

## **UTM 's DOCTORAL PROGRAM IN ENGINEERING EDUCATION**

### **UTM IN THE WORLD ENGINEERING EDUCATION MAP**

UTM (Universiti Teknologi Malaysia) as Malaysia's premier university in engineering and technology has been actively involved in conducting training, research and seminars in the engineering education. UTM has organized various conferences, seminars and workshops, nationally and internationally to disseminate and share research findings. Collaborative network worldwide with experts in this field has become a reality when our academic staff has been invited as guest speakers to many international and national conferences and forums on engineering education, and invited to be lead editors of book chapters in the international arena. UTM has also attracted internationally renowned engineering educators, such as Prof Richard Felder and Prof Karl Smith, and opens the door to smart partnership with engineering education institutions throughout the world. As a result of these activities and collaboration between lecturers from engineering and social science based faculties, UTM has offered a Ph.D. in Engineering Education program, which is managed by the School of Graduate Studies. The program has currently 20 Ph.D. students. Based on current feedbacks and applications the number seems to increase for the next intakes.

### **THE PROGRAM OBJECTIVE**

The objective of this program is to produce competent practitioners and researchers in engineering education.

### **RESEARCH AREAS**

The research areas include the following components which can be investigated independently or integrated with other areas of inquiry:

- Engineering Epistemologies – research on what constitutes engineering thinking and knowledge within social context
- Engineering Learning Approaches – research on engineering learners' developing knowledge and competencies in context
- Engineering Learning System – research on the instructional culture, infrastructure and epistemology of engineering educators
- Engineering Diversity and Inclusiveness – research on how diverse community contribute solutions to the social and global challenges and relevance of engineering profession
- Engineering Assessment – research on assessment methods, instruments and measurements to inform engineering education practice and learning

These areas are in accordance with the EERC (The National Engineering Education Research Colloquies, US.) priority research areas.

### **WHO SHOULD JOIN**

The program is suitable for graduates who would like to be employed at universities, colleges, industries, consulting firms, publishers, and government agencies. It is also suitable for engineering education researchers, engineers, educational training specialists, technical communication specialists and directors of teaching/learning centers, diversity programs or outreach programs.

### **CAREER OPPORTUNITIES**

There is a wide variety of career options for graduates of this program due to their versatility. They will be knowledgeable in both technical and social science aspects, which will open up opportunities for graduates to be well suited for both fields, as well as jobs that uniquely require multidisciplinary knowledge and abilities in both areas. Among the potential career for graduates are:

- Academicians in Engineering Sciences and/or Social Science/Education
- Academic administrators of engineering schools or departments in higher learning institutions
- Engineering Sciences curricula developer
- Higher Education Consultant and Trainer
- Training designer and developer in industries
- Instructional designer
- Content developer in publishing companies
- Practicing engineer or administrator in industries
- Researcher, and etc.

### **DURATION OF STUDY**

The program could be completed within 3 years (full-time) or between 2 – 6 years (part-time).

### **ADMISSION REQUIREMENTS**

- A Master Degree from Universiti Teknologi Malaysia or other higher learning institution recognized by the Senate; or
- Other qualifications equivalent to a Master degree and experience in the relevant field recognized by the Senate; or
- Candidates who are currently undertaking a Master degree program at Universiti Teknologi Malaysia with the approval of the Senate.

### **Additional Requirement for International Students - English Language Requirement**

- An international candidate is required to have a minimum qualification of Test of English as Foreign Language (TOEFL) of 550 or International English language Test System (IELTS) of band 6.0 or Malaysian Universities English Test (MUET) of band 4.0. Exemption may be given to those who originate from countries whose native language is English or who graduated from English-speaking

countries. Those who do not meet the minimum requirement must attend and pass the Intensive English Program before they are allowed to proceed with their respective programs of study.

## PROGRAM STRUCTURE

Candidates are required to take some courses throughout their study. The required courses listed below represent the minimum credits required for graduation. A student's graduate committee may require additional courses to strengthen the student background in the particular learning domain.

The Ph.D. in Engineering Education is a full research mode program. For the completion of the program, graduates are required to complete five courses which award 12 credits, and write and defend their theses. The courses and their credits are as listed below. The courses provide strong fundamentals as well as current and future needs in engineering education, and assists candidates in designing research frameworks and prepare good research proposals. Each candidate will be supervised by two qualified supervisors; one with education and the other with engineering background. Candidates will present and defend their research proposals at the end of their second year of study.

Course Name	Credit	Status
PLT 6113- Fundamentals of Engineering Education	3	HW (Pass/Fail)
PLT6123- Research Methodology in Engineering Education	3	HW (Pass/Fail)
PLT6133- Quantitative Data analysis	3	HW (Pass/Fail)
PLT6140- Seminar in Engineering Education	0	HW (Pass/Fail)
PLT6143- Issues in Engineering Education	3	HW (Pass/Fail)
<b>Total Courses Credit</b>	12	
<b>Thesis</b> PLT 1100- Engineering Education Ph.D. Thesis	Equivalent to 93	Pass/Fail

## Course Synopsis

### PLT 6113 Education Elective

Discussion topics in this course include among others curriculum design, examples on objective-based learning, pedagogy including problem based learning, generic skills, assessment/evaluation methods, current issues on engineering education , learning style, learning problems, teaching materials (software, etc.).

**PLT6123 Research Methodology for Engineering Education**

Discussion topics in this course include among others research objective, type of research, research plan, literature review, hypothesis, bias, sample, research variables, sample and measurement, sampling technique, sample bias, introduction to analysis, report preparation, formulation of question, item analysis, test score statistic, reliability, validity, standard score.

**PLT 6133 Quantitative Data Analysis**

Discussion topics in this course include among others statistic and research, descriptive statistic, statistical test and T-test, one-way ANOVA, correlation analysis, correlation prediction, regression and multiple regression, one-way, two-way and three-way ANOVA, factor analysis, and correlation analysis.

**PLT 6140 Engineering Education Seminar**

This course provides training on the preparation of research proposal, communication and presentation of research proposal and development of self confidence.

**PLT 62X3 Issues on Engineering Education**

This course is developed to strengthen students' knowledge on their respective research area. For example, issues that can be studied are problem-based learning, ICT in education, assessment and evaluation method and curriculum design.

**PLT 1100 Engineering Education Ph.D. Thesis**

Students are required to conduct research on topics approved by the Academic Panel for the Engineering Education Doctorate Program. In the research proposal stage, students are required to identify important issues in Engineering Education. Based on the identified issues, students will propose the problems to be researched for the Ph.D. study. They are required to explain how their research findings will give impacts and reform the aspects of engineering learning and program curriculum either formally or informally.

**TUITION FEES***International Student*

The tuition fees for a full-time international student is RM4,546 for the first semester and RM3,496.00 for the following semesters. The tuition fees for a part-time international student is RM3,546 for the first semester and RM2,496.00 for the following semesters.

*Local Student*

The tuition fees for a full-time local student is RM2175 for the first semester and RM1425 for the following semesters. The tuition fees for a part-time local student is RM1775 for the first semester and RM1025 for the following semesters.

*Note:* The tuition fee is not conclusive of other university's fees such as medical check prior to registration, and Intensive English Course, which a student may have to enroll pending on their TOEFL or IELTS score.

#### **APPLICATION INFORMATION**

Application to join the program is open all year round. The application form is assessable online from the website <http://www.sps.utm.my>. Any inquiries about UTM Graduate Studies can be addressed to [graduate@utm.my](mailto:graduate@utm.my)