINING PARTNER (ATP)

(Offers IMM Certification Training Programs and Courses)

ATP: Materials Technology Education Sdn Bhd
(Malaysia and Overseas)

IMM Training Programs & Courses

Coating

- Certified Protective Coating Technician (Blaster and/or Painter) Level 1 & Level 2
- Refresher Course for Certified Protective Coating Technician (Blaster and/or Painter) Level 1 and Level 2
- Certified Assistant Blaster & Painter Level 1 & Level 2
- Certified Blasting and Painting Supervisor
- Certified Coating Inspector Level 1 & Level 2
- Refresher Course for Certified Coating Inspector Level 1 and Level 2
- Certified Coating Quality Control Technician
- Certified Thermal Spray Coating Applicator
- Basic Knowledge on Corrosion Protection for Technicians and Engineers
- Corrosion Control by Protective Paints
- Corrosion Control by Protective Coating

Coating Fingerprinting

- Coating Fingerprint Foundation Course
- Certified Coating Fingerprint Quality Controller Level 1
- Certified Coating Fingerprint Quality Controller Level 2
- Refresher Course of Certified Coating Fingerprint Quality Controller Level 1/Level 2

Train-the-Trainer

- Certified Trainer

Corrosion

- Certified Corrosion Monitoring Practitioner Level 1
- Certified Corrosion Monitoring Practitioner Level 2
- Certified Corrosion Monitoring Practitioner Level 3
- Certified Cathodic Protection Practitioner Level 1
- Certified Cathodic Protection Practitioner Level 2
- Certified Cathodic Protection Practitioner Level 3
- Certified Cathodic Protection Engineer
- Corrosion Control by Cathodic Protection

Thermal Insulation

- Introduction to Thermal Insulation
- Certified Thermal Insulation Installer

Vibration

- Certified Vibration Practitioner Category 1
- Certified Vibration Practitioner Category 2
- Certified Vibration Specialist Category 3
- Certified Vibration Specialist Category 4

Welding

- Certified Welding Inspector
- Repair Welding of Pressure Equipment in Refineries & Chemical Plants
- Welding & Joining Technology for Non-Welding Personnel
- Steel Technology for Non-Technical Personnel

IMM-JWES Courses

- Certified Associate Welding Engineer (AWE)
- Certified Welding Engineer (WE)
- Certified Senior Welding Engineer (SWE)

Mechanical Joint Integrity

- Certified Mechanical Joint Integrity for Small-bore Piping, Tubing and Valves
- Certified Mechanical Joint Integrity for Flange Bolted Connections
- Valve Operations, Maintenance & Inspection Including Flange Breaking

Loss of Primary Containment

- Mechanical Joint Integrity
- Pressure Safety Valve
- Small Bore Tubing

Rotating Equipment

- Competent Mobile Industrial Compressor Operator
- Competent Mobile Industrial Equipment Inspector
- Inspection & Maintenance of Pumps
- Practical Approach to Inspection and Maintenance of Stream Turbine
- Practical Approach to Precision Alignment Methods
- Practical Approach to Precision Balancing Methods
- Reciprocating Compressors: Operations, Maintenance, Inspection & Troubleshooting
- Troubleshooting Techniques for Rotating Equipment

Other Materials Courses

- Materials Selection & Corrosion
- Metallurgical Failure Investigation
- Basic Course on Operation of Mobile Air Compressor

UCSI University

Technical Article 1

Innovative Mechanical Engineering Design

Prepared by Asst. Prof. Dr. Mohammed Al-Gailani, C.Eng, IMechE, UCSI University
Edited and submitted by Dr. Yu Lih Jiun and Dr. Cik Suhana Hassan

UCSI University's Department of Mechanical Engineering through their Design Project course provide opportunities for their students to be involved in the design of solutions to industrial or community problems as well as to use appropriate CAE software to optimise the solution of their designs. The Design Project aims to broaden students' knowledge and prepare them to enter the job market after graduation. It aids in the development of the ability to propose conceptual design and justify design selection decisions, including material and mechanism which are regarded as critical to the success of the engineering design and process. The selection must consider environmental aspects, public health, safety measurements as well as relevant engineering codes and standards. A good engineering design must meet the requirements of both the industry and the community service sector.

Taking advantage of technological advancements, students are also required to model and analyse the proposed design and material, with expected results on safety, durability, performance, and cost.

Several designs have been proposed by different batches of students to demonstrate the design quality, such as Fruit Peeling Machine (***Figure 1***) in which students are required to design a fruit peeling machine capable of washing, peeling, and packing the fruit while ensuring fruit quality through the integration of roller and belt; and Fire Spread Control Device (***Figure 2***). Another example is the design of a Mobile Retractable Bridge (***Figure 3***) for flood rescue purposes, where the emphasis is placed on the use of lightweight materials and Covid-19 precautions in the design and analysis.

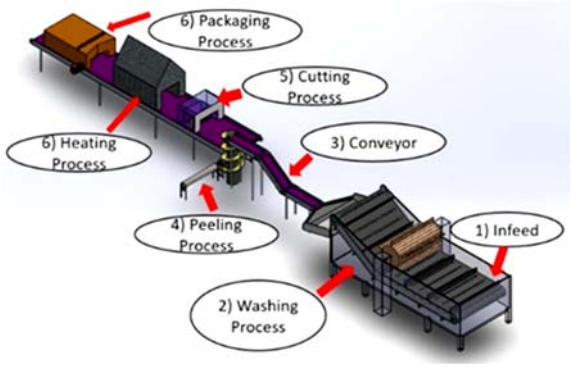


Figure 1 *Design of Fruit Peeling Machine Combining Rollers and Belt*

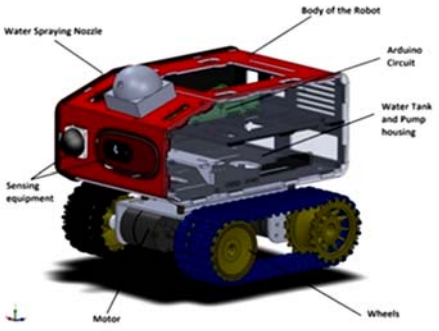


Figure 2 *Design of Device to Control Fire from Spreading*

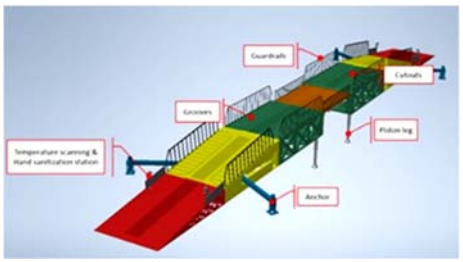


Figure 3 *Design with the Mechanism of the Mobile Retractable Bridge*

In 2021, with the collaboration of the non-governmental organisation Friends of Sungai Klang Mid Valley River Three, the course has linked the students to the mission of transforming the river bank of the Klang River into a River Park. Students took part in the development of Dripping Irrigation System Integrated with Rainwater Harvesting System (***Figure 4***). A collaboration such as this provides opportunities for students to contribute to the pursuit and advancement of knowledge for the betterment of society, as well as a platform to exchange technical knowledge with relevant stakeholders and improve their communication skills.

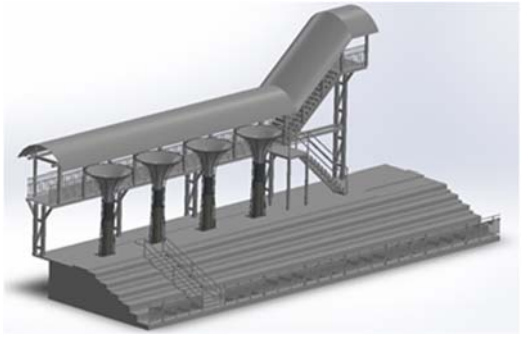


Figure 4 *Design of Integrated Dripping Irrigation System utilizing Rainwater Harvesting for Mid Valley River Three (MVR3) Site*

Technical Article 2

Cathodic Protection Practitioner Certification Programs for Master Degree

Prepared by Dr. Azzura Ismail
Head of Panel, Materials and Industry
Faculty of Mechanical and Manufacturing Engineering, Universiti Tun Hussein Onn Malaysia (UTHM)

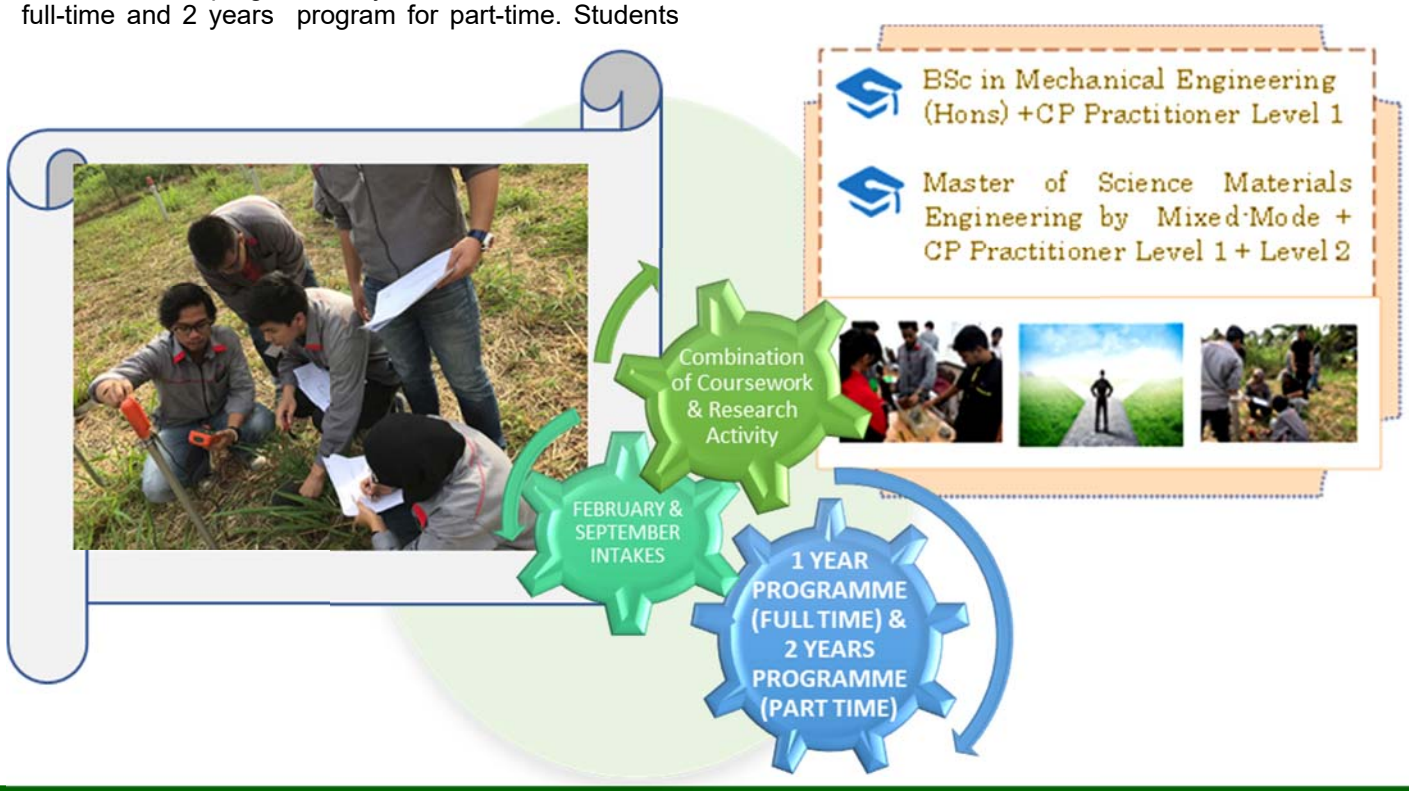
When a fresh graduate seeks for employment, the potential employer will looked at the graduate's specialization and extra skills. Certifications awarded by professional organizations are useful in confirming that the graduate has specific knowledge or skills needed to do the job. Typically, most graduate's earned s their credential after completing their degrees or securing jobs by looking for 'something' extra to enhance their skills. With extra skills, knowledge and experience gained through internship, residency or time on the job, employees can command higher wages. Employers may also require that employees acquire relevant certification before being promoted or given salary increment.

Having awareness on the importance of processing 'extra skills'had initiated Universiti Tun Hussein Onn Malaysia (UTHM) to offer their students extra skills to earn certificates awarded by accredited bodies such as the Institute of Materials, Malaysia (IMM). It is no denial that certification involves meeting specific standards and passing exams as well as practical assessments to ensure that the candidates are fully qualified to do their jobs.

The curriculum structure for this Malaysian Qualifications Agency (MQA) certified program is a combination of coursework and research activity. The duration of this program is 1 year with 3 semesters for full-time and 2 years program for part-time. Students can enroll either in February or September intake every year. The minimum requirements are a Bachelor's degree in Engineering Technology or Science from local or international institutions recognized by UTHM with a cumulative point average (CPA) of 2.75 and above. For applicants with a CPA between 2.50 and 2.75, they must pass an internal assessment, and applicants with a CPA lesser than 2.50, must have at least 5 years of working experience in related engineering fields. Additional English assessment is also needed with a minimum Test of English as a Foreign Language (TOEFL) score of 500 or International English Language Testing System (IELTS) band 5 or Malaysian University English Test (MUET) band 3 or other equivalent English courses.

This 3-semester curriculum structure is arranged into core courses during the 1st semester, followed by dissertation 1 (short 2nd semester) finalized by elective courses + CP Practitioner Level 2 assessment.

The core courses are research methodology, sustainable manufacturing, materials characterization and testing, corrosion and prevention, engineering composites dissertation 1 and 2. The electives offered are engineering polymer, engineering ceramic, metallurgy, thin-film and coatings, porous materials, and biomaterials.



Technical Article 3

Master of Science in Mechanical Engineering (Materials Track) with IMM Coating Inspector Certifications Level 1 & Level 2 Programs

Overview

This master's degree aims to provide graduates with advanced knowledge and capabilities to effectively carry out research and solve material engineering problems. Upon graduation, graduates, depending on students' interests, will be exposed to knowledge related to smart materials, advanced material processing, asset integrity and management, and corrosion and materials degradation, and many more. The versatility of these programs allow graduates a variety of career options. The program is structured in such a way that registered students are also eligible to sit for Institute of Materials, Malaysia (IMM) coating inspector Level 1 & 2 certifications. Universiti Teknologi Malaysia is appointed as an authorised testing centre to host these certifications. Various coating related experiences will be provided to students during the duration of the study with at least 6 months of industrial attachment after semester 3. A few of the included courses are also designed to accommodate learning experiences in the coating field. For candidates who have industrial experience in coating fields, the 6-month industrial attachment can be waived (subjected to approval from IMM).

What's Covered in This Course?

Advance your knowledge and understanding of materials engineering and develop your critical thinking and prepare to work across a range of organisations with this MSc programme. This degree comprises a combination of program core courses, university general courses, various electives courses, and a master's project. The three (3) core courses of the program that must be completed by each student, are Research Methodology, Emerging Technologies and Management, and Product Innovation and Development. In order to be eligible to sit for the IMM certification programme students need to choose the material track and they are required to take five (5) elective courses offered within this track and one (1) free elective course along with a master project relevant to the track specialisation. The four (4) compulsory elective courses for IMM coating inspector certifications include advanced surface modification of metallic materials, assets integrity and management, corrosion and materials degradation and advanced materials characterization. These courses are structured to enhance students' knowledge on coating technology.

Why Study with Us?

This master's degree could help you secure your dream job in the field of materials engineering with coating inspection specialization. Employers are always looking for graduates who have advanced knowledge of their sector. The extra skills you build during this program could increase your earning potential, too. This master's degree provides opportunities to connect with like-minded people on your course who could be valuable contacts in the future. Studying for a master's degree gives you an extra year to build knowledge of your chosen courses and preparing you to stand out in your field. The industrial attachment embedded within this program is also something that is valued by employers.

UTM provides an enriching learning environment with state-of-the-art facilities, fantastic sport and social facilities, as well as on-campus residential housing within a community of creative and accomplished people from around the world.

Who should register?

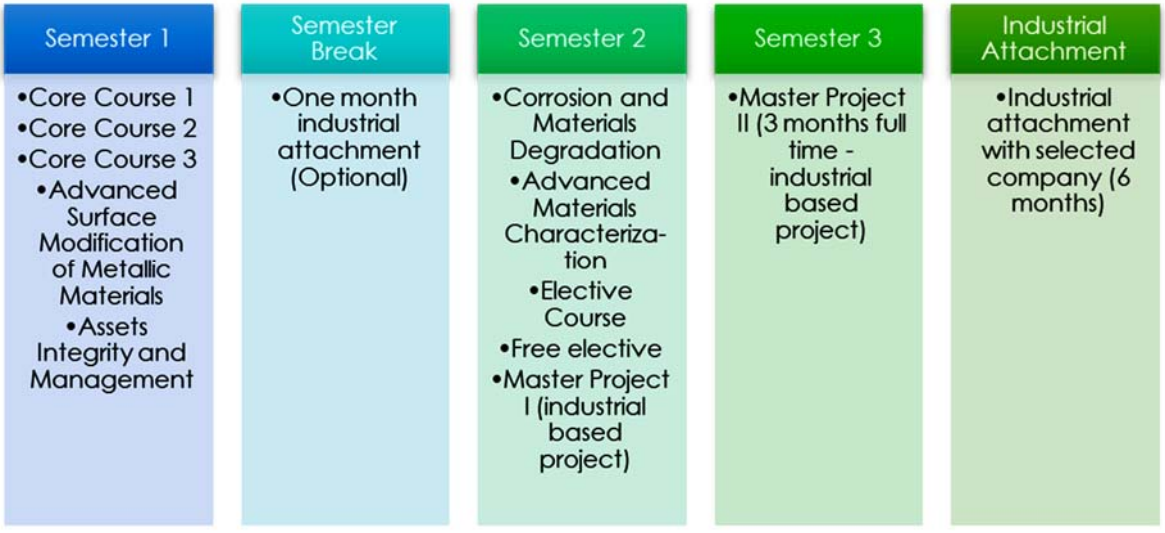
This program is recommended for university graduates and the normal requirement for admission to the programme is a bachelor degree recognised by the university in either engineering or sciences. Students applying for admission with a degree other than degrees from engineering or science, including National Higher Diploma, an Advanced Diploma or equivalent, can enroll to the pre-master programme before joining this master programme.

Further information

Name : Assoc. Prof. Ts. Dr. Muhamad Azizi Mat Yajid
Position: Director (Materials, Manufacturing & Industrial Engineering)
Office: 07-5557038
Email: azizi@utm.my

MSc of Mechanical Engineering (Material Track) + IMM Coating Inspector Certification Programs Level 1 & Level 2	
Programme Core Courses	
Core Course 1	Research Methodology
Core Course 2	Emerging Technologies and Management
Core Course 3	Product Innovation and Development
Material Track Elective Courses (Select 5 courses)	
Elective Course 1	Advanced Surface Modification of Metallic Materials*
Elective Course 2	Assets Integrity and Management*
Elective Course 3	Corrosion and Materials Degradation*
Elective Course 4	Advanced Materials Characterization*
Elective Course 5	Smart Materials
Elective Course 6	Structural composites
Elective Course 7	Advanced Materials Processing
Elective Course 8	Electron Microscopy for Nanomaterials
Elective Course 9	Mechanical Behaviour of Materials
Elective Course 10	Advanced Ceramic Processing
Free Elective	
Free Elective 1	Any one course, cross discipline/area/track/school
Master Project	
Master Project 1	Master Project 1
Master Project 2	Master Project 2
Industrial Attachment	6 months industrial attachment with a selected company.

* Compulsory elective courses to be selected for IMM certifications programs



Technical Article 4

Bachelor of Materials Engineering (Honours) at Universiti Teknologi PETRONAS – Your Route to A Successful Career

Prepared by Puteri Sri Melor Megat Yusoff, Programme Leader, Materials Engineering Programme, Universiti Teknologi PETRONAS

Why study Materials Engineering? Understanding materials - their internal microstructure, behaviours, performance and processing – is the key to designing new and improved materials for innovation and invention of products, be it a smartphone, a washing machine, a computer, a car, or a spacecraft. The core of studying materials is to unravel the relationship between the atomic arrangements and their bondings to the observed properties of the materials.

Why and how a communication device such as a phone has evolved from being wired, big enough to be placed on a table to being wireless and handheld in the palm? This scenario will never be possible without the understanding of materials, what influence their behaviours and performance. Looking around us, we can appreciate that the world is made of materials of varying types, differing properties and functions. If you have the curiosity to know why materials behave differently and have a strong inclination in designing new materials for the benefit of mankind, the Bachelor of Materials Engineering is for you.

What does Bachelor of Materials Engineering (Honours) at Universiti Teknologi PETRONAS (UTP) offer? This programme has been approved to be offered by the Kementerian Pengajian Tinggi (KPT) in 2019. The programme's educational objectives are to produce technically qualified Materials Engineers with the potential to become leaders in Materials Engineering industries and Materials Engineers who are committed to the sustainable development of Materials Engineering industries for the betterment of society.

At UTP, our Materials Engineering programme is a broad-based engineering programme that emphasizes strong fundamentals in Mathematics and Engineering principles. This programme prepares graduates for industry specific needs through specialization elective packages offered in the final year, as well as lifelong learning and independent study skills through design courses, final year projects and adjunct lecture series.

Students will be exposed to team-based and practical problem solving through Engineering Team Project (ETP), Final Year Projects (FYP) I & II, Engineering Design Projects (MECP) I & II and our unique 7-month Student Industrial Internship Programme (SIT & SIP).

Students of this programme will also be aware of environmental, social, political, ethical and economic constraints through humanities, management and social science electives.

In addition to the above courses, students may further develop their engineering knowledge through one of the Core Specialisations as follows: Advanced Computational and Modelling of Materials and Degradation and Failure of Materials. These also serve the niche to our programme aligned to the needs of the Oil & Gas industry, in particular.

Figure 1 *Analytical equipment facilities supporting the Materials Engineering programme 1. Scanning Electron Microscopy (SEM): For the determination of surface morphology 2. X-ray Diffraction (XRD): For determination of structure and purity 3. X-ray Fluorescence (XRF): For determination of elemental composition and purity 4. X-ray Photoelectron Spectroscopy (XPS): For determination of surface chemistry 5. Transmission Electron Microscopy (TEM): For determination of average particle size 6. Brunauer-Emmett-Teller (BET): For the determination of specific surface area 7. Fourier Transform Infra-Red (FTIR): For the determination of chemical composition*

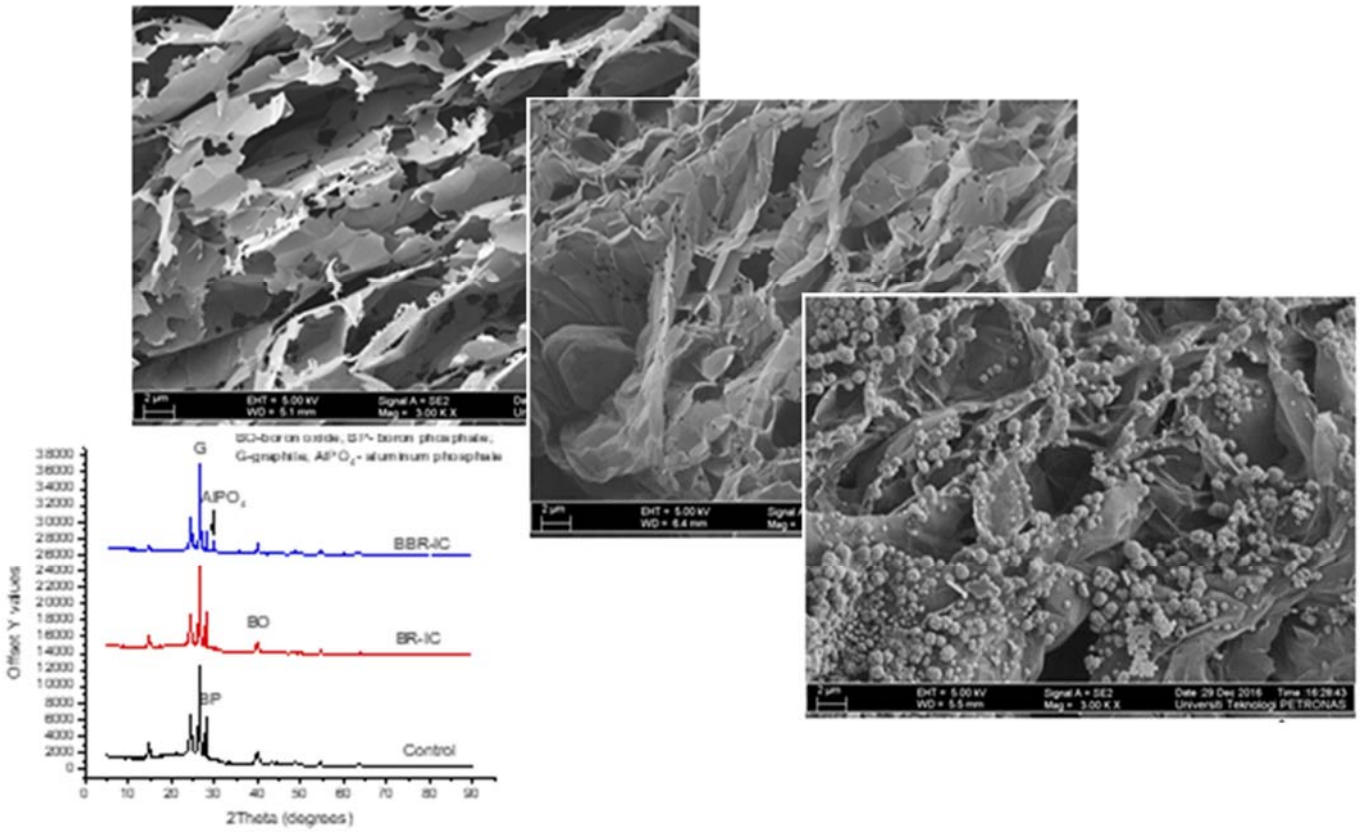


Figure 2 *An illustration of the study of the morphology of the intumescent coating*

What is the prospect of jobs for Materials Engineers? Indeed, the job prospects for Materials Engineers are huge. They are relevant to various industries and sectors such as oil and gas, manufacturing, production, medical, pharmaceutical, construction, renewable energy, electrical, healthcare and domestic products. In short, Materials Engineers are not only needed in the industrial sector but also other including government, plantation, Research & Development Scientific Bodies and Education. Job titles may vary from Materials Engineer to Quality Engineer, Corrosion Specialist, Metallurgical Engineer, Materials Production Research, Materials Consultant, Manufacturing Engineer and many others.

Figure 3 *The transmission electron microscope, one of the state-of-the-art analytical instruments at UTP, produces a high-resolution imaging technique that yields information on the morphology, crystal phase, crystal structure and defects*

As our continuous effort to add value to our graduates, we also offer students to take up minor courses in the following areas, Entrepreneurship, Project Management, International Relations and Big Data Analytics. The knowledge beyond the Materials Engineering discipline deepens graduates' thinking and allow them to forge a broader worldview, increasing their marketability.

Our students are also given the opportunity to obtain certification in AutoCAD 2D Design and Drafting by AUTODESK and Six Sigma Certification by the Institute of Materials Malaysia. At the end of the study, graduates will possess a degree in Materials Engineering, with the possibility of a Minor and is certified in the related area.

The Bachelor of Materials Engineering (Honours) is offered by the Mechanical Engineering Department (MED). Mechanical Engineering Department at UTP has achieved top 300 positions in the latest QS World University Rankings by Subject 2021, thus a recognition of our academic reputation, employer reputation as well as excellence in research. UTP is also one of the top private universities in Malaysia to be ranked at 70 for the QS Asian University Rankings 2021 and ranked at 439 for the QS World University Rankings 2021. Recently, UTP was awarded the 6-STAR rating by the Malaysian Research Assessment Instrument (MyRA), which is the highest recognition for UTP's achievement in its R&D activities. It has also been rated six-star (Outstanding) in the SETARA 2018/2019.

For more information on UTP's Materials Engineering programme, visit www.utp.edu.my.

STUDENT EDITORIAL

Solid Oxide Fuel Cell as Renewable Energy for Future Generations

Introduction

Approximately 84.3% of the energy consumed worldwide in 2021 is from fossil fuel sources. These sources include coal, oil and natural gas [1]. All activities involving fossil fuels tend to release carbon dioxide (CO_2) into the atmosphere and negatively affect the world's condition. The emission of CO_2 is not only harmful to the earth. It also harms living things, such as impairment of cognitive and behavioural development, respiratory illness and other chronic diseases [2].

Today, much effort is exerted to produce an alternative energy source that will help the world in various ways. A few decades ago, a reliable fuel cell device that converts chemical energy to electrical energy in an ecologically friendly manner was developed [3–4]. According to Mohapatra *et al*. (2018) [5], fuel cells are one of the most reliable types of renewable energy that are easily accessible at a reasonable cost. Among the few types of fuel cells, solid oxide fuel cell (SOFC) has shown many advantages that address present concerns [6].

According to Lai *et al*. (2017) [7], SOFC is a fuel cell system that is easily compatible with the material. It has a high electrochemical activity for the oxygen reduction reaction, high thermal stability and fuel flexibility. In addition, SOFC holds the most significant potential among any fuel cell technology owing to its excellent electrical efficiency. In this modern period, various fuel cells are being applied in daily life. Fuel cells can be used in applications such as powering buildings, automobiles, trucks, portable electronic devices and a backup power system. ***Figure 1***(a) shows the schematic diagram of a solid oxide fuel cell (SOFC) and ***Figure 1***(b) displays the commercial application of the SOFC system that is already available in the market.

SOFCs are categorised as high-temperature fuel cells that generally operate at 1050 ºC. SOFCs are favoured over conventional fuel cells because of their high operating temperature for heat utilisation and tolerance to typical production gas components and contaminants [8].

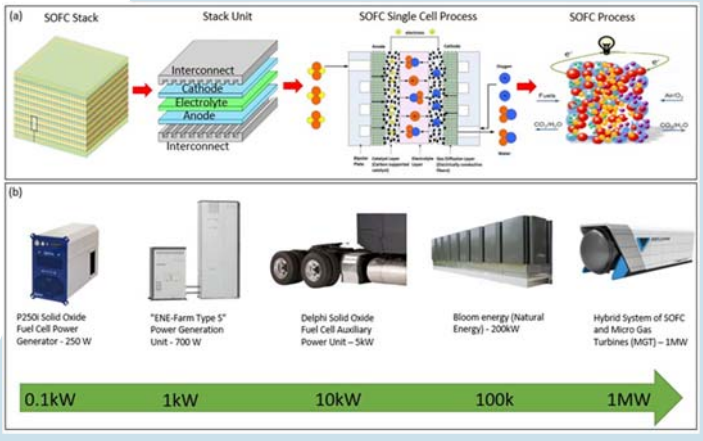


Figure 1 *(a) Schematic diagram of a solid-oxide fuel cell (SOFC), (b) Commercial application of SOFC*

SOFCs may attain electrical efficiency of more than 60%. Hence, they are well-suited for off-grid applications where SOFCs may provide energy and heat at high efficiency [9]. SOFCs are potential energy-generating technologies that are clean and efficient [10].

Conclusion

The dependable SOFC is considered as one of the promising power-generating technologies that exhibits many excellent performances that benefits the world. Nonetheless, SOFC must be thoroughly explored to realize their optimum contribution to energy supply.

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IKM PROFESSIONAL CENTRE
TRAINING CALENDAR 2022

Date	ONLINE TRAINING	Trainer
11 Apr 2022 (Monday)	Decision Rules and Conformity Assessment Meeting The MS ISO/IEC 17025:2017 Requirements	ChM CHANG HON FONG
17 May 2022 (Tuesday)	Root Cause Analysis and Corrective Actions on Unsatisfactory PT Performance	ChM CHANG HON FONG
18 - 19 May 2022 (Wednesday - Thursday)	General QA/QC Procedures for Testing Laboratories	ChM PUA HIANG
23 - 24 May 2022 (Monday - Tuesday)	Chemical Safety and Security	DATIN ChM DR ZURIATI ZAKARIA
25 - 26 May 2022 (Wednesday - Thursday)	Measurement Uncertainty in Chemical Analysis	ChM CHANG HON FONG
13 - 14 Jun 2022 (Monday - Tuesday)	Statistical Methods for Chemists	PROF ChM DR SHARON TEH GEOK BEE
15 - 16 Jun 2022 (Wednesday - Thursday)	Method Validation & Quantification of Measurement Uncertainty in Microbiological Testing	DR NEW CHIA YEUNG
20 - 21 Jun 2022 (Monday - Tuesday)	Calibration of Test and Measuring Instruments and Metrological Traceability	MR CHEN SOO FATT
18 - 19 Jul 2022 (Monday - Tuesday)	Basic Laboratory Skills & Techniques	PROF ChM DR SHARON TEH GEOK BEE

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https://ikm.org.my/ikm-professional-centre/training-calendar/

Institut Kimia Malaysia

INSTITUTE OF MATERIALS, MALAYSIA

Updated on 30th December 2021

Institute of Materials, Malaysia (IMM) is a non-profit professional society that promotes honourable practice, professional ethics and encourages education in materials science, technology and engineering. Engineers, academicians, technicians, skilled workers and professionals are amongst its members exceeding 6800.

Registered with the Registrar of Societies on 6th November 1987, the Malaysian Materials Science & Technology Society (MMS) changed its name to the Institute of Materials, Malaysia (IMM) on 16th June 1997. The objectives of IMM include the training and development of individuals and companies in Malaysia to attain professional recognition in various fields of materials science, technology and engineering.

IMM is administered by a council of 30 members, with volunteers leading more than 15 materials committees and more than 4 regional chapters, and supported by a secretariat with full time staff.

IMM Vision

To be internationally recognised leading institution in Materials Science and Technology.

IMM Mission

(1) To be the technical authority on material science and technology
(2) To develop an enhance competency and skills for all categories and practitioner
(3) To become an internationally recognized certifying body
(4) To be the forum for industry and academia collaboration
(5) To positively contribute to society and quality of life

The IMM membership is categorised into 6 different grades and open to anyone above the age of 17 years - individuals and companies keen in developing and contributing towards the growth of materials science, technology and engineering in Malaysia.

Over the years, IMM have conducted courses on coatings, coatings fingerprinting, corrosion, welding, vibration etc in support of the oil and gas industry in Malaysia. Over 750 Coatings Inspectors have been trained and certified as well as more than 3300 Blasters & Painters, Supervisors, Corrosion Technician and Vibration Practitioners. Its certification programmes are recognized by PETRONAS and all oil & gas operators. Since January 2011, more than 80 Associate Welding Engineers, more than 90 Welding Engineers, more than 30 Senior Welding Engineers and more than 45 Coating Fingerprint Quality Controllers were trained and certified.

IMM has also organised 10 International Materials Technology conferences (IMTCE) on a biennial basis, and numerous technical seminars, educational programmes, technical visits, and materials awareness programmes since 1988.

Public courses, such as Microbiologically Influenced Corrosion (MIC) and Welding Technology for Non-Welding Personnel, are being offered occasionally. Training on materials awareness has also been conducted in public listed companies.

The courses and programmes are being organised by Authorized Training Body/Bodies and Authorized Event Organizer/Organizers.

Collaborations with the Asian Welding Federation, Sabah Skills Technology Centre (SSTC), and local universities continue to be part of IMM's vision and long term mission to educate, train and serve the materials fraternity.

GENERAL INFORMATION ON MEMBERSHIP

The IMM Membership is open to all individuals and companies in developing the contribution of Materials science, technology and engineering towards industrial growth in Malaysia. The technology of materials is advancing day-to-day throughout the world. Membership to the IMM will enable networking and exchange of knowledge from a very wide variety of specialised areas of expertise. Please feel free to download or print a copy of the application form together with the IMM regulations. If you have any doubt, please do not hesitate to contact our secretariat through the phone; +603-76611591 or email to secretariat@iomm.org.my

Annual subscriptions shall be payable in advance on 1st January of each year. Those admitted into the IMM between 1st July and 31st December in any year shall pay only half the annual subscription. Seniors (above 55 years old) get 50% discount off their annual subscriptions.

We have an online application for membership for selected grades. Membership application forms in document format can be accessed from www.iomm.org.my.

Kindly fill the form and email to secretariat@iomm.org.my or send it to :

IMM SECRETARIAT
Suite 1006, Level 10, Block A, Kelana Centre Point,
No. 3 Jalan SS 7/19,
47301 Petaling Jaya, Selangor

IMM MEMBERSHIP BENEFITS

(1) IMM activities offer members to interact and network with representative from the industry, academia and government related to the Materials profession.

(2) Members will gain knowledge on career opportunities for their children, friends etc as IMM offers certification courses in skilled trades *e.g.* Welding, Painting, Inspection, Corrosion *etc*.

(3) IMM-JWES Welding Engineer Certification program leading to a Welding Engineer Certification which offers great employment opportunities in the oil & gas, heavy industry, marine and energy sectors.

(4) IMM publications – quarterly magazine plus annual conferences offer presenters an opportunity for their technical research or industry-academia papers to be published in ISI- and Scopus-index journals.

(5) IMM organizes many free technical events for members to acquire new knowledge and networking opportunities. Participants to these events will also receive Certificate of Attendance for their Continuing Professional Development records.

IMM MEMBERSHIP FEES SCHEDULE AS PER BELOW:

Description	Amount			
	Entrance Fee	Processing Fee	Transfer Fee	Annual Subscription
Fellow (F.I.M.M)	-	RM 300.00	RM 10.00	RM 150.00
Professional (M.I.M.M)	-	RM 150.00	RM 10.00	RM 100.00
Associate (A.M.I.M.M)	-	RM 150.00	RM 10.00	RM 80.00
Company	RM 50.00	-	-	RM 200.00
Ordinary	RM 20.00	-	-	RM 40.00
Student	RM 10.00	-	-	RM 10.00
Ordinary/ Company for affiliates	RM 40.00/ RM 50.00	-	-	NIL

INSTITUTE OF MATERIALS, MALAYSIA

Updated on 30th December 2021

REGULATIONS GOVERNING ADMISSION AND TRANSFER OF MEMBER GRADES

The Council shall establish a Membership Committee which will be responsible for these Regulations and for review of applications for new membership and transfer to other grades (upgrades). The Membership Committee shall recommend for Council approval for admission and transfer of membership. All grades of memberships are awarded at the discretion of the Council and may be withheld or withdrawn in the event of conduct likely to prejudice the standing of the Institute. Every member shall receive a membership certificate.

Every application for membership, individual or company, shall be proposed and seconded according to these regulations and shall be forwarded to the IMM Secretariat who on behalf of the Honorary Secretary will process for consideration and approval of the Membership Committee before tabling for Council's endorsement. The Council may at its discretion reject any application without assigning any reason thereof. The Council may use its discretion to exempt the need for proposer and seconder for Student, Ordinary and Company membership.

Each company on admission as a member shall be entitled to nominate one representative to exercise all rights of membership. Only representatives of Company membership, as well as Fellows (F.I.M.M.). Professional Members (M.I.M.M.) and Ordinary members shall have the right to vote and to hold office in IMM.

Only Malaysian Citizens can become Ordinary Members, Associate Members (A.M.I.M.M.), Professional Members (M.I.M.M.) and Fellow Members (F.I.M.M.) with voting rights. Foreigners can have membership to similar grades but shall have no voting rights.

MEMBERSHIP GRADE & REQUIREMENT

Honorary Fellow (Hon. F.I.M.M.)
The Council shall have the power to elect Honorary Fellows who shall be persons of eminence in science or industry. The election shall be based on a majority vote within the Council. Honorary fellows shall enjoy such privileges as may from time to time be determined by the Council.

Fellow (F.I.M.M.)
A person at least 35 years of age with approved academic qualifications, training and 8 years relevant responsible experience who has made significant contributions to the science and practice of profession of Materials Science and Engineering or has given distinguished service to industry or education.

Professional Member (M.I.M.M.)
A person at least 25 years of age, with approved academic qualifications and training, having at least 3 years responsible experience in Materials Science and Engineering, or a person at least 40 years of age, with at least 15 years of experience with practical responsibility, as demonstrated by thesis/dissertation or report and interview.

Associate Member (A.M.I.M.M.)
A person at least 25 years of age, who possesses an interest in Materials Science and Engineering but have not acquired the necessary experience or obtained the qualification, governing entry to Member grade. An Associate Member, on obtaining the necessary qualifications, may apply for transfer to Member grade.

Company Member
Any company that is involved or has interest in Materials Science and Engineering will be qualified to join as a company member.

Ordinary Member
Any Malaysian Citizen and above the age of 18 years engaged in activities related to research, development and applications in Materials Science and Engineering shall qualify for Ordinary Membership. Only Ordinary Members who meet the necessary minimum requirements may apply for transfer to membership grades of Fellow, Member and Associate Member and may use the abbreviated titles upon transfer.

Student Member
A student member shall be a person not under 17 years of age who at the time of application satisfies the Council that he has received a good general education and is studying subjects related to Materials Science or Engineering. A student member shall transfer to the grade of Ordinary Member after graduation provided he or she is suitably qualified and as soon as he or she is earning a full-time salary. A Student shall not become member of the IMM without the prior approval of the Vice-Chancellor or Head of Department of the university or relevant authority concerned.



IMM Week 2021: The Evolution of Material, Science and Technology in The Post-Covid Era

1-Day Rheology Workshop on Polymers

Materials Lecture Competition 2021 (MLC 2021)

FREE Ordinary Membership for Affiliates:

The Institute of Materials, Malaysia will recognize members of various professional institutions and societies for membership at "Ordinary Grade" without any annual subscriptions. Such members shall submit to IMM proof of their current membership of the respective institutions together with their application.

Members of the following institutions and societies are eligible to apply for affiliate membership:

1. American Welding Society
2. Asian Welding Federation
3. Board of Architects Malaysia
4. Board of Engineers, Malaysia
5. Engineering Institutes under the Engineering Council of UK
6. Geological Society of Malaysia
7. Institut Kimia Malaysia
8. Institute of Corrosion UK
9. Institute of Materials Singapore
10. Institute of Physics Malaysia
11. Institution of Engineers, Malaysia
12. Jabatan Minerals & Geoscience
13. Malaysian Medical Association
14. Malaysian Nurses Association
15. Malaysian Society for Non-Destructive Testing
16. Malaysian Welding & Joining Society
17. Persatuan Arkitek Malaysia
18. Plastics & Rubber Institute of Malaysia
19. Singapore Welding Society
20. Society of Petroleum Engineers
21. The Welding Institute UK

FREE Company Membership for Affiliates:

The Institute of Materials, Malaysia will recognize various professional institutions and associations for membership at "Company Grade" without any annual subscriptions.

Companies registered with the following Trade Associations are recognized for Affiliate Company Memberships:

1. Federation of Malaysian Manufacturers (FMM)
2. Malaysian Offshore Contractors Association (MOCA)
3. Malaysian Oil & Gas Engineering Council (MOGEC)
4. Malaysian Oil & Gas Services Council (MOGSC)

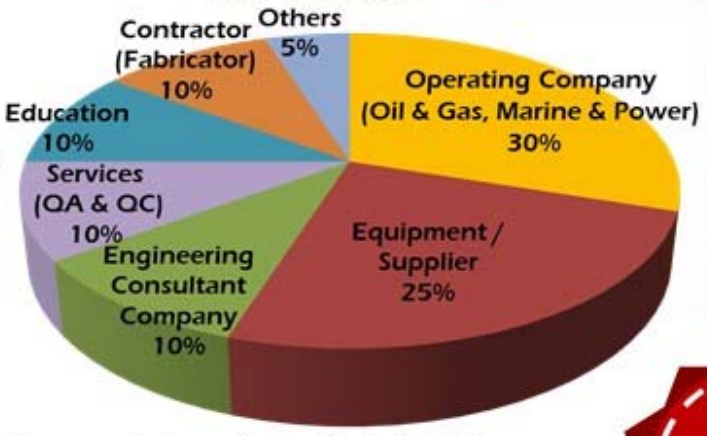
The companies shall submit to IMM proof of their current membership at the respective trade associations together with their application.

NOTE: The above provisions for affiliate membership for individuals and companies was approved by the IMM Council in accordance with the powers vested in the Council as per Clause 6.1.3 of the IMM Constitution and was subsequently endorsed by members at its 21st Annual General Meeting held on 19th March 2011.

MATERIALS MIND

Quarterly Magazine of Institute of Materials, Malaysia

Our Readers



General Information

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Event & Activity Reports, Conference Information, Technical Papers, Information on IMM, IMM Course Details, Advertorial, IMM Supporting Events and many more…..

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