

Chemical Engineering Education in Malaysia



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It has been 50 years since formal tertiary education on chemical engineering (ChE) started in Malaysia. The first ChE undergraduate programme was offered at the University of Malaya (UM) in 1974 (IEM, 2013). In the following decade, two other universities also started ChE programmes, i.e. Universiti Teknologi Malaysia (UTM, 1983) and National University of Malaysia (UKM, 1984). Till the late 1990s, ChE graduates did not get much attention among various Malaysian industrial sectors, as there was a lack of understanding on the role and contribution of chemical engineers.

We then witnessed a boost in the chemical industry in Malaysia in 1990s, when many major petrochemical and oleo chemical plants were commissioned. Following this, career opportunities for ChE graduates arose significantly. This led to the exponential increase of ChE Departments as well as number of graduates in the country. The author conducted a survey in 2014 among various higher learning institutions in Malaysia which revealed that there are over 20 universities that offer ChE-related programmes in the country and that there were approximately 2,400 ChE graduates in 2014 (see Figure 1 and details given in Table 1).

From this, it is clear that approximately each year, a new ChE programme was offered by Malaysian universities in the last two decades (1995-2014), despite the fact that it involved high capital expenditure (mainly due to the teaching and learning facilities including laboratory set-up). There are also foreign university branches that offer some of these programmes in Malaysia, including those from UK and Australia. Recent development shows that a top university from China has also set up its branch here which will offer the ChE programme. Most of these programmes are accredited by the Engineering Accreditation Council (EAC) of the Board of Engineers Malaysia, a few by the Institute of Chemical

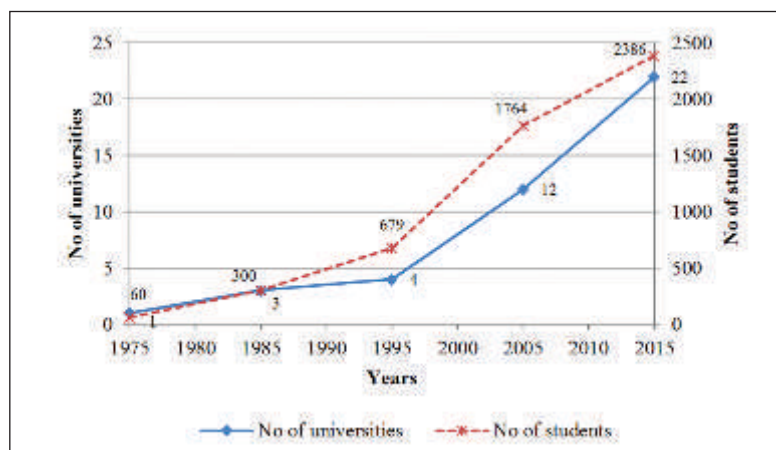


Figure 1: Number of universities that offer ChE programmes and number of ChE undergraduate students in Malaysia

Engineers (IChemE) and Engineers Australia (IEAust).

As Malaysia has been accepted as the 13th signatory of the Washington Accord on 18 June, 2009 (EAC, 2010), all graduates from EAC-accredited programmes after this date are, by default, recognised by the signatories of the Washington accord. In other words, a Malaysian ChE graduate from an EAC-accredited program fulfils the minimum requirements of ABET (US), and is able to sit for the Professional Engineering (PEng) examination in the US.

ROLE OF IEM IN FOSTERING ChE EDUCATION IN MALAYSIA

The two important bodies for promoting engineering profession among ChE community in Malaysia are IEM and the IChemE. Within IEM, the Chemical Engineering Technical Division (CETD) plays an important role in promoting interactions among working professionals and academia. CETD is aware that there is a

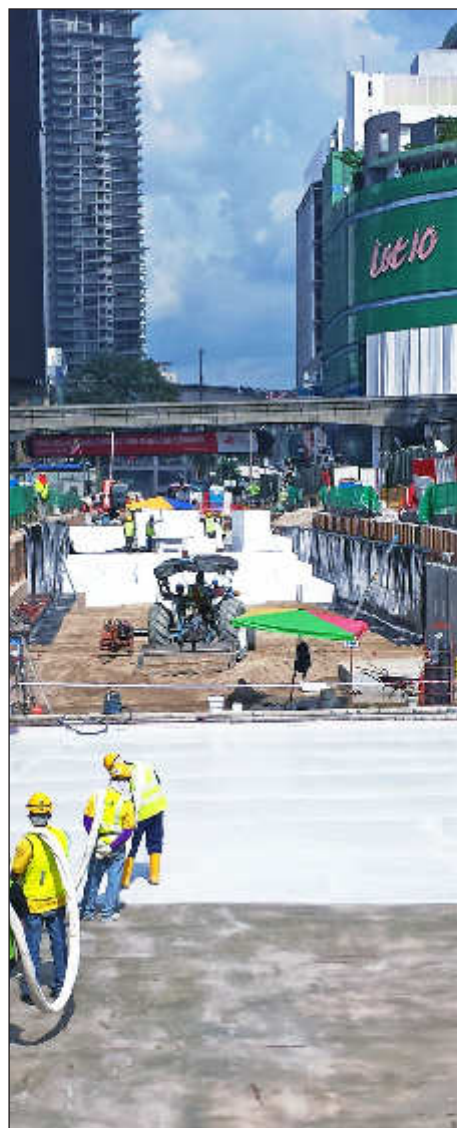
Name of institution	Faculty/Department	Name of Programmes**	Date started	Annual intake***	Accreditation bodies
University Malaya (UM)	Department of Chemical Engineering	Bachelor of Engineering (Chemical)	1974	60	EAC, IChemE
Universiti Teknologi Malaysia (UTM)	Chemical Engineering Department Bioprocess Engineering Department	BEng (Chemical Engineering) BEng (Bioprocess Engineering)	1983	120 40	EAC
National University of Malaysia (UKM)	Department Of Chemical & Process Engineering	Chemical and Process Engineering Biochemical Engineering	1984	50 30	EAC
Universiti Sains Malaysia (USM)	School of Chemical Engineering	Bachelor of Engineering in Chemical Engineering	1992	70	EAC, IChemE
Universiti Putra Malaysia (UPM)	Department of Chemical & Environmental Engineering	Bachelor of Chemical Engineering	1996	59	EAC
Universiti Teknologi Petronas (UTP)		BEng Chemical Engineering	1997	190	EAC
Universiti Malaysia Sabah (UMS)	Faculty of Engineering (Chemical Engineering Programme)	BEng (Chemical Engineering) BEng (Oil and Gas)	1998 2014	60 15	EAC
Curtin University, Sarawak Malaysia	Department of Chemical & Petroleum Engineering	BEng in Chemical Engineering	2000	100	EAC, IChemE, IEAust
Universiti Kuala Lumpur (UnikL-MICET)	Malaysian Institute of Chemical and Bioengineering Technology	Bachelor of Chemical Engineering Technology in Biosystem Bachelor of Chemical Engineering Technology in Bioprocess Bachelor of Chemical Engineering Technology in Environment Bachelor of Chemical Engineering Technology in Food Bachelor of Chemical Engineering Technology in Polymer Bachelor of Chemical Engineering Technology in Process Bachelor of Chemical Engineering	2006 2011	80 30 30 30 100 30 100	EAC
Universiti Malaysia Pahang (UMP)	Faculty of Chemical and Natural Resources Engineering	BEng Chemical Engineering BEng Chemical Engineering (Biotechnology) BEng Chemical Engineering (Gas Technology)	2002 2003 2003	60 30 30	EAC
Universiti Teknologi MARA (UiTM)	Faculty of Chemical Engineering	BEng Chemical BEng Chemical & Process BEng Chemical & Bioprocess BEng Oil and Gas BEng Chemical & Environmental Engineering	2000	90 60 60 60	EAC
University of Nottingham (UNMC)	Department of Chemical & Environmental Engineering	MEng Chemical Engineering BEng Chemical Engineering with Environmental Engineering	2003	130	EAC, IChemE
Universiti Malaysia Perlis (UniMAP)	School of Bioprocess Engineering	BEng (Bioprocess Engineering) Bachelor of Chemical Engineering Technology (Industrial Biotechnology)	2005	50	
Monash University Malaysia (MUM)	Faculty of Engineering (Chemical Engineering Discipline)	BEng in Chemical Engineering	2006	100	EAC IEAust
Universiti Tunku Abdul Rahman (UTAR)	Department of Chemical Engineering	BEng Chemical Engineering	2006	150	EAC
UCSI University (UCSI)	Department of Chemical & Petroleum Engineering	BEng Chemical Engineering	2008	93	EAC
Universiti Malaysia Sarawak (UNIMAS)	Department of Chemical Engineering and Energy Sustainability	BEng in Chemical Engineering	2009	80	EAC
Taylor's University	School of Engineering	BEng Chemical Engineering	2009	70	EAC
Manipal International University (MIU)		Bachelor of Chemical Engineering	2012	80	
Swinburne University of Technology Sarawak Campus	Faculty of Engineering, Computing and Science	BEng in Chemical Engineering	2012	25	EAC (2016)
Universiti Tun Hussein Onn Malaysia (UTHM)	Department of Chemical Engineering Technology	Bachelor of Chemical Engineering Technology (Biotechnology)	2012	30	
Heriot-Watt University Malaysia Campus (HWUM)	Chemical Engineering Programme	BEng Chemical Engineering	2014	24	IChemE, EAC (2018)

* The survey exclude institutions that only offer twinning/sandwich programmes

** All universities offer honour degrees

*** Data collected as of December 2014

Table 1: A survey on ChE-related programmes in Malaysia*



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continuous need to produce highly qualified chemical engineers to support the growth of the chemical industry in Malaysia. In line with this, CETD organises seminars, workshops and activities throughout the year. One of the most important annual events of CETD is the Malaysian Chem-E-Car competition; the 10th competition was held recently in April, 2015, at UKM). The Chem-E-Car event attracts the participation of many Malaysian chemical engineering undergraduate students. Participants utilise various alternative fuels (no fossil fuel is allowed!) to move the load carrying the shoe box sized car.

CETD also organises the annual national Research Paper Competition and Chemical Engineering Design Competition. The former is held in conjunction with the Asia Pacific Confederation of Chemical Engineering (APCCHE) congress, where CETD represents IEM as a member body. Winning students of the competition are partially sponsored to present their work in the APCCHE congresses (New Zealand, 2002, Korea, 2013, Melbourne, 2015).

Chemical Engineering Design Competition was launched in 2012 and three competitions have been held since. It attracts final year students from various universities to compete their capstone design projects. Throughout the competition cycle, several workshops are also held, where CETD committees serve as speakers in delivering various industry-relevant topics such as those related to safety, health and environment.

In a nutshell, CETD is dedicated to the training of future chemical engineers through interaction with current students through such competitions. CETD also assists the Board of Engineers Malaysia in the accreditation of ChE programmes in local universities, as well as to conduct Professional Interview for qualifying candidates to achieve professional status.

On the other hand, the Institution of Chemical Engineers (IChemE), which started its Malaysia Branch since 2006 (IChemE, 2015), has an important role to play in promoting professionalism among ChE academia in the country. They organise two congresses annually, i.e. the Symposium of Malaysian Chemical Engineers (SOMChE), a research-based conference where various research papers are presented, as well as the undergraduate seminar known as National Chemical Engineering Symposium (NACES). Both attract good participation among academics and students. In 2013, the IChemE signed a Memorandum of Understand (MOU) with IEM to foster better collaboration for the ChE community.

LOOKING FORWARD

With the growth of chemical industrial sectors, the growth of the ChE education sector is expected to remain active at least for the next decade. Presently, there remain some challenges faced by the ChE academic community in Malaysia. Limited qualified teaching staff (with PhD degree and sufficient industrial experience) and balancing the load between teaching and research activities are the main challenges that need to be addressed.

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