Editorial

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Dean’s Foreword

Assalamu’alaikum.

First and foremost, I would like to congratulate the office of Research, Industrial Linkage and Alumni and those who involved in the publication of the Faculty of Chemical Engineering Research Booklet in conjunction with FKK’s Research and Consultancy Day. Research and teaching are interdependent activities. Therefore, the faculty is committed in supporting its staff with resources and opportunities to enhance research collaboration and consultancy effort.

FKK: Activating dreams, catalysing excellence for a sustainable future

Thank you. Wassalam.
Deputy Dean’s (Research, Industrial Linkage and Alumni) Foreword

Assalamu’alaikum.

I would like to express my sincere and deepest gratitude to all FKK staff who have given their cooperation in providing necessary information in this directory and hence making its debut a success. FKK has a pool of expertise in various areas of studies which can generally be categorized into four niche areas, which are Harnessing the full potential of FKK’s staff is essential to ensure research excellence in line with the ongoing transformation of UiTM. Therefore, we are very keen on engaging our expertise in various activities. We welcome any kind of collaborations such as research, consultation, publication, and staff & student attachment program with others academic and industrial communities.

The directory has been prepared to provide a searchable listing of FKK’s research expertise and facilities available in the faculty, with two main objectives:

- To enable collaboration
- To improve efficiency and utilisation of existing equipment and facilities
Research Niche Area

Faculty of Chemical Engineering offers researchers a wealth of research facilities including modern laboratories and instruments, as well as access to the expertise. There are four niche research area under the FKK as listed below:

- Biotechnology & Engineering
- Material Technology & Engineering
- Environment & Process Engineering
- Energy Technology & Engineering
Focus Area

- **Biocatalyst and Biobased Material**
  Dr Fazlena Hamzah  
  Nurul Asyikin Md Zaki  
  Shareena Fairuz Abdul Manaf  
  Nor Halaliza Alias  
  Suhaila Mohd Saud  
  Nurhaslina Che Radzi

- **Bioreactor & Biochemical Engineering**
  Amizon Azizan  
  Dr Nik Raikhan Nik Him  
  Dr Tan Huey Ling  
  Syazana Mohamad Pauzi  
  Abdul Aziz Ishak  
  Prof Jailani  
  Mohamad Sufian Soa‘ib

- **Food Science & Engineering**
  Dr Siti Noor Suzila Maqsood-ul-Haque  
  Ummi Kalthum Ibrahim  
  Siti Fatma Abd Karim

- **Herbal Downstream Processing**
  Prof Dr Ku Halim Ku Hamid  
  Noorharliza Aziz  
  Dr Jefri Jaapar
Focus Area

- **Cystallization**
  Dr Nornizar Anuar
  Muhamad Fitri Othman
  Dr Siti Nurul’ain Yusop

- **Nanomaterial & Catalyst**
  Dr Abdul Hadi
  Siti Khatijah Jamaludin
  PM Dr Md Amin bin Hashim
  Dr Kamariah Noor Ismail
  Dr Atikah Kadri
  PM Hasnora Jafri

- **Particle Technology**
  Dr Noor Fitrah Abu Bakar
  Siti Norazian Ismail
  PM Dr Norazah Abd Rahman
  Syafiza Abd Hashib
  Rabiatul Adawiyah Abdol Aziz

- **Polymer Technology**
  Dr Rahidawati Sharudin
  Christina Vargis

- **Surface Coating**
  Dr Junaidah Jai
  Fariza binti Hamidon
  Asdarina Yahya
  Fariza binti Hamidon
  Dr Istikamah Subuki
  Norasmah Mohammed Manshor
  Rafeqah Raslan

- **Membrane technology**
  Dr. Siti Wahidah Puasa
  Dr Norhidayah Ideris
  Lim Ying Pei
  Dr Putri Faizura
  Dr Norin Zamiah Kassim Shaari
  Meor Muhammad Hafiz Shah Buddin
  Dr Nur Hidayati Othman

- **Self Assembly Technology**
  Dr Nurul Fadhilah Kamalul Aripin
Focus Area

- **Atmospheric and Air Pollution Engineering**
  Dr Azil Bahari Alias
  Nur Hayati Talib

- **Gas-Liquid Sorption**
  Dr Safari Zainal

- **Process System Engineering**
  Dr Safari Zainal

- **Corrosion Engineering**
  Dr Ayub Md Som
  Dr Najmiddin Yaakob
  Dr Nor Roslina Rosli

- **Process Safety Risk Reliability Eng & Assessment**
  Dr Zulkifli Abd Rashid
  Dr Sharif Abdul Bari Ali

- **Supercritical extraction**
Focus Area

- **Microwave Technology**
  Dr Siti Shawalliah Idris
  Nor Sharliza Mohd Safaai

- **Renewable Energy and Advanced Chemical Technology**
  Prof Dr Md Asadullah Md Hossain
  Prof Dr Sharifah Aishah Syed A Kadir
  Rusmi Alias

- **Hydrocarbon Processing**
  Dr Syed Shatir Asghar Syed Hassan
  Effah Yahya

- **Fluid Transport Technologies**
  Dr Hazlina Husin
  Muhamad Syafiq Mat Shayuti
  Munawar Zaman Shahruddin
  Nik Khairul Irfan Bin Nik Ab Lah
  Fazril Irfan
  Siti Nurliyana Binti Che Mohamed Hussein
  Azzah Nazihah binti Che Abdul Rahim
  Ir Normadyzah Ahmad

- **Well Technology**
  Suriatie Mat Yusuf
  Nurul Aimi Ghazali
  Arina binti Sauki
  Husna Hayati
  Khalil bin Abdul Razak
Researcher Profile
Norazah Abd Rahman graduated from University of Missouri, Rolla in the United States with a Bachelor of Chemical Engineering in 1989. Upon graduation, she joined Matsushita (M) Sdn Bhd in Johor Bahru and Faculty of Engineering, University Malaya for a few months. Later, she joined Institut Teknologi MARA in 1990 which now known as Universiti Teknologi MARA. Due to her passion for knowledge and enthusiast in discovering new research area has impetus her to pursue her study to Master level where in 1994, she obtained her MSc in Non Destructive Testing. It is a one year taught course where she has been exposed to several Non-destructive testing techniques such as Ultrasonic, Eddy current, Magnetic particle, Radiography, Liquid penetrant, Thermography, and Microwave. These techniques have been used to check integrity and reliability of equipment such as heat exchangers, distillation column, plants, oil and gas structures, highways and pipelines. In 2006, she obtained her PhD in Chemical Engineering from Universiti Kebangsaan Malaysia. Dr Norazah is a Fellow of Energy Institute, United Kingdom, Chartered Engineer in Energy and Petroleum Engineering and life member of Malaysian Society of Non Destructive Testing. She is a qualified Level 3 Ultrasonic personnel, National Expert in Ultrasonic, NDT (03-07) Programme MC-113-1 Ultrasonic Examination- Welded Component (oil and gas) lecturer, examiner and invigilator. Her research interests include particle processing, renewable energy and environment and non-destructive testing. Up to date, she has obtained thirty research grants as Principal and co-researcher. She also has supervised and co-supervised 35 PhD and master students. She has published and presented more than 80 refereed articles in reputable journals and conferences.

Azil Bahari Alias holds a B.Eng. Degree (Hons) in Chemical Engineering from Universiti Teknologi Malaysia (2001), a M.Sc. in Chemical Engineering (Energy and Environment) from Universiti Teknologi MARA (2005) and a Ph.D in Chemical Engineering from University of Melbourne, Australia (2012). He has over 10 years of lecturing experience in chemical engineering field especially in waste management, energy, environment and industrial process engineering. He used to be in the industry as a process engineer at battery manufacturing company in year 2001. He is currently a senior lecturer at the Faculty of Chemical Engineering, Universiti Teknologi MARA (UiTM) and holding a Deputy Dean (Research & Industrial Linkages) position at the for the past 2 years and previously appointed as Deputy Dean (Student Affairs) in year 2013. He is appointed as a resource person for waste management and environment courses at the faculty. His areas of research interest are Green Engineering, Energy and Environment, Biomass conversion, Coal cleaning technology, Waste Management and Occupational Safety and Health. He managed to secure almost 10 national research grants either as principal investigator or project member in the past 10 years of service in UiTM that accounted close to RM 1 million in total. He published in total almost 50 journals, conference papers and chapter in book. Apart from that, he also received close to 20 research awards national and international. He is also an associate member of the Institution of Chemical Engineers (IChemE), UK and graduate member of Board of Engineer (BEM). He also involved in several consultancy projects and also as one of the trainers in an operator training program courses for various industries such as Emery Oleochemical (M) Sdn Bhd.
**Dr. Najmiddin Yaakob** holds a B.Eng. Degree (Hons) in Chemical Engineering from Universiti Teknologi Malaysia (2003), a M.Sc. in Chemical Engineering (Corrosion) from Universiti Teknologi MARA (2007) and a Ph.D in Chemical Engineering from Institute for Corrosion and Multiphase Technology, Ohio University, USA (2015). He has over 10 years of lecturing experience in chemical engineering field especially in process separation, reaction engineering and pipeline corrosion. He used to be in the industry as R&D Engineer in the year 2004. He is currently a senior lecturer at the Faculty of Chemical Engineering, Universiti Teknologi MARA (UiTM) and currently holding a Deputy Dean (Student Affairs) position at the faculty and previously appointed as Head of Oil and Gas Engineering Studies Center in year 2015. His areas of research interest are mainly in the oil and gas pipeline corrosion. He has involved in various pipeline corrosion problem mainly from the oil and gas industries such as Petronas, PTTEP, Chevron which includes top of the line corrosion in sweet and sour environment, sour corrosion mechanism, elemental sulfur corrosion in sour glycolic environment, elemental sulfur corrosion mitigation by using sulfur solvent and inhibitor and corrosion inhibitor/coating from palm oil based. He is also an associate member of the Institution of Chemical Engineers (IChemE), UK, graduate member of Board of Engineer (BEM) and also the committee member of National Association Corrosion Engineers (NACE) International Malaysian Section.

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**Atikah Kadri** started her career as an academician in the Faculty of Chemical Engineering, Universiti Teknologi MARA after earning MSc. Engineering from University Malaya in 2003. Prior to that she attended The University of Sheffield, UK where she graduated in B. Eng. (Hons.) Chemical and Process Engineering in 1998. Her passion in nanotechnology brought her to The University of Queensland Australia where she was attached to Australian Institute for Bioengineering and Nanotechnology (AIBN) and soon awarded PhD in Advanced Materials Engineering in 2013. She received Best Oral Presentation by an Early Career Researcher (Runner-up) in OzCarbon2012 an annual conference for Australian Carbon Society. Serves as an active member of Nanomaterial and Catalyst special interest group, she expended her research area to hydrides hydrogen storage, nano-catalysts and nano-enzyme technology in extraction. Apart from actively involved in collaboration and consultation work she is also an associate member of the Energy Institute.

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Siti Wahidah Binti Puasa was born in Melaka, Malaysia, in 1981. She received her B.E. degree in Chemical Engineering and Master of Science (Chemical Engineering) at the School of Chemical Engineering, Universiti Sains Malaysia in 2004 and 2006, respectively and Ph.D degree in Chemical Engineering (Separation Technology) at the Faculty of Chemical Engineering, Universiti Teknologi MARA in 2016. In July 2006, she joined the Faculty of Chemical Engineering, Universiti Teknologi MARA Shah Alam as a lecturer. Her areas of research are membrane separation, wastewater treatment process and surfactant technology.

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Nor Roslina Rosli graduated with a B.Eng (Hons) Chemical Engineering from Universiti Teknologi Malaysia in 2002. After a brief working experience as a Environmental Process Engineer at an engineering consulting firm, she decided to move into the academic career. Having awarded a scholarship to pursue her studies at Universiti Kebangsaan Malaysia, she graduated with a M.Sc in Chemical and Process Engineering. She then accepted a job as a Lecturer at Universiti Teknologi MARA, Shah Alam in 2005 at the Faculty of Chemical Engineering. Having various different field of research interest, including natural product extraction and supercritical fluid technology, her latest passion is corrosion science. Her investigation on sweet corrosion of steel under CO2-EOR conditions has earned her a PhD in Chemical Engineering from Ohio University (USA) in 2015. She is currently a Senior Lecturer and the Head of Studies Center for the Oil and Gas Engineering Department in UiTM Shah Alam.

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Fazlena Hamzah joined the Faculty of Chemical Engineering, Universiti Teknologi MARA as a lecturer in 2010. She received the B.E. Degree in Chemical Engineering and Master of Science from the Universiti Sains Malaysia (USM), Malaysia, in 2002 and 2005,respectively. After 2 years academic experience at Universiti Kuala Lumpur (UniKL-Micet), she is pursuing PhD degrees in Chemical Engineering (Bioprocessing) at Universiti Teknologi Malaysia (UTM) and graduated in 2013. Since June 2012, she has been with the Bioprocess Engineering studies center, FKK-UITM, as a Head of studies center. Her current research interests include carbon sequestration, enzymatic membrane reactor, activated carbon, bioconversion, natural colour extract and enzymatic biosensor. Dr. Fazlena is a Associate Member of The Institution of Chemical Engineers (IChemE) and member of the Science and Engineering Institute (SCIEI).

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Dr. Siti Shawalliah Idris was born in Kuala Lumpur in 1976. She obtained her first degree in Chemical Engineering from the University of Leeds, United Kingdom in 1999. She was awarded with a Master of Science degree in Advanced Chemical Process Design from the University of Manchester (formerly known as UMIST), United Kingdom in 2004. Later, in 2015, she received her Doctorate in Chemical Engineering (Biomass Energy) from the Universiti Teknologi MARA, Malaysia. She joined SNC Industrial Laminates Sdn Bhd based in Pasir Gudang, Johore in 1999 as a Quality Assurance Engineer. She then reported duty at Seagate Penang (M) Ltd, as ESD and Contamination Control Engineer on October 2000. Her career as an academician started in October 2001, when she joined the Universiti Teknologi MARA (UiTM) as a contract lecturer at the Department of Chemical Engineering, Faculty of Mechanical Engineering, for a duration of two years. She joined the Faculty of Chemical Engineering at the end of 2004, upon receiving her Master degree and currently serves the faculty as a Senior Lecturer. She had held several management post and currently is the Head of Postgraduate Studies for the Faculty of Chemical Engineering, UiTM. Her research interest is on energy-based research particularly on renewable energy involving conversion technique from waste to wealth and green materials. Besides that her interest also evolved around chemical process design especially in process integration. She did not limit herself in these areas and continuing to explore current research trends and opportunities. Her active involvement in research is proved from the number of research grants obtained since she started her involvement in research actively around 2010. To date, she has secured a total grant of RM 600,000 as a leader and members of the research grants. The outcome from the research had awarded her several research awards from UiTM and National level competition. The research product has also been filed for patent. The research activities include collaboration between other university and industry such as Sime Darby Research, JKR and Waris Nove Sdn Bhd. As an academician, Dr. Siti Shawalliah also actively involved in supervising postgraduate students and has written several high impact journal articles. Dr. Siti Shawalliah is a Member of the Energy Institute, UK, and an Associate Member of Institute of Chemical Engineers, UK.

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Kamariah Noor Ismail is currently a senior lecturer at Faculty of Chemical Engineering, Universiti Teknologi MARA (UiTM). She received her First Class BSc (Hons) in Chemistry from National University of Malaysia (UKM) in 1992. She was awarded the Royal Academic Medal for her outstanding academic and co-curriculum performance. She was also awarded the Royal Chemistry Society of Malayian Section medal in that year. She then pursued her MSc (Eng) in Process Control with a research title of The Model Based Control of Mass Transfer in Agitated Gas-Liquid Mixture in 1993 at University of Leeds, UK under SIRIM sponsorship. She joined SIRIM as a Researcher in 1994 until 2001. Within this 7 years, she has gained a numerous of research and consultancy works. Among her significance achievements, she has involved as a technical committee of two commercialization projects between SIRIM Bhd and DMIB (M) Berhad: the first project was the Development of Internal Tyre Lubricant for DMIB Berhad and has been commercialized through Outright Technology Transfer in 1998 at cost of RM 500,000.00. The second project was the Development of Anti Tack for DMIB Berhad and successfully commercialized in 2001 at cost of RM 200,000.00. In 1997, she has joined short term research attachment on Optical Fibre Chemical Sensor for Carbon
Monoxide at UMIST, United Kingdom which was sponsored by Asean Development Bank (ADB). Associate Prof Dr Kamariah joined UiTM at the end of 2001 and received her PhD in Chemical Engineering from the same university in 2009. Her main research interests are heterogeneous catalyst technology for toxic gas pollution abatement and palm oil cracking, advanced materials development and waste water treatment. As part of an academic contributions to the university and national, she was appointed as an external examiner of PETRONAS Technology Institute (2010-2012). She was also appointed as examiner for matriculation chemistry paper by Malaysian Education Ministry Department in year 2011. Currently she is a Head of Quality and actively involved in research supervision for undergraduates and postgraduate students. Since 2005 until now, she has granted numbers of research grants at amount of more than RM 800,000.00. She is now registered as associate member of Malaysian Institute of Chemistry (AMIC).

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Norin Zamiah binti Kassim Shaari completed her PhD in Mass transfer/Membrane Separation at the Faculty of Chemical Engineering, Universiti Teknologi MARA in 2015. She received her Master of Engineering (Chemical) at the Faculty of Engineering and Build Environment, Universiti Kebangsaan Malaysia in 2006. She was a research officer in Malaysian Palm Oil Board (MPOB) from 1999 to 2008 before joining Universiti Teknologi MARA as a lecturer in June 2008. In MPOB, she conducted researches particularly to produce value-added products from palm oil such as polymer (polyol and polyurethane), surfactant (sulphonated methyl ester) and polyglycerols. The work scope covers laboratory production and upgrading the process to a pilot plant scale. She has published a patent, US Patent 8,404,904 on 26 March 2013 entitled Process for reducing color of a polyglycerol. Her area of researches are membrane separation, oleochemicals, novel polymer material and value-added products from palm oil. She has been awarded with a Fundamental Research Grant Scheme with the amount of RM 52,000.00 (28 Mac 2010 – 28 August 2013) for a research entitled Formulation of nano hybrid membrane for ion separation and with the same grant scheme in the amount of RM 74,180.00 (June 2014 – December 2016) for a research entitled Formulation of a thin film composite with a hybrid membrane as the barrier layer for heavy metal removal. Besides publishing the research findings in Scopus-indexed conference proceedings, she has produced few articles in Journal of Oil Palm Research (Volume 16 and 18) and in Journal of Advanced Research in Material Sciences (Volume 8).
I was formally trained as chemical engineer, graduating with a BSc (Hons) in Chemical Engineering from Loughborough University, UK in 1980, and PhD from University of Surrey in 1985. Except for a 10-year stint in industry, all my working years have been in universities involving teaching and research. My current research is on the complete sequestration of CO₂ waste gas, by feeding it through a permeation membrane to a microalgae culture growing by photosynthesis in palm oil mill effluent under sunlight, in an expanding volume fed-batch paddle-stirred raceway bioreactor, as part of a zero-waste palm oil processing concept. At the same time I am venturing into the area of standardisation of nutraceuticals production for use in health foods, using anaerobic fermentation as the platform technology. Of particular interest is the potential of the anaerobic fermentation products of some local plants and fruits as health foods which are beneficial for dengue patients.

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Ku Halim Ku Hamid is a professor of Faculty of Chemical Engineering, Universiti Teknologi MARA, Shah Alam, Selangor, Malaysia. He received degrees of BSc and MSc from Universiti Kebangsaan Malaysia and PhD from The University of Sheffield, UK. His research interest are catalysts and catalysis, waste management, green energy, biotechnology, advanced material, natural product extraction and integrated biological treatment of wastewater. He had published about 250 technical papers, owned 26 of patents and received more than 200 of invention and innovation awards from various parts of the world including award from World Intellectual Property Organization (WIPO). He was also appointed as technical committees and expert panel in various government agencies of Malaysia such as Ministry of Higher Learning Education, Ministry of Science, Technology and Innovation and Ministry of Urban Wellbeing, Housing and Local Authority. He is also the co-author of the book; Smart Advisory System Application for Hazardous Waste Management, published by Lambert Academic Publishing. Prof. Ku Halim also aggressively involved in commercialization of research products and closely worked some industries in Malaysia such as Proton Berhad, Picorp Berhad, Perfect Triangle Sdn Bhd, Southern Farm Valley Sdn Bhd, Petroclamp Sdn Bhd, Jauha Sdn Bhd, Shah Alam City Council, Ikhlas Resmi Sdn Bhd etc. His relationship with industries is to comprehend the needs of commercial features and inculcate in his R&D activities. Besides that, he has supervised more than 70 postgraduate students and being appointed as external examiners from various universities. He also was a moderator of TV program called INOVASI (Innovation and Invention Program) for about one and half years since 2002 and has been working with a company in Saudi Arabia as a consultant of sewage treatment from 2006 to 2010

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Mohammad Asadullah studied BSc., (Hons) and MSc. in Applied Chemistry and Chemical Technology at Rajshahi University Bangladesh. He secured First Class First Position in both of the degrees. He received his PhD. Degree from Kyushu University, Japan in 2000. He joined as a lecturer in January, 1994 at Rajshahi University, Bangladesh. In April 2000, he joined as a postdoctoral research fellow at Tokyo University to do research on biomass gasification. From March 2003 to 2007, he has worked as Associate and full Professor at Rajshahi University. From May 2008 to November 2010, he worked as a Senior Research Fellow at Fuels and Energy Technology Institute (FETI) under the Department of Chemical Engineering at Curtin University, Australia. Since December 2010, he has been working as a Professor in the Faculty of Chemical Engineering, Universiti Teknologi Mara, Malaysia. He has published 160 high impact research papers, two book chapters, and 3 patents from his research. His research areas are biomass gasification, pyrolysis and terrefaction, MSW gasification for power generation, Biorefinery, Catalyst development for tar reforming and hydrocarbon processing, Pressure swing adsorption for carbon dioxide separation, Heavy metal removal from water. He have several on going project with industry partner such as pilot gasification of biomass and MSW for power generation at UiTM (PRGS Project), pilot gasification for clean syngas production at SIRIM, Shah Alam and Pilot Vacuum Pressure Swing Adsorption (VPSA) at TNBR (Collaboration Project). He won a number of awards such as at 25th IITEX-2014, Gold Medal Award (1),Invention, Innovation and Design Exhibition 2014 (IIDEX-2014) Gold Medal Award (2),Curtin Commercial Innovation Award, 2010 (AUD 20,000.00), University Grants Commission (UGC) Gold Medal Award for distinguished research, 2007.Japan Petroleum Institute Award for a distinguished paper, 2004, Akbar Hossain Prize for placing the First-Class First position in BSc. (Honors), 1990 and Akbar Hossain Prize for placing the First-Class First position in MSc., 1991. He is a Chartered Engineer, Fellow of energy Institute, London,Member – Chemical Society of Japan. Life member – Chemical Society of Bangladesh, Member – Bangladesh Academy of Sciences and Member – Renewable Energy Forum in Bangladesh.

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SHARIFAH AISHAH SYED A KADIR , PhD CEng FIChemE holds a B.Sc Degree in Chemical Engineering from Salford University, UK (1981) and PhD in Chemical Engineering from Leeds University, UK (1995). She has over 30 years of experience in solid waste management technologies such as incineration,composting,materials Recycle and Reuse and other waste management such as pollution Control, Mercury Emission, and heavy metals control municipal waste treatments production. She was a visiting Scientist to Kyoto in November 2015.

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Abdul Hadi was born in Aceh, Indonesia, in 1969. He received the B.E. degree in Chemical Engineering from the University of Syiah Kuala, Banda Aceh, Indonesia, in 1995, and the M.Eng.Sc. degree in Materials Engineering and Ph.D. degree in Nanomaterials from the University of Malaya (UM) Kuala Lumpur, Malaysia, in 2004 and 2008, respectively. In 2010, he joined the Faculty of Chemical Engineering, Universiti Teknologi MARA, Shah Alam, Malaysia, as a Senior Lecturer. His current research interests include Nanocatalyst for automotive emissions control, Nanostructured materials, Nanocatalysts for biofuel processing, Nano advanced Materials. He has published many articles in the area of nanotechnology in indexed journals and conferences. He was the member of Energy Institute (IE, UK), Institution of Chemical Engineering (IChemE, UK), Indonesian Nanotechnology Society and Indonesian Catalysis Society.

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Ayub Md. Som, PhD CEng FIChemE holds a B.Sc Degree in Chemical Engineering from Mississippi State University, Mississippi, USA (1986), a M.Sc. in Chemical Engineering from University of Manchester (formerly known UMIST), UK (1995) and a PhD in Environmental Engineering from University of Southampton, UK (1998). He has over 28 years of experience in industrial wastewater treatment, spanning from the design, construction and commissioning of the plants, having previously worked in the production and consulting firms such as IOI Oleo-chemicals (formerly known as Pan Century Edible Oils Sdn Bhd), MARDEC Engineering Sdn Bhd, and Lankhorst Environmental Services Sdn Bhd. He had formerly served as a lecturer at UKM (1998 – 2005). He later joined UiTM in June 2005 which he then held several key management positions such as Head of Program (2007-2008), Deputy Dean in Research & Industrial Linkages (2011), Deputy Dean of Academic Affairs (2012) and Dean of the Faculty of Chemical Engineering, UiTM (2013-2015). He is still attached as an Associate Professor at the Faculty, teaching massive courses related to Environmental Engineering as well as carrying out and supervising related research projects pertaining to process systems engineering, expert systems modelling, artificial pancreas algorithm, plant-based coagulants, green solvents and wastewater engineering. He is a Chartered Chemical Engineer registered with the Engineering Council, UK, a Fellow Member of Institution of Chemical Engineers (IChemE), UK and a Companion Member of the Institution of Engineers, Malaysia (IEM). He has also spent a few years abroad as a Visiting Academic carrying out postdoctoral research at Department of Chemical Engineering, Imperial College London, UK (2009-2010) and as a Visiting Research Scientist at School of Postgraduate Studies, Kyoto University, Japan (2006). He has currently been appointed as a Research Fellow at Accounting Research Institute (ARI as Higher Institution Centre of Excellence, HiCOE), UiTM since 1 February 2016 for the period of 3 years. He will assist ARI in developing decision support system (DSS) software for ARI niche area, i.e. Islamic Financial Criminology for fast commercialisation.

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Junaidah Jai was born in Klang, Selangor on July 8, 1967. She received the B.Sc. degrees from National University of Malaysia, Bangi, Malaysia in 1992 and her M.Sc., and Ph.D from Universiti Teknologi MARA in 2005 and 2010, respectively. She joined SIRIM Berhad as research officer in 1993. Since 2001, she has been with the Faculty of Chemical Engineering, Universiti Teknologi MARA, where she is currently a lecturer. Her main areas of research interest are corrosion inhibitor, metal composites, synthesis of nanoparticle by green method and encapsulation of essential oils. She is a associate member of the Institute of Chemical Engineers of Malaysia, graduate member for Board of Engineers Malaysia and Institute of Engineers Malaysia.

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Md Amin Hashim is a chemical engineering graduate from the University of Malaya, he then proceeded to the University of Manchester Institute of Science and Technology (UMIST) to undertake a Master Degree in Corrosion Science and Engineering. Later, he continued his study at the School of Mineral Resources, Mining and Materials, Engineering Campus, Universiti Sains Malaysia in Reliability Testing of Lead-containing and Lead-Free Solder Alloys for Integrated Chips Packaging. Prior to his appointment to UiTM, Dr. Md Amin had years of experience and exposure as a researcher at Advanced Materials Research Centre (AMREC), SIRIM Berhad. He holds a Malaysian Patent (2010) in the development of Resin Free SAC305 Solder Paste for IC Packaging. His current research interest include development and efficiency enhancement of PFAD-derived adsorption type of corrosion inhibitors, development of lead-free solder paste for Ball Grid Array (BGA) construction, and development and fabrication of organic and inorganic nanowires for bio-sensors.

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Fauziah Marpani was born in Johore, Malaysia, in 1980. She received the B.E. (hons) degree and MSc. in chemical engineering from the Universiti Teknologi MARA, Malaysia, in 2004 and 2008 respectively. In 2008, she was first appointed as a lecturer in the Faculty of Chemical Engineering, Universiti Teknologi MARA. She pursued her PhD studies in Center of Biochemical Engineering, Technical University of Denmark, Lyngby, Denmark in 2012 and graduated 4 years later. Her research interests include reactive separation technology via membrane bioreactor, biocatalysis, membrane technology, enzyme immobilization, powder technology and fluidization. Currently, she is investigating the conversion of carbon dioxide to methanol via multienzyme catalysis of dehydrogenases. The enzymes are immobilize in/on polymer membrane to achieve a simultaneous reaction and product separation.

Istikamah Subuki received the Chemical Engineering degree and the PhD degree in Mechanical Engineering from the Universiti Teknologi MARA (UiTM) Shah Alam, Malaysia in 2004 and 2010 respectively. From 2007 to 2010, she was the researcher of the Advanced Materials Research Center (AMREC), SIRIM Berhad. She is currently a Senior Lecturer in the Faculty of Chemical Engineering, UiTM Shah Alam. Her current research interests are in advanced materials (synthesize Hydroxyapatite powder, composite and Injection Moulding process)
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System and Industrial process engineering. He completed his PhD in Chemical Engineering (in Process Safety and Loss Prevention) from University Technology of PETRONAS, 2013. Currently he has holding an Occupational Safety and Health Management Representatives (OSHMR) or Deputy Chairman of SOSHCO position at the faculty for the past 4 years and previously appointed as Safety Officer in year 2006. Dr. Zulkifli’s research interest involved various aspects of process safety and loss prevention with specialization in quantitative of risk assessment, risk management decisions, accident modeling and prevention, inherent safety, risk based decision and transportation risk analysis. Dr Zulkifli other areas of research interest are Green Engineering, Energy and Environment, Air Pollution Engineering, Waste Management and Wastewater Design Engineering. Dr Zulkifli has also involved in various projects such as assessment RDF technology for KPKT, Development of Total Maximum Daily Load (TMDL) Database for Sungai Langat for Jabatan Alam Sekitar Malaysia (JAS), DOSH Contract Research on Malaysia Safety Health Marking for NIOSH, perform engineering, technical services and consultation in undertaking the development of reports such as CIMAH Safety Reports as required by the law, conducting risk assessment such as Consequences Analysis (Fire, Explosion, Toxic release) Quantitative Risk Assessment, developing plans and studies e.g Emergency Response Plans, Safety and Risk Studies for Global Offshore Consultancy Sdn Bhd, and I-Sharp Integrated Sdn Bhd. Dr Zulkifli is an associate member of IChemE, UK (99919241), registered graduate member (chemical engineer) to Board of Engineers Malaysia, and Safety and Health Officer (SHO) competence (SHO3114-J) and CIMAH competent registered to DOSH (OKMH: HQ/16/MH/00/201).

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- Conventional and unconventional EOR
- CO2 sequestration in aquifers
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Her main areas of research interest are separation technology, drying technology, and wastewater treatment. She also interested in ‘waste to wealth’ invention’s research. Various awards of invention have been received throughout her career from university, national and also international level.

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Siti Nurliyana is a researcher and academic lecturer attached to the Department of Oil and Gas Engineering, UiTM Shah Alam, Malaysia. She holds a Bachelor's degree in Chemical Engineering and Master's degree in Petroleum Engineering from The University of Adelaide, Australia. Siti's research areas and interest include the EOR techniques and petroleum reservoir engineering.

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Syafiza was born in Selangor, on February 23rd, 1977. She received Bachelor Degree in Chemical Engineering in 2000 from Universiti Teknologi Malaysia (UTM), and the M.Tech. in Environmental from Universiti Putra Malaysia (UPM) in 2008. Upon graduated from UTM in 2000, she joined Johan Ceramics Berhad in Negeri Sembilan as a Quality Assurance Executive before joining ICI Paints (Malaysia) Sdn Bhd as Training Executive in 2004. Her job includes maintaining the quality assurance of product quality and certification to ISO9001:2000. Later she was offered a position as an Academic Quality Assurance Executive in Universiti Kuala Lumpur Malaysian Institute of Chemical & Bioengineering Technology (UniKL MICET). During her time in MICET, she pursue study on master degree where she was offered again a position as a project engineer by the company she attached for the master research project. She accepted the offer by Kyoto Energy Pvt Ltd in 2006 and become the Clean Development Mechanism (CDM) Executive where she handled various project involving CDM in Malaysia including composting of empty fruit bunches, biogas recovery and biomass boiler. Since July 2009, she has been a Lecturer with the Department of Chemical Engineering Process, Universiti Teknologi MARA (UiTM). Her current research interests include process separation including spray drying, electrospray of nanomaterial, adsorption and food technology. Syafiza is a member of The Institution of Engineers, Malaysia (IEM), The Institution of Chemical Engineers.
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Munawar Zaman Shahruddin is a graduate of Chemical Engineering from Universiti Kebangsaan Malaysia. Then he pursued his master degree by research in Universiti Teknologi MARA (UiTM) under the Faculty of Chemical Engineering. Since then, he is consistently involved in membrane separation research mainly on wastewater treatment using polymeric composite membrane. The research on the wastewater treatment was funded by Exxon Mobil Grant in 2009. Upon completion in 2011, he serve UiTM as a lecture and continues his research activities for UiTM undergraduate final year projects. He is also actively involved in the research for other disciplines such as coal-bio oil slurry for alternative fuel, extraction of agarwood, enhanced oil recovery and drilling fluid. In the near future, he plan to further his PhD degree in Oil and Gas related environmental studies and expand his consultation work in the area.
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1- PRODUCTION PLANT FOR EDUCATIONAL TRAINING SYSTEM

The common part of the programme consists on the one hand of basic knowledge, insights and skills in the areas of production, transformation, preservation, marketing and consumption of industrial products. On the other hand, it contains a practically oriented component that enables the alumni to identify problems by means of quantitative and qualitative research methods and analytical techniques, to assess and rank causes, and to plan, to execute and to evaluate appropriate interventions.

2- COURSE FOR PROFESSIONAL CONSEQUENCES QUANTITATIVE RISK ASSESSOR (CQRAM1) IN THE INSTALLATION OF MAJOR HAZARDOUS MATERIAL IN INDUSTRIAL PLANT - PART 1

All processes have a risk potential. In order to manage risks effectively, they must be estimated. Management systems such as engineering codes, checklists and process safety management (PSM) provide layers of protection against accidents. However, the potential for serious incidents cannot be totally eliminated. Various consequences effect could be experienced by the operator and the surroundings in the operation of hazardous materials facility which need to be considered before the correct decision can be made. Therefore CQRA provides a quantitative method to evaluate risk and to identify areas for cost-effective risk reduction. In Malaysia, a law was provided to prohibit any settlement, installation of major hazardous material facility prior to a detail risk assessment. Therefore, adequate knowledge, ability to predict, recognize and analyze important risk are vitals especially for personnel, decision maker or department involved to approve chemical process facility involving explosive, flammable and toxic materials. This is to ensure that an appropriate steps to control and prevention accident could be done at the preliminary stage of plant design. For the operators, they will be able to monitor the process industry production effectively and competently, able to identify and choose the most suitable criteria to achieve the best and consistent plant operation condition in daily and during a plant maintenance. Besides that, the operators were not only become knowledgeable and able to comply to the related law, but they also able to predict short term and long term effects of any development project and activity. This may avoid unfavorable effects to the plant and environment. In other words they can become smart decision maker, independent, confident, free to give opinion related to industrial risk and will not totally rely on the consultant reports and justification.

3- COURSE FOR PROFESSIONAL CONSEQUENCES QUANTITATIVE RISK ASSESSOR (CQRAM2) IN THE INSTALLATION OF MAJOR HAZARDOUS MATERIAL IN INDUSTRIAL PLANT - PART II

Hazard risk analysis techniques such as HAZOP, F&EI and CEI are commonly used as a tool for hazard identification and risk management. However, there are few reasons contributing to the misunderstanding of the approaches, the main reasons are lacked of awareness of the concept, especially by designers, decision maker, regulatory bodies and project leaders; the lack of recognized most suitable methodology to review the agreement of different process alternatives. Till to date, applications of these risk assessment principles became more challenging aspect when the result analysis and evaluation were mandatory in the endorsement and approval of any major hazard facilities installation. Therefore, capability to apply Quantitative Risk Assessment (QRA) tool for determining the risk from major hazard activities will
provide the assessor authorities with relevant information to enable decides on the acceptability of risk related to developments on site, or around the establishment or transport route. This may avoid unfavorable effects to the plant and environment. In other words they can become smart decision maker; independent, confident, free to give opinion related to industrial risk and will not totally rely on the consultant reports and justification.

4- COURSE FOR ENVIRONMENTAL PROFESSIONAL ON CONTROL FORMATION OF DIOXINS AND FURANS IN FLUE GAS EMISSIONS FROM INCINERATOR (CDAFEI)

The most toxic compounds released from the flue gas resulting from the incomplete combustion process are dibenzo-p-dioxins (dioxins) and dibenzofurans (furans). These two toxic compounds are organochloride aromatic compounds containing covalently bonded chlorine atoms. Chlorinated dioxins and furans are one of the family members of complex chemicals containing chlorine atoms, which include several hundred of chemicals. These chemicals can be subdivided into three closely related sub-families: the chlorinated dibenzo-p-dioxins, chlorinated dibenzofurans and some polychlorinated biphenyls (PCB). They are some of the most toxic or unwanted by-products of combustion gases as well as from several industrial chemical processes. They are also the most notorious pollutants associated with incinerators, and can be found in emissions from the combustion of municipal solid wastes, clinical wastes, and sewage sludge.

In order to prevent and control the formation of dioxins and furans during combustion in incinerator, the incinerator operators or engineers must understand the process and to control incineration parameters. The success of the operation of an incinerator is primarily in the hands of the operator. A knowledgeable and skilled operator or supervisor knows how to monitor the processes occurring in an incineration, understands what factors affect the formation of dioxins and incinerator performance, knows what operational conditions is the best way for prevent formation of dioxins during combustion. Successful operation of an incinerator is an integral part of the operation of a successful industry. A trained and skilled incinerator operators especially knew in optimizing combustion processes will to reduce operating costs as well as reduce air pollution released to environment. Good environmental performance does not only portray positive corporate image, but avoids possibility of factory downtime and hefty monetary penalties due to legal actions from the environmental authority. The industries must pay great attention to the training of their staff in the proper operation and maintenance of incinerator. A Certificate of Competency will be awarded to a participant who successfully completes the course.

5- COURSE FOR ENVIRONMENTAL PROFESSIONAL ON SOLID WASTE: DEFINITION, CHARACTERISTICS, MANAGEMENT AND ITS ENGINEERING SYSTEM (CWES)

Solid wastes are all the wastes arising from activities that are normally discarded as useless or unwanted. It is important that all terms used and solid waste handling to be clearly defined and understood to avoid confusion. Generally, solid wastes encompass the heterogeneous mass of throwaways of residences and commercial activities as well as the more homogeneous accumulations of a single industrial activity. Besides the introduction of correct terminologies used in this subject, the first objective of this course is to identify various types of solid wastes and sources. It’s then followed by the standard method to examine the physical and chemical composition of the wastes. Lastly, management of these wastes from the point of generation to the final disposal, including the waste reduction activities at the processing stage would be accomplished. Example of good management practices of the wastes would be carried out and open discussion would be conducted to sharpen the knowledge of participants where innovative ideas could be generated.

6- COURSE FOR ENVIRONMENTAL PROFESSIONAL ON WASTE AND ENVIRONMENTAL MANAGEMENT IN PALM OIL INDUSTRIAL SECTORS (CPOIS)

Managing wastes from oil palm industry encompasses environmental impacts of the palm oil manufacturing process and waste water generated; which are mainly decanter cake, empty fruit bunches, seed shells and fibre from mesocarp. Hence there is an urgent need for a sustainable waste management system to tackle this waste. As these wastes are organic in origin,
they are rich in plants nutrients, Air pollution, climate change, liquid wastes as Crude Oil (CPO), Crude Palm Kernel Oil (CPKO), Palm Oil Mill Effluent (POME) and Solid Waste, Empty Fruit Bunches (EFB), Oil Palm Shells (OPS), Oil Palm Fibre (OPF) will also be discussed. The various ways the wastes can be put to use especially in terms of energy generation, fuel substitutes in the boilers environmental management systems with regards to Biological Oxygen Demand (BOD) and Suspended Solids (SS) were reviewed. This course discusses on the wastes generated from palm oil industries and the treatments involve in treating the wastes. In addition, topics on waste utilization and management would also be discussed.

7- COURSE FOR ENVIRONMENTAL PROFESSIONAL ON WASTE AND ENVIRONMENTAL MANAGEMENT IN POLYMER INDUSTRIES (CPOI)

Increasing volumes of synthetic polymers are manufactured for various applications. The disposal of the used materials is becoming a serious problem. Unlike natural polymers, most synthetic macromolecules cannot be assimilated by microorganisms. Although polymers represent slightly over 10% of total municipal waste, the problem of nonbiodegradability is highlighted by overflowing landfills, polluted marine waters, and unsightly litter. The government will greatly limit the use of polymers in large volume applications unless acceptable means of waste management are available. Total management of polymer wastes requires complementary combinations of biodegradation, incineration, and recycling. This course covers the waste streams from polymer industries, the feasibility of the waste management policy and regulations, physical, chemical, thermal treatments and disposal methods of polymer wastes. Industry specific topics of plastic recycling and reprocessing of thermoplastic recyclates will also be covered.

8- COURSE FOR ENVIRONMENTAL PROFESSIONAL ON WASTE AND ENVIRONMENTAL MANAGEMENT IN PETROCHEMICAL INDUSTRIES (CPI)

The global chemical and petroleum industries have always had the challenge of disposing of chemical wastes, by-products, and residuals, but with traditional techniques such as deep well injection and incineration proving flawed, the need for disposal by legal, safe and economically effective means has never been greater. Increasingly, the need to produce without pollution is the preferred model for industry, and the strategy of waste minimization is seen as the best way forward. This is particularly relevant in the petrochemical and chemical industries, where large quantities of hazardous and toxic wastes are produced which can pose formidable disposal problems. Topics covered include recognizing waste streams and its distribution, wastes effect to the environment and regulation involved, waste management and pollution prevention policy, physical, chemical, thermal treatments and disposal methods of wastes. Industry specific topics (petroleum and petrochemical) cover the major sources of pollution related and ways for mitigation.

9- COURSE FOR ENVIRONMENTAL PROFESSIONAL ON ADVANCED BIOLOGICAL TREATMENT SYSTEM: DESIGN, OPERATION, MAINTENANCE AND INSPECTION (CABIOTS)

Industrial wastewater is always perceived as having categorized as medium or high strength wastewater due to presence of high content of its organic and/or inorganic compounds. Malaysia produces products either for domestic consumption or export which are purely based on industries namely; palm oil, rubber, food processing, textile, oil & gas, brewery, distillery, diary, tannery, slaughterhouse, etc. As a result, the country would have to face enormous challenges in dealing with water pollution generated by the industries so as to make these products sustainable for the future national economic growth. Massive industrial effluents discharged from these industries, if not being treated properly, would be detrimental to the environment and stricter enforcement has to be implemented to mitigate this through on site treatment as stipulated by the Department of Environment (DOE), Malaysia. In the literature, many researches have proven that physico-chemical treatment alone could not be sufficient to reduce pollutant loads generated by these industries; furthermore, most of these contain organic fractions which are biodegradable and require biological treatment processes to further degrade them prior to discharge into the main stream. This course attempts to give in-depth fundamental knowledge
of advanced biological wastewater treatment systems, not only covering on design aspects but also on operation, maintenance, trouble-shooting and inspection of the industrial wastewater treatment plant.

10- COURSE FOR ENVIRONMENTAL PROFESIONAL ON SOLID WASTE: DEFINATION, CHARACTERISTIC, MANAGEMENT AND ITS ENGINEERING SYSTEM (CWES)

Solid wastes are all the wastes arising from activities that are normally discarded as useless or unwanted. It is important that all terms used and solid waste handling to be clearly defined and understood to avoid confusion. Generally, solid wastes encompass the heterogeneous mass of throwaways of residences and commercial activities as well as the more homogeneous accumulations of a single industrial activity. Besides the introduction of correct terminologies used in this subject, the first objective of this course is to identify various types of solid wastes and sources. It’s then followed by the standard method to examine the physical and chemical composition of the wastes. Lastly, management of these wastes by from the point of generation to the final disposal, including the waste reduction activities at the processing stage would be accomplished. Example of good management practices of the wastes would be carried out and open discussion would be conducted to sharpen the knowledge of participants where innovative ideas could be generated.

11- FLOW ASSURANCE WORKSHOP

Flow assurance in the oil and gas refers to the systems put in place to guarantee and secure a continuous flow of hydrocarbon from the reservoir to surface facilities and eventually to refineries. Historically, these systems were introduced to producing nature fields as a reactive mechanism to the impedance of flow. However, now it is critical to have flow assurance strategies design at the field development stage to counter the challenges anticipated during the different production stage as the fields matures. Developing a robust flow assurance strategy needs an integration between many engineering disciplines such as petroleum, chemical, mechanical, process software and instrumentations engineers. The industry should recognize flow assurance as an essential building block of a filed development plan that can influence design, cost and schedule. Hence, this workshop will discuss the latest flow assurance systems and solutions required to allow for successful continuous, cost effective and sustainable production of hydrocarbons from first oil to the abandonment of a field.

12- SOUR CORROSION MECHANISM IN OIL AND GAS PIPELINE

Pipeline transmission is the most commonly used method for oil and gas transportation due to the need to transport large volumes and since oil and gas reservoirs can be in remote offshore or onshore locations. This transportation method has been used for almost a century, acting as an economical and reliable method to transfer oil and natural gas, facilitating its further processing and fulfilling market demands. Transmission pipelines are typically tens or hundreds of kilometers in length (although some are thousands of kilometers long), and are made primarily of carbon steel. One of the challenges in the oil and gas industry is to maintain the integrity of pipelines, with a view to their having a lifespan of at least 30 to 50 years. The biggest threat to pipeline integrity that oil and gas companies face is corrosion. In the United States, it has been estimated that corrosion costs have increased up to $1372 billion per year. The internal corrosion of pipelines occurs during the transportation of fluids, usually in multiphase form and containing gaseous or liquid hydrocarbons, water or brine, acidic gases such as carbon dioxide (CO2) and hydrogen sulfide (H2S), organic acids, and often entrained solids (sand). The presence of these acidic gases and water has the potential to accelerate corrosion in pipelines which are normally made of carbon steel.

In the field, corrosion phenomena are commonly classified into two main categories: sweet and sour corrosion. Sweet corrosion refers to the corrosion that occurs in the presence of CO2, while sour environments are associated with the additional presence of H2S. As the majority of the research conducted on corrosion in pipelines is very much centered on sweet systems and a limited amount of work has been published in (H2S) environments, there are many unanswered questions relating to corrosion in H2S environments. Thus this course would emphasize on the corrosion mechanism in sour environment which focus on the top and bottom of line corrosion.
**Dr. Zulkifli Abdul Rashid** is a senior lecturer at UiTM. He attained his first degree in chemical engineering at University of Manchester Institute of Science and Technology (UMIST) UK. After graduated, Dr Zulkifli works as a project engineer and project manager for about 3 years in a few oil and gas companies. The petrochemical projects which he participated were insulation project at UCC plant in Kertih, Terengganu, fabrication and maintenance sphere tank at BP mobil in Klang, Selangor and PETRONAS, Melaka. During his service at Department of Environment (DOE), he directly involved in various enforcement activities such as prosecutor officer, assess hazardous material installation projects, river rehabilitation project evaluation, analyze the reliability and performance of industrial wastewater and air pollution control system. Whilst at DOE, Dr Zulkifli pursued his study in MSc Eng (Env Eng) at UPM and after 5 years, he joined UiTM. Dr Zulkifli holds his PhD from UTP in Process Safety and Loss Prevention. In UiTM, Dr Zulkifli involved in various projects such as assessment RDF technology for KPKT, research associated with process safety and quantitative of risk assessment, risk management decisions, major accident prevention, collaborative research in industrial safety and environmental management at local and overseas. Dr Zulkifli is an associate member of IChemE, UK (99919241), registered graduate member (chemical engineer) to Board of Engineers Malaysia, and Safety and Health Officer (SHO) competence (SHO3114-J) and CIMAH competent assessor registered to DOSH (OKMH: HQ/16/MH/00/201).

**Mr Mohd Fazril Irfan** is a lecturer of Oil & Gas Department, Faculty of Chemical Engineering, UiTM. He holds a Master Degree in Petroleum and Gas Engineering from The University of Salford, UK and Bachelor Degree in Mechanical Engineering (Materials and Petroleum) from University Technology Petronas, Malaysia. Prior to joining UiTM, he has more than three years working experience in Maintenance, Reliability and Safety fields with various oil and gas companies. He has been involved in various project design phases including Conceptual Design (CD), Front End Engineering Design (FEED) and Detailed Design (DD). His experience covers execution Reliability, Availability and Maintainability (RAM) study, Safety Critical Element Management & Establishment of Performance Standard (SCE-PS), Acoustic Induced Vibration (AIV) Analysis, Maintenance Manual Development including inspection scopes and frequencies, High Level Sparing Philosophy Establishment, Consequences Analysis and prepared the concerning reports for various clients as well as maintenance aspects in repair activities, job unit notes, engineering packages and maintenance documentation.

**Prof. Ku Halim Ku Hamid** is a professor of Faculty of Chemical Engineering at Universiti Teknologi MARA, Shah Alam, Selangor, Malaysia. He received degrees of BSc and MSc from Universiti Kebangsaan Malaysia and PhD from The University of Sheffield, UK. His research interests are catalysts and catalysis, waste management, green energy, biotechnology, advanced material, natural product extraction and integrated biological treatment of wastewater. He had published about 250 technical papers, owned 26 of patents and received more than 200 of invention and innovation awards from various parts of the world including award from World Intellectual Property Organization (WIPO). He was also appointed as technical committees and expert panel in various government agencies of Malaysia such as Ministry of Higher Learning Education, Ministry of Science, Technology and Innovation and Ministry of Urban Wellbeing, Housing and Local Authority. He is also the co-author of the book; Smart Advisory System Application for Hazardous Waste Management, published by Lambert Academic Publishing. Prof. Ku Halim also aggressively involved in commercialization of research products and closely worked in some industries in Malaysia such as Proton Berhad, Picorp Berhad, Perfect Triangle Sdn Bhd, Southern Farm Valley Sdn Bhd, Petroclamp Sdn Bhd, Jauha Sdn Bhd, Shah Alam City Council, Ikhlas Resmi Sdn Bhd, etc. His relationship with...
Dr. Safari Zainal holds a B. Sc. (Hons) Applied Chemistry and a M.Sc. in Environmental Technologies from Universiti Teknologi MARA, and a PhD in Process, Environmental and Materials Engineering from the University of Leeds, UK. After obtained MSc, he worked as research assistant in UiTM for almost 2 years, focusing in oil spill treatment using organic materials. He had over 4 years’ experience as an environmental consultant in Alam Sekitar Malaysia Sdn. Bhd (ASMA). As an environmental consultant he directly involved in various field works, monitoring, sampling and consulting customers for wastewater, noise, ambient air and stack sampling (isokinetic). For isokinetic sampling, he specialized in measured dioxins and furans as well as various parameters such as particulate matters, heavy metals and toxics gases using USEPA method for stack sampling. He involved in stack sampling, measuring dioxin and furan from cements industries, clinical wastes incinerator, municipals solid wastes incinerator and hazardous solid wastes incinerator. To gain more knowledge related to dioxin, he pursued his PhD in dioxins and furans related field entitle “Removal of dioxins from contaminated samples using supercritical water oxidation and the effectiveness of catalysts for control of dioxins emissions from waste incinerator” He also published a few journals related to dioxins. Currently he works as a senior lecturer in Faculty of Chemical Engineering, Universiti Teknologi MARA and teaches Air Pollution Engineering and Wastewater Engineering as main subjects.

Associate Professor Dr. Ayub Md. Som holds a B.Sc Degree in Chemical Engineering from Mississippi State University, Mississippi, USA (1986), a M.Sc. in Chemical Engineering from University of Manchester (formerly known UMIST), UK (1995) and a PhD in Environmental Engineering from University of Southampton, UK (1998). He has over 28 years of experience in industrial wastewater treatment, spanning from the design, construction and commissioning of the plants while previously working in the production and consulting firms such as IOI Oleochemicals (formely known as Pan Century Edible Oils Sdn Bhd), MARDEC Engineering Sdn Bhd, and Lankhorst Environmental Services Sdn Bhd. He was formerly served as a lecturer at UKM (1998 – 2005), and is currently attached as an Associate Professor at UiTM, teaching massive courses related to Environmental Engineering as well as carrying out and supervising related research projects pertaining to biological treatment systems. He is a Chartered Chemical Engineer registered with the Engineering Council, UK, a Corporate Member of Institution of Chemical Engineers (IChemE), UK and a Companion Member of the Institution of Engineers, Malaysia (IEM). He has also spent a few years abroad as a Visiting Academic carrying out postdoctoral research at Department of Chemical Engineering, Imperial College London, UK (2009-2010) and as a Visiting Research Scientist at School of Postgraduate Studies, Kyoto University, Japan (2006).

Dr. Azil Bahari Alias holds a B.Eng Degree in Chemical Engineering from Universiti Teknologi Malaysia (2001), a M.Sc. in Chemical Engineering (Energy and Environment) from Universiti Teknologi MARA, Selangor, Malaysia (2005) and a PhD in Chemical Engineering from University of Melbourne, Australia (2012). He has over 10 years of lecturing experience in chemical engineering field especially in waste management, energy and environment. He used to be in the industry as a process engineer at battery manufacturing company in year 2001. He is currently attached as senior lecturer at Universiti Teknologi MARA (UiTM), holding a deputy dean position at the Faculty of Chemical Engineering, UiTM Shah Alam for the past 3 years. He is appointed as a resource person for waste management courses in UiTM. He is also an associate member of the Institution of Chemical Engineers (IChemE), UK. He used to be involved as one of the trainers in an operator training program courses for various industries such as Emery Oleochemical Sdn Bhd.
**Associate Professor Dr. Md Amin Hashim** holds a B.Eng (Hons) Degree in Chemical Engineering from Universiti Malaya, Kuala Lumpur (1983), a M.Sc. in Corrosion Science and Engineering from University of Manchester Institute of Science and Technology (UMIST), UK (1992) and a PhD in Materials Engineering from Universiti Sains Malaysia, Pulau Pinang (2011). He has over 25 years of experience working as a researcher at SIRIM Bhd metals research centre, later the centre of excellence is known as Advanced Materials Research Centre (AMREC), located at Kulim High Tech Park, Kedah. As a researcher he had attended professional trainings in the area of metal finishing engineering under JICA programme, and Corrosion Protection of Concrete Structures in Marine Environment held at the Port and Harbour Research Institute of Japan. He had undertaken consultancy and advisory works, testing and inspection and research works in the area of corrosion inhibitors, development of Lead-free solder alloys, solder flux and solder pastes for IC packaging. And, also in the development of metallic nano-wires through electodeposition process. He was active in conducting short courses for professionals in the area of electroplating and electroplating wastewater treatment, corrosion and failure investigation works with regards to the industrial application of ferrous and non-ferrous metal alloys, especially in the area of integrated circuit (IC) packaging. He later joined the Faculty of Chemical Engineering, UiTM (2012), where he taught undergraduates subjects such as materials properties, mechanical design of process equipment, engineering polymers and process heat integration. At post-graduate level, he is supervising students in the development of corrosion inhibitors. He is a registered graduate member (Chemical Engineer) with the Board of Engineers Malaysia and an Associate Member of Institution of Chemical Engineers (IChemE), UK. He is also a graduate member of the Institute of Materials, Malaysia.

**Dr Ahmad Rafizan** is currently a senior lecturer at the Faculty of Chemical Engineering, UiTM, Pasir Gudang. He received his B. Eng (Chemical & Process) from Universiti Kebangsaan Malaysia (UKM) in 1999. He then worked as R&D technical executive at Pan Century Rubber Sdn. Bhd. before joining the QA team at SNC Industrial Laminates Sdn. Bhd in 2000. Prior to joining the academia world, he was a production manager at Pacific Activated Carbon Sdn. Bhd. until 2003. He received his MSc. in Energy and Environmental Eng. from the University of Sheffield, UK in 2004 and joined the Faculty of Chemical Engineering UiTM in 2005, becoming senior lecturer in 2010. He completed his PhD in Chemical Engineering from Imperial College London, UK in 2012. Dr. Rafizan’s research interest involved various aspects of conventional and renewable energy sources with specialization in hydrothermal upgrading of heavy hydrocarbon sources. Between 2005 and 2007 he was a technical committee member for Biomass Refinery Industrial Complex Project hosted by the Office of Science Advisor to the Prime Minister, Prime Minister’s Department. He was a registered graduate member of Board of Engineers, Malaysia (BEM), and a Chartered Chemical Engineer with UK Engineering Council, Corporate Member of IChemE, UK and a graduate member of the Institution of Engineers, Malaysia (IEM).

**Dr Rusmi Alias** received his B.Eng. in Chemical Engineering from University of Wales, Swansea in 1995 and M.Eng. in Chemical Engineering from University Kebangsaan Malaysia in 2004. Upon graduation, he has worked with several private companies for more than 10 years as an Engineer and Mill Assistant Manager. In the industry, he has been involved in the maintenance of plant equipment and machinery including boilers, steam turbine and pumping system, Dr Rusmi has been a lecturer at the Faculty of Chemical Engineering, University Teknologi MARA (UiTM) for more than 10 years and has taught various courses such as Introduction to Chemical Engineering, Fluid Mechanics, Fluid Flow, Industrial Processes, Oleochemical Technology, Thermodynamics etc. Whilst at UiTM, he completed his PhD study in Chemical Engineering and his research interest involved in various aspects of Fuel and Renewable Energy. He also has been involved in several consultancy projects with industry such as Emery Oleochemicals (M) Sdn Bhd and Schaefer Kalk (M) Sdn Bhd as a trainer for the “Operator Training Programmes”. Currently, he is a Senior Lecturer in the Faculty of Chemical Engineering, UiTM,
Shah Alam. He is a registered graduate member of Board of Engineer, Malaysia (BEM), a graduate member of the Institution of Engineers, Malaysia (IEM), an associate member of IChemE, UK and a graduate member of Energy Institute, UK (EI).

Mr Abdul Aziz Ishak
Dr Hazlina Hussin
Dr Najmiddin
Dr Roslina Rosli
Prof. Dr Asadullah

INDUSTRIAL PROJECT AND CONSULTANCY

PROJECT TYPE 1

CIMAH safety report

a) Prepare and review an updated of previous CIMAH documents content/report to be in line with the Schedule 6 of the CIMAH Regulations,
b) Report on current activities, such as detail operation at Chlorine storage facility, chemical storage tank, major hazardous installation and etc,
c) Data collection (such as meteorology data, population data, latest chemical SDS and etc),
d) Review, update and conduct consequence analysis for the products namely chlorine as prescribed in the Schedule 1 and II of the Regulations,
e) To study and update the effects of the consequence modeling (FIRE, EXPLOSION TOXIC RELEASE) to the plant and its surrounding community,
f) Review, Analyze and Update the On Site Emergency Plan

g) Review, Analyze and Update on the Information to the Public

h) Consultation with the client for any corrective recommendation,
i) Agreement to the corrective recommendation,
j) Signing of the Report by the CIMAH Competent person and approval by company management,

SELECTED LISTS OF INDUSTRIAL CIMAH ACTIVITIES

1) GLOBAL OFFSHORE CONSULTANCY SDN BHD
   LPG Storage for 15 tons (2 acres)

2) I-SHARP INTEGRATED SDN BHD
   Chlorine Facility (20 tons)

3) PERBADANAN BEKALAN AIR PULAU PINANG BHD
   Chlorine Facility (20 tons)

4) STOLTHAVEN (WESTPORT) SDN BHD
   Tanker farm (Product: Xylene, Toulene, Hexane, Oleochemical, petroleum product)
CIMAH COMPETENT CONTACT PERSON:
Dr. Zulkifli Abdul Rashid
Senior Risk Engineer /Senior lecturer
CIMAH registered (OKMH: HQ/16/MH/00/201)
PhD (Process Safety and Risk Assessment) UTP
MSc (Env.Eng) UPM, B.Eng (Hons) Chem. Eng. UMIST
SHO (NIOSH: SHO3114-J)

Email:- zulmas06@yahoo.com.my (preferable)
        zulkifli466@salam.uitm.edu.my
H/P: 012-3940702

List of Equipments available for training

ALOHA software
Phast Risk version 6.7
ArcGIS version 10
Matlab
Ansys CFD
Fluent CFD
AutoCAD
HYSYS
Aspen Plus version 8
Minitab
20 liter sphere tank (explosion test)
Analytical lab

PROJECT TYPE 2

Contract research

a) Answer purpose of the study in detail based on the available information on the results
b) Develop a methodology, an outline of which is to be included with the tender
c) Prepare detail analysis, evaluation, mitigation work which concentrate on information which
   is available about the projects.
d) Report findings
e) Presentation
SELECTED LISTS OF INDUSTRIAL CONTRACT RESEARCH ACTIVITIES

1) KAJIAN PENAIKTARAFAN DAN PENJENAMAAN SEMULA R&D DAN PEMBANGUNAN STANDARD KESELAMATAN DAN KESIHATAN PEKERJAAN (KKP)
   National institute of Occupational Safety and health (NIOSH) for 18 months

2) TNB ENERGY RESEARCH
   Fabricate engineering, procurement and commissioning work at TNB site.

3) PEMBANGUNAN KEPAKARAN TMDL (TOTAL MAXIMUM DAILY LOAD) DATA –DATA PUNCA PENCEMARAN DI SUNGAI LANGAT
   Jabatan Alam Sekitar Malaysia
**LIST OF EQUIPMENT & RATES**

Technical Staff: **En. Mustafa Mokhtar**  
Location: **Instrumentation Lab 1**  
Contact no:

<table>
<thead>
<tr>
<th>No</th>
<th>Equipment/ Facilities</th>
<th>Model</th>
<th>Brand</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>X-Ray Diffractometer (XRD)</td>
<td>D/Max 2200V/PC</td>
<td>Rigaku</td>
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<tr>
<td>2.</td>
<td>X-Ray Fluorescent (XRF)</td>
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<td>Philip</td>
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<td>3.</td>
<td>Gas Chromatography (GC)</td>
<td>Finnigan Trace GC Ultra</td>
<td>Thermo Electron</td>
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</table>

Technical Staff: **Pn. Azizan Din/En. Mohd Yazid Yusof**  
Location: **Instrumentation Lab 1**  
Contact no:

<table>
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<tr>
<th>No</th>
<th>Equipment/ Facilities</th>
<th>Model</th>
<th>Brand</th>
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</thead>
<tbody>
<tr>
<td>1.</td>
<td>Gas Chromatography Mass Spectrometer (GC-MS)</td>
<td></td>
<td>Varian</td>
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<tr>
<td>2.</td>
<td>High Performance Liquid Chromatography (HPLC)</td>
<td>Series 200LC</td>
<td>Perkin Elmer</td>
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<tr>
<td>3.</td>
<td>UV-Visible/NIR Spectrometer</td>
<td>Lambda 750</td>
<td>Perkin Elmer</td>
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<tr>
<td>4.</td>
<td>Thermofin TPDRO 1100 Catalyst System</td>
<td>TPDRO 1100</td>
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<tr>
<td>5.</td>
<td>Powder Tester</td>
<td>PT-5</td>
<td>Hosokawa</td>
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<tr>
<td>6.</td>
<td>Particle Size Analyzer</td>
<td>Malvern Instrument Mastersizer 2000</td>
<td>Malvern</td>
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## Technical Staff: En Mohd Nazmi Mukelas/ Roswati Hasim / Rohaida Zainordin
Location: Instrumentation Lab 2
Contact no:

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<tr>
<th>No</th>
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<tbody>
<tr>
<td>1.</td>
<td>Differential Scanning Calorimetry (DSC)</td>
<td>DSCI</td>
<td>Mettler Toledo</td>
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<tr>
<td>2.</td>
<td>Thermogravimetric Analyzer (TGA)</td>
<td>TGA851/LF/1600</td>
<td>Mettler Toledo</td>
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<td>3.</td>
<td>Fourier Transform Infra-Red (FT-IR)</td>
<td>TGA/SDTA 851</td>
<td>Perkin Elmer</td>
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<tr>
<td>4.</td>
<td>Bomb Calorimeter</td>
<td>C 5000 Control</td>
<td>IKA Works</td>
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<tr>
<td>5.</td>
<td>Elemental Analyzer</td>
<td>FlashEA 1112</td>
<td>Thermo Finnigan</td>
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<td>6.</td>
<td>Mercury Analyzer</td>
<td>Hydra AF Gold+</td>
<td>Teledyne Leeman Labs</td>
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<tr>
<td>7.</td>
<td>Mercury Porosimeter</td>
<td>IV 9510</td>
<td>Micromeritics Autopore</td>
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<td>8.</td>
<td>Atomic Absorption Spectrometer (AAS)</td>
<td>AAS Z2000</td>
<td>Hitachi</td>
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<td>9.</td>
<td>Inductive Coupled Plasma (ICP-OES)</td>
<td>ICAP 6000 Series</td>
<td>Thermo Scientific</td>
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## Technical Staff: Idris Md Desah
Location: Gas Engineering Lab (Level 5)

<table>
<thead>
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<th>No</th>
<th>Equipment/ Facilities</th>
<th>Model</th>
<th>Brand</th>
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<tbody>
<tr>
<td>1.</td>
<td>Schilling Effusimeter</td>
<td>97300-1</td>
<td>Stanhope Seta</td>
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<td>2.</td>
<td>Gas Calorimeter</td>
<td>P5615</td>
<td>Cussons</td>
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<td>3.</td>
<td>Gas Metering Calibration</td>
<td>CLB0104RR</td>
<td>Solteq</td>
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<tr>
<td>4.</td>
<td>Gas Flow Measurement Bench</td>
<td>FM120</td>
<td>Solteq</td>
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<tr>
<td>5.</td>
<td>Combustion Laboratory Unit</td>
<td>CO 01</td>
<td>Solteq</td>
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<td>6.</td>
<td>Flame Propagation &amp; Stability Unit</td>
<td>GE 02</td>
<td>Solteq</td>
</tr>
<tr>
<td>7.</td>
<td>Gas Absorption Refrigeration Unit</td>
<td>RF 10</td>
<td>Solteq</td>
</tr>
<tr>
<td>8.</td>
<td>Gas Service Station</td>
<td>GE 01</td>
<td>Solteq</td>
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<tr>
<td>9.</td>
<td>Upper / Lower Flammability</td>
<td>GE 02</td>
<td>Solteq</td>
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<tr>
<td>No</td>
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<tr>
<td>10</td>
<td>Steel Kleen Rocket Water Filters</td>
<td>TK-R50</td>
<td>Front Instruments Service</td>
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<td>11</td>
<td>Fire And Explosion Tester Unit</td>
<td>20L</td>
<td>Kuhner</td>
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<td>12</td>
<td>Fire &amp; Gas Detection System</td>
<td>SE109</td>
<td>Solteq</td>
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<td>13</td>
<td>Endecotts Octagon 2000 Digital Sieve Shaker</td>
<td>Octagon 2000</td>
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<tr>
<td>14</td>
<td>Gas Adsorption Unit</td>
<td>BP200</td>
<td>Solteq</td>
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<tr>
<td>15</td>
<td>Methane Gas Adsorption</td>
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Technical Staff: **Mohd Khairi Yusof**  
Location: **Reservoir Lab (Level 5)**

<table>
<thead>
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<tbody>
<tr>
<td>1</td>
<td>Resistivity Meter (Analog)</td>
<td>653B</td>
<td>Fann</td>
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<tr>
<td>2</td>
<td>Viscometer</td>
<td></td>
<td>Antoon Paar</td>
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<tr>
<td>3</td>
<td>Liquid Permeameter</td>
<td></td>
<td>PMI</td>
</tr>
<tr>
<td>4</td>
<td>Hydrometer Kit</td>
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<td>Fann</td>
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Technical Staff: **Mohd Rizuan Mohd Razlan**  
Location: **Drilling Lab Level 5**

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<th>No</th>
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<tbody>
<tr>
<td>1</td>
<td>Front Loading Furnace</td>
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<td>Carbolite</td>
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<td>2</td>
<td>Electrochemical Laboratory Radiometer</td>
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<td>Voltalab</td>
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<td>3</td>
<td>Precision Analytical Balance</td>
<td>XT-220A</td>
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<td>4</td>
<td>Refrigerator Glass</td>
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<tr>
<td>5</td>
<td>Dip Coater</td>
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<td>6</td>
<td>Bibby Aquatron Water Still</td>
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<td>7</td>
<td>Ultrasonic Cleaner</td>
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<tr>
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<tr>
<td>8</td>
<td>Seven Multi Bench Tap Meter</td>
<td>S 47K</td>
<td>Mettler Toledo</td>
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<td>9</td>
<td>Protech Floor Model Laboratory Dryer with Double Doors</td>
<td>FDD 720</td>
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<td>10</td>
<td>Protech Chemical Storage Cabinet</td>
<td>91000C</td>
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<td>11</td>
<td>Stirring Hot Plate</td>
<td>SP131320-33Q</td>
<td>Cimarec</td>
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<tr>
<td>12</td>
<td>Potentiostat / Galvanostat with Impedance</td>
<td>PGZ 402</td>
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<td>13</td>
<td>2 Wheel Grinding / Polishing Machine</td>
<td>Labopol-21</td>
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<td>14</td>
<td>Heating Circulation Thermostats</td>
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<td>Huber</td>
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<td>15</td>
<td>Furnace</td>
<td>HT-30-1400</td>
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<td>16</td>
<td>Digital Reading Viscometer</td>
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<td>17</td>
<td>Venticell Oven</td>
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Technical Staff: **Mohd Redzuan Yusof**  
Location: **Geology Lab (Level 5)**
### Technical Staff: Mohd Rizuan Mohd Razlan
Location: Waste Lab (Aras 5)

<table>
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<th>No</th>
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<tbody>
<tr>
<td>1</td>
<td>Chiller</td>
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<td>Heidolph</td>
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<tr>
<td>2</td>
<td>Electric Drying Cabinet with 3 Shelves</td>
<td>DRY420</td>
<td>Weifo,</td>
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<tr>
<td>3</td>
<td>Electric Mixers</td>
<td>RW 20D</td>
<td>IKA</td>
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<tr>
<td>4</td>
<td>Extraction Heater</td>
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<td>5</td>
<td>Friedrich Glass Condensor 300ML.55/50</td>
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<tr>
<td>6</td>
<td>Analytical Balance with Sliding Cover</td>
<td>PA214/</td>
<td>Ohaus</td>
</tr>
<tr>
<td>7</td>
<td>Digital Stop Watch</td>
<td>TM-104/Avantec</td>
<td>Avantec</td>
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### Technical Staff: Nor Suhaila Sabli
Location: Food Engineering Lab

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### Technical Staff: Mohd Faeez Sarulan
Location: Supercritical Lab (Level 6)

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### Technical Staff: Khuzairin Sanusi/Fairuza Assarawi
Location: Chemistry Lab (Level 6)

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Technical staff: **Rizuan Hamzah**  
Location: **Pharmaceutical Lab (Aras 6)**
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