
South-East Asia Centre for Engineering and Technology Education (SEACETE)

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King Mongkut's University of Technology Thonburi (KMUTT), Bangkok, Thailand, and the UNESCO International Centre for Engineering Education (UICEE), based at Monash University, Melbourne, Australia, has mutually established a partnership and a satellite centre of the UNESCO International Centre for Engineering Education (UICEE) within King Mongkut's University of Technology Thonburi to be known as the *South-East Asia Centre for Engineering and Technology Education (SEACETE)*. Its main purpose was to establish and develop a South-east Asia satellite centre of the UICEE with its mission to provide the focus for the development of academic and research related activities in engineering and technology education within the sphere of the SEACETE and where appropriate and work together with the UNESCO International Centre for Engineering Education (UICEE) to further the globalisation of engineering and technology education through the satellite centre. This paper outlines the initial stages of development of the SEACETE in accordance with the guidelines provided in Memorandum of Agreement between the UICEE and the KMUTT.

KING MONGKUT'S UNIVERSITY OF TECHNOLOGY THONBURI

King Mongkut's University of Technology Thonburi (KMUTT), Bangkok, Thailand, is the first university of Thailand to have changed its status from an officially-run government university or public university to an autonomous university. Since its inception in 1960, the KMUTT has maintained a tradition of excellence in engineering, science and technology. KMUTT academic staff members are committed to uncompromising excellence in teaching and research.

The development of academic programmes of KMUTT can be broadly grouped into three periods. These are:

- First decade: The mission of the University was to produce technicians (through 3-year programmes after Grade 12) and practical engineers (through 5-year programmes after Grade 12) and technical instructors for technical colleges (through 2-year programmes after technician diploma) at the bachelor degree level.

- Second decade: The University established a broader academic programme in science and technology by offering bachelor degree programmes in engineering and multidisciplinary technologies.
- Third decade: New areas in science, engineering and multidisciplinary technologies are covered at the bachelor, master and doctoral degree levels, resulting in an increased emphasis on research, development and international academic cooperation. Five programmes in engineering and multidisciplinary technology are offered. A master programme in applied linguistics and bachelor programmes in architecture have been initiated. Technical services units were established [1].

Current Status

The KMUTT caters for around 11,000 students, of which 7,500 are at the undergraduate level, and 3,500 study at the graduate level. The KMUTT offers a comprehensive range of degree programmes in the following fields:

- Engineering;
- Industrial education;
- Information technology;
- Sciences;
- Energy and materials;
- Bioresources technology;
- Liberal arts;
- Architecture and design.

These range from the bachelor degree level to doctorates.

As one of the top technological universities in Thailand, the KMUTT also has a mandate to incubate and cradle leading scientists and technologists to share the development and the prosperity of the country. The KMUTT has advanced several important educational initiatives to enhance the educational potential of its graduates and to augment engineering education at the local, regional and international levels. This includes collaborative ventures with local and international universities. Details of several initiatives are listed below.

Twinning Programme

A twinning programme between the KMUTT in Bangkok, Thailand, and the University of Tasmania (UT) in Hobart, Australia, was initiated in January 1999 through the Thailand-Australia Science and Engineering Assistance Project (TASEAP) [2].

This linkage has helped to meld a process of quality assurance for this new programme by implementing mechanisms for self-review through stringent internal approvals processes and governance by an executive level steering committee.

A prospectus prepared by the KMUTT to issue to potential applicants of the programme lists the following objectives:

- To promote international calibre civil engineering graduates;
- Enhance strong cooperation in engineering education with world standard universities;
- Reduce costs to Thai students who wish to study abroad;
- Produce graduates with a strong proficiency in the English language;
- Activate the improvement and development of the normal Thai engineering programme at the KMUTT.

There are other goals that follow, such as enriching the programme through staff and student exchanges, collaboration on curriculum improvements and on

research at the graduate level, which have already taken place, but these are subordinate to the broader objectives listed above.

The Department of Civil Engineering at the KMUTT has instituted an internal steering committee to monitor and review the academic standards in both teaching and learning, in accordance with the obligations of the formal agreement. In addition, the bilateral KMUTT-UT management committee meets on a twice-annual basis to agree on curriculum development issues and entry points for students at the UT. The formal agreement allows for annually adjusting recognised standards to ensure that due care is offered to the programme.

While not new in the Asia-Pacific region, the implementation of an international programme in Thailand, based solely on the English language is rare. The only other programme that can be compared with is that of Thammasat and Nottingham Universities, although that is partially delivered in Thai. It is certainly a first in recent years for Australia. The programme can be considered to be groundbreaking in this sense since the follow-on effects could be as great as, if not greater than, the impact of Australian engineering education on academic and professional engineering in Thailand during the Colombo Plan days.

Collaboration at the undergraduate level has additional spin-offs. For example, the KMUTT and the UT have organised postgraduate opportunities that have arisen as a result of the alliance. Postgraduate research opportunities are currently being fleshed out in areas of interest to the KMUTT, although this is outside the ambit of the twinning agreement.

The bilateral management committee has the responsibility to pursue opportunities for staff exchange. It is envisaged that future opportunities will permit KMUTT staff to spend time at the UT, either in a teaching or research capacity [3].

Cooperative Master of Engineering Degree in Industrial Metrology

Since 1998, a multidisciplinary cooperative Master of Engineering degree in industrial metrology has been offered as part of a consortium of four Thai universities, namely:

- King Mongkut's Institute of Technology Lardkrabang
- Kasetsart University
- Chulalongkorn University
- King Mongkut's University of Technology Thonburi (host institution).

The six key objectives in organising the consortium are as follows:

- To produce graduates at the Masters degree level in Industrial Measurement Systems.
- To promote R&D activities in metrology.
- To strengthen selected Thai universities in the area of metrology through staff development and R&D funding supports.
- To promote the offer of courses in metrology as electives at the Bachelor degree level in science and engineering.
- To offer advanced courses in metrology to practicing engineers and scientists.
- To lay the groundwork for a future PhD programme in metrology in Thailand.

The course covers compulsory and elective elements, as well as laboratory work and a thesis research project. Graduates from this programme can fulfil effectively the urgent need for a high-level workforce who will be part of Thailand's national metrology network and quality systems in industries [4].

Other Notable Projects

Other recent projects tackled by the KMUTT include the following:

- Engineering final projects that target rural problems in Thailand;
- Researcher education by production control to enhance concentration;
- Implementation and evaluation of the Quota Student Project, which has helped to open up educational opportunities for students across Thailand.

UICEE SATELLITE CENTRE

The KMUTT and the UICEE agreed mutually to establish a partnership and a satellite centre (sub-centre) of the UNESCO International Centre for Engineering Education within the KMUTT to be known as the *South-East Asia Centre for Engineering and Technology Education* (SEACETE). A Memorandum of Agreement between the UICEE and the KMUTT was signed on 13 March 2002, with the main purpose being to establish and develop a satellite centre of the UICEE [5]. The satellite centre is intended to provide a focus for the development of academic and research activities in engineering and technology education in South-east Asia and other appropriate regions locally and internationally with the UICEE in

order to advance the globalisation of engineering and technology education.

The SEACETE is one of a burgeoning group of satellite centres that exist within the sphere of the UICEE, which acts as a hub. The network of satellite centres forms a communications network to share and exchange information on engineering and technology education.

Specific Goals and Objectives of the Centre

The SEACETE is committed to quality and diversity in the internationalisation of engineering and technology education. As such, the fundamental goals or development objectives of the centre are as follows:

- To enhance and facilitate in engineering and technology education throughout the entire UICEE global network of engineering educators.
- To establish the range of activities to reflect the mission, goals and objectives of the UICEE.
- To exchange scholars as appropriate to take forward academic and research related activities in engineering and technology education.
- To work together to take forward seminars, workshops, conferences and other academic meetings as appropriate and to support the production of publications, books and software in engineering and technology education.
- To provide a focus for academic and research activities related to the work on engineering and technology education in the *UICEE Global Network of Engineering Education*, and in particular on the transfer and exchange of information on engineering and technology education among the neighbouring countries.

The project's objectives are to develop a relationship and partnership between the UICEE and the KMUTT through the establishment and development of a satellite centre called the *South-East Asia Centre for Engineering and Technology Education* (SEACETE).

Mission of the SEACETE

The primary mission of the SEACETE is to provide the focus for the development of academic and research related activities and seek collaboration in engineering and technology education within the sphere of the SEACETE. Where appropriate, the SEACETE works together with the UICEE to further the globalisation of engineering and technology education through the satellite centre.

Organisational Structure

The structure of SEACETE consists of the Advisory Board and the Executive Board. The Advisory Board has been formed to initiate and deploy a wide and visionary policy and propose to the Executive Board in implementing the Centre.

The SEACETE Advisory Board consists of the UICEE Director as the Honorary Adviser, the KMUTT President as the Chairman of the SEACETE Advisory Board, and the Senior Vice-President for Academic Affairs as Deputy Chairman. The Advisory Board also incorporates input from members of 10 South-east Asian countries, namely: Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand and Vietnam. The Secretary to the SEACETE Advisory Board is the member from Thailand.

The SEACETE Executive Board consists of the KMUTT Senior Vice-President for Academic Affairs as the Director, the Vice-President for Research and Information as the Deputy Director, and members who are the Coordinators in the areas of engineering, energy and materials, sciences, industrial education, bio-resources and technology, architecture and design, human resource development, Secretary and the Office Manager.

The operating office is located on Level 2, Office of the President Building, King Mongkut's University of Technology Thonburi.

Budget and Personnel

The capital budget for the office is provided by the KMUTT, and the operating budget is contributed by the International Office, KMUTT, and by faculties and schools collaborated in this partnership. The budget, resource requirements, and commitments are defined on an annual basis following consultation with the Executive Board and the Advisory Board.

The resources incorporate in-kind contributions by the SEACETE's partners, including contributions from private sector organisations that support the activities of the SEACETE. A major activity of the SEACETE's Director and other personnel is to actively seek corporate support for the SEACETE's activities.

Within the KMUTT, the SEACETE will interact with the International Office to liaise activities, which includes a part of the exchange programme for faculty, staff and students. The Centre is run by the Office Manager and the Secretary, who will work together under the recommendations and supervision of the Director and the Executive Board within the policy framework directed by the Advisory Board.

Achievements to Date

The following achievements have already been accomplished:

- Collaboration with the Deans of Engineering Council of Thailand (DECT), the Deans of Science Council of Thailand (DSCT) and the Deans of Industrial Education Council of Thailand (DIECT) regarding the exchange of data and information and other academic activities in engineering and technology education between universities and institutions.
- A Web site is being developed that will provide up-to-date information on the Centre and its related activities; the address is www.kmutt.ac.th/seacete/

Specific Linkages within and outside the UICEE Global Network

In working with the UICEE, it is a major goal of the SEACETE is to establish linkages with universities and colleges in developed and developing countries within and outside the UICEE global network, especially among the ten countries in the region of South-east Asia or ASEAN, so as to facilitate the exchange of faculty, staff, and students in all areas of mutual interest and benefit. This includes the transfer and exchange of knowledge and expertise related to all areas of engineering and technology education.

COLLABORATION IN UICEE-RUN CONFERENCES

4th UICEE Annual Conference

The highly successful 4th UICEE Annual Conference on Engineering Education was held in Bangkok, Thailand, from 7 to 10 February 2001. This Conference had the support from four key universities in Thailand, which were then Contributing Members of the UICEE. These universities were:

- King Mongkut's University of Technology Thonburi;
- Kasetsart University, Bangkok;
- Khon Kaen University, Khon Kaen;
- Thammasat University, Prathutani.

The Conference theme of *Innovation in Engineering Education* was chosen to identify and present best projects, programmes and relevant examples, to discuss the importance of the status and quality global

engineering education and to debate their impact on best practice and engineering academic endeavour.

The Conference brought together participants from almost 30 countries, representing all of the inhabited continents. A volume of Proceedings was produced, collecting the 92 papers presented, which were of an extremely high standard.

Several papers included in the Proceedings presented research and development activities in the host country, which has several high-class universities topping the list of best universities in Asia. They demonstrate that the global debate on engineering education and international expansion of interest in engineering education has also had a strong impact on the engineering scene in Thailand [6].

4th Global Congress

It should be noted that 2004 is the year of the celebrations of the 200th year anniversary of the birth of King Rama IV, King Mongkut, the Father of Thai Science, whose name was adopted by the University, and who became the Patron of the KMUTT. Hence, a decision was made to coincide these celebrations with the *4th Global Congress on Engineering Education*, which, it is envisaged, will be held in Bangkok, Thailand, from 5 to 9 July 2004, with the KMUTT as the host and principal co-sponsor.

Future Plans and Milestones

In order to develop, organise and promote seminars, conferences, workshops, and other academic meeting designed to further the goals of the UICEE in engineering and technology education, the SEACETE plans to work closely with the following:

- Universities and institutions in Thailand, specifically state universities, in 2004;
- Universities and institutions in nations in the South-east Asia region in 2005;
- Universities and institutions in countries in the UICEE's network of satellite centres in 2006.

Being part of the UICEE international network of engineering education institutions has also facilitated linkages with other universities around the world, including possible academic collaboration between Hochschule Wismar - University of Technology, Business and Design (HSW), Wismar, Germany, and the KMUTT, and to lay the foundations for the possible signing of a bilateral agreement on collaboration between the two institutions, within the framework of the UICEE. A wide range of issues related to this

matter was raised and debated during the meeting. The Heads of the two institutions agreed that their representatives should work on a draft Memorandum of Agreement, which is likely to be signed in the near future.

RESEARCH, DEVELOPMENT AND SCHOLARLY ACTIVITIES

In order to be consistent with the goals and objectives of the SEACETE, collaboration within the KMUTT Research and Development Programme is carried out at the KMUTT under the groups of R&D projects listed below:

- Energy, environment and clean technology;
- Engineering technology;
- Biotechnology, food technology and agro-based technology;
- ICT and applied mathematics;
- Learning and industrial education;
- Humanities;
- Policy studies.

Cooperation exists with the centres and institutions within the KMUTT, including the following:

- The Institute for Scientific and Technological Research and Services (ISTRS);
- The Pilot Plant Development and Training Institute (PDTI);
- The Continuing Education Centre;
- The Industrial Park Centre under the Technology Transfer and Technological Services Programme [7].

Selected Publications

Some of the papers presented at UICEE-run international conferences include the following:

1. Chamnongthai, K., Engineering final projects to target rural problems. *Proc. 3rd Global Congress on Engng. Educ.*, Glasgow, Scotland, UK, 303-306 (2002).
2. Beasley, A., Bullen, F., Payothornsiri, S., Petchgate, K. and Tungboonterm, P., Quality assurance and a qualitative evaluation of the KMUTT-UT twinning programme. *Proc. 3rd Asia-Pacific Forum on Engng. and Technology Educ.*, 77-80 (2001).
3. Kongkachandra, R. and Chamnongthai, K., Researchers' education by production control. *Proc. 4th UICEE Annual Conf. on Engng. Educ.*, Bangkok, Thailand, 232-236 (2001).

4. Congmuang, S., Evaluation of Quota Student Project's achievement: a case study. *Proc. 4th UICEE Annual Conf. on Engng. Educ.*, Bangkok, Thailand, 261-263 (2001).
 5. Limmaneevichitr, C. and Kou., S., Flow visualisation demonstrating surface-tension driven convection in the weld pool. *Proc. 4th UICEE Annual Conf. on Engng. Educ.*, Bangkok, Thailand, 383-386 (2001).
 6. Poopat, B., Computer simulation of hot plate welding of high density polyethylene. *Proc. 4th UICEE Annual Conf. on Engng. Educ.*, Bangkok, Thailand, 396-400 (2001).
 7. Chaisawadi, A., Multidisciplinary, cooperative Master of Engineering degree in industrial metrology. *Proc. 4th UICEE Annual Conf. on Engng. Educ.*, Bangkok, Thailand, 422-424 (2001).
- Continue to develop and establish activities that are consistent with furthering the goals of the UICEE and which are related to the globalisation of engineering and technology education;
 - Promote the exchange of faculty, staff and students with the UICEE and other centres so as to further academic and research activities in engineering education;
 - Work with the UICEE and other centres to develop, organise and promote seminars, conferences, workshops, and other academic meetings that are designed to further the goals of the UICEE in engineering and technology education;
 - Undertake other responsibilities, as appropriate, to move engineering and technology education into the new era consistent with mandate and mission of the UICEE.

UICEE journal publications include the following:

1. Chanchalor, S. and Daungchan, T., A comparison of academic achievement on the Intranet in a course on electric transformers between individual-learning and group-learning. *World Trans. on Engng. and Technology Educ.*, 2, 3, 387-390 (2003).
2. Jitgarun, K., Yangyuan, U., Srisombut, R. and Chaiton, D., An analysis of the factors affecting the vocational competencies of electricians in industry with regard to refrigeration and air-conditioning technicians. *World Trans. on Engng. and Technology Educ.*, 2, 2, 221-224 (2003).
3. Chanchalor, S. and Powichai, L., The effect of distance learning via the Internet on electric motor control. *World Trans. on Engng. and Technology Educ.*, 2, 2, 255-258 (2003).

SUMMARY AND CONCLUSIONS

The South-East Asia Centre for Engineering & Technology Education has been established so as to coordinate and be a focal point for all international, collaborative engineering and technology education and to be a part of the UICEE's network of satellite centres. As a satellite centre of the UICEE, the SEACETE will carry out the following:

- Take forward the mission, goals, and objectives of the UICEE and, in particular, work with the UICEE and the worldwide network of satellite centres in order to facilitate the transfer and exchange of information on engineering and technology education on global scale;

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BIOGRAPHY

Kraiwood Kiattikomol was born in 1944. He graduated with a BEng (CE) (Hons) from Chulalongkorn University, Thailand, in 1967, and an MEng (Structure) from the Asian Institute of Technology, Thailand, in 1969. He went further to attain his PhD (CE) from Northwestern University, USA, in 1972.

He has gained wide experiences from his professional career as a senior engineer in the Department of Aviation, Ministry of Communication, between 1972 and 1975, as well as a lecturer in the Department of Civil Engineering, and Chairman, Department of Civil Engineering, from 1983 to 1986 at King Mongkut's University of Technology Thonburi (KMUTT). He has been the Vice-President for Planning and Development from 1986 to 1992, the Vice-President for

Academic Affairs from 1992 to 1998 and Senior Vice-President for Academic Affairs from 1998 to 2002 at the KMUTT.

He has also achieved supplementary work as the President of the Engineering Institute of Thailand under HM the King's Patronage (EIT) between 2000 and 2001. Additionally, he was a Member of the Town Planning Board, Department of Town Planning, from 2001-2002, and has been a Member of the Ethics Committee, Council of Engineers, from 2000 to the present.

He has published about 40 technical papers, as well as a patent in 2002 for new cementitious material for concrete work. In 2002, he was accorded the Outstanding Technologist Award for the Development of Using Fly Ash in Thailand, and was also honoured with the 1998 3rd National Award for the Invention of Database Development of Building Cost Estimation. His current position is as Adviser to the President, and Acting Dean, School of Architecture and Design, King Mongkut's University of Technology Thonburi (KMUTT).

7th Baltic Region Seminar on Engineering Education: Seminar Proceedings

edited by Zenon J. Pudlowski

The very successful 7th *Baltic Region Seminar on Engineering Education* was held between 4 and 6 September 2003 in St Petersburg, Russia, and was hosted by St Petersburg State Electrotechnical University, *LETI*. The papers cover a diverse scope of important and current issues currently facing engineering and technology education internationally; nevertheless, the Seminar still maintained a particular focus on the Baltic region, with strong participation from the host country. Indeed, the level of Russian participation reflects of the nation's commitment to advancing engineering education, both locally and generally.

The Baltic Seminar series of seminars seeks to bring together educators, primarily from the Baltic Region, to continue and expand on debates about common problems and key challenges in engineering and technology education; to promote discussion on the need for innovation in engineering and technology education; and to foster the links, collaboration and friendships already established within the region.

There are 54 papers from senior academics, representing 20 countries from around the globe, included in this set of Proceedings. Academics gathered at this Seminar to consider and debate the impact of globalisation on engineering and technology education, the rapidly changing technology and production processes and the status, quality and importance of engineering education in the context of the recent economic changes in the Baltic Region. The papers included in these Proceedings reflect on this debate and are grouped under the following broad topics:

- New trends and approaches to engineering education
- Case studies
- Importance of science subjects in engineering education
- International examples of engineering education and training
- Computers, multimedia and the Internet in engineering education
- Learning strategies and methods in engineering education
- Important issues and challenges in engineering education
- Specific engineering education programmes
- Recent developments in engineering education

All of the papers presented in this volume were subject to a formal peer review process, which is the case with all UICEE publications. This should ensure the future value of these Proceedings, not just for the Baltic Region, but internationally as well.

To purchase a copy of the Seminar Proceedings, a cheque for \$A70 (+ \$A10 for postage within Australia, and \$A20 for overseas postage) should be made payable to Monash University - UICEE, and sent to: Administrative Officer, UICEE, Faculty of Engineering, Monash University, Clayton, Victoria 3800, Australia. Please note that sales within Australia incur 10% GST.

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