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## The Course Outcomes (COs) Evaluation For Civil Engineering Design II Course

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### Abstract

Engineering Accreditation Council (EAC) has emphasized that Outcome Based Education (OBE) learning approach is to be adopted for all engineering programs at the Higher Learning Institutions (IPTA) in Malaysia. OBE calls for the evaluation of the Course Outcomes (CO) as specified in the program specification. This study aims to assess the students' achievement on the course outcomes (COs) that has been outlined in the Civil Engineering Design II Course. This assessment was conducted to all 64 final year students in the Department of Civil and Structural Engineering (JKAS), Faculty of Engineering and Built Environment, University Kebangsaan Malaysia. The course was selected as it is a compulsory course for all students in the department and it covers all aspect of civil engineering syllabus from the beginning semester of first year study. Eight COs will be assessed for the course based on course mapping of PO and CO as reported in Engineering Accreditation Council (EAC) self-assessment report. The CO assessment is measured based on students performance on written report of the design project, Bill of Quantities (BQ) report, presentation and also peer assessment. CO1 to CO5 were assessed from design project and presentation, whilst CO6 and CO8 from peer assessment and CO7 from BQ report. From the study it shows that CO6 and CO8 have the highest overall achievement of 100% while CO7 shows the lowest level of achievement of 73% among of all COs. The rest of the COs have a similar percentage around 76% - 78%. This study gives an indication on the achievement of the course and this can be used as a guide to improve the teaching and learning method in the future.

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*Keywords:* Course outcomes; Civil Engineering Design Course; students performance; program outcomes; direct assessment

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### 1. Introduction

The emphasis on the Outcome Based Education (OBE) for all engineering programs at the Higher Learning Institutions (IPTA) in Malaysia has greatly influenced the learning trends of undergraduate students. In fact the assessment and evaluation on the students achievement has shifted and focused based on the learning and program

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outcomes. One result of the changes introduced by the new outcome based ABET EC 2000 is that design, communication skills, managerial skills, working in multidisciplinary teams and life-long learning have been given increasingly important treatment in undergraduate engineering curricula (Abdullaal et al. 2011). Through this OBE implementation, students are allowed to work more autonomously to construct their own learning and culminate in realistic, student-generated product (Maliki and Alizadh, 2006).

In order to assess the students' ability and achievement through this OBE approach, a systematic assessment must be carried out. Systematic assessment has become the requirement for accreditation by various accrediting organizations (Afida et al. 2011). OBE calls for the evaluation of the CO as specified in each course outline (Rozeza et al. 2007). Normally the evaluation of the COs and POs are largely dependent on the students' performance in carrying out tasks such as quizzes, final examination, capstone project and submission of assignments which gives an indication of their learning achievements (Rozeza et al. 2007). Evaluation and measurement on the performance output gives an indication on the achievement of POs and COs for each course and automatically it can be used to guide us in determining the appropriate improvement of the teaching method.

For the purpose of OBE assessment on the students' achievement, this paper discusses and presents the POs and COs measurement in Engineering Design II course (KH4253) for session 2010/2011. The measurement is based on the submission of the design project, report, students' presentation and peer assessment. Through this measurement, the individual and overall achievement can be obtained.

## **2. Methodology**

This study was conducted to all 64 final year students who registered for Engineering Design II course (KH4253) in Semester 2 of session 2010/2011. Basically, the civil engineering design course consists of 2 parts in which the first semester students are required to register for Engineering Design I course (KH4013) and in the second semester for Engineering Design II course (KH4253). Students were given the real design project in the first semester and they have to continue with the same project in the second semester. Figure 1 shows the implementation procedure of the course in the department. However for the purpose of this paper, the achievement of COs for the course KH 4253 in the second semester are only presented and discussed here. The course was selected because it is compulsory to all students and it covers the overall aspects of civil engineering courses from first to final year study. Furthermore the achievement of several program outcomes (PO) can be measured in this course as compared to the other courses. POs for the course have been identified and linked to each course outcomes (CO) using course mapping as shown in Table 1. Based on the course mapping of POs and COs, there are eight POs that need to be assessed in this course (EAC 2010). Student's achievement then will be evaluated based on these CO-PO relations using assessment tools such as design project, BQ report, presentation and peer assessment (Hamimi Fadziati et al. 2011).

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