

# Preparation for Teaching Engineering on a Remote Campus

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***Abstract:** The University is planning to teach the first two years of an established engineering program on a remote campus. We report on the context, preparation and strategies to ensure that students will develop the same engineering attributes as students on the home campus.*

## Introduction

The Sydney campus of CQUniversity was established in 1995 and currently teaches undergraduate and postgraduate programs in accounting, arts, business, information technology, management and multimedia to over 2,200 international students. The Sydney campus has built a very effective teaching and student support team that has resulted in good student learning outcomes. The campus is currently preparing to teach the first two years of the CQUniversity engineering program commencing in Term 1, 2009. Students will complete the advanced years of study at the Rockhampton campus.

## Background

The home campus of CQUniversity is situated at Rockhampton in Central Queensland. All years of the engineering program are taught on the Rockhampton campus and students may study the first two years at the Mackay or Gladstone campuses. The students graduating from the engineering program at Rockhampton are in demand with many students receiving offers of employment before completing their studies. Undergraduates also have the opportunity to enrol in the industry cooperative program where currently there are many more places available than students. Furthermore, there is a shortage of engineering graduates available for employment in Central Queensland. Two of the commitments in the Learning and Teaching component of the strategic plan (CQUniversity, 2006) are:

- to provide multiple pathways to students from a variety of backgrounds and
- to ensure the program mix on each of our campuses enhances their strengths and uniqueness.

In addition to broadening the program offerings at the Sydney campus, the University would like to increase the number of graduates who may be able to contribute to the growth in Central Queensland. Teaching engineering at the Sydney campus combines this commitment with the strategic goal to serve the people and industry of Central Queensland.

The first students to commence in Term 1, 2009 will be in the mechanical engineering discipline. These students will study the common first year and mechanical engineering in second year (2010). It is planned that from Term 1, 2010 students will be able to choose from either the civil, electrical or mechanical disciplines at the end of their first year of study, i.e. it is envisaged that all three disciplines will be taught for second year students in 2011.

## Context

The facilities on the Sydney campus are very suitable for the current programs but there are no science courses. Where science is being taught at an institution, there is already existing infrastructure and support on which engineering programs can be built. For example the University of Western Sydney was teaching science before engineering was developed and Macquarie University had very well established programs in electronics, science, mathematics, computing and photonics before commencing an engineering program.

The CQU engineering program incorporates 'Project Based Learning', providing learning in context, in formal and informal learning environments such as workshops, classes and project studios. Teamwork and problem solving skills are learned alongside the technical content in real-world engineering environment. (CQUniversity, 2008)

The Sydney campus has two sites in the city with good facilities for the programs currently being taught. With no laboratories or engineering teaching team on the campus, how will the program be introduced and problem based learning supported?

Staffing, facilities, support, learning outcomes, quality framework, accreditation and future development will be addressed separately.

## **Staffing**

A Coordinator of Engineering Studies with experience in teaching, course development, accreditation and academic leadership was appointed and commenced in February 2008. There is well qualified academic staff teaching at the campus with the background and experience needed to teach mathematics, physics and engineering with a number having expressed an interest in teaching in engineering. At the time of writing, expressions of interest have been called to appoint staff to teach mathematics and physics. In addition, an academic engineering team is being formed to support the engineering skills courses and to ensure students are exposed to, and supported by, a wide range of engineering experiences. As the coordinator is an electrical engineer, a mechanical engineer will be appointed to teach second year mechanical engineering courses and support the first year program.

## **Facilities**

During 2009, the existing teaching and computing facilities will be used for lectures and tutorials. In addition a room will be set aside as a student project room. Equipment will be acquired for the first term physics laboratory experiments that will be completed in normal class rooms. Arrangements have been made with the local TAFE to use their laboratories for the second term physics laboratory experiments. An inspection found that the labs have all the required equipment and support and it is geographically readily accessible for students.

## **Support**

The Sydney campus currently has a well established IT team to look after the needs of staff and students. There are currently over 400 computers for student access in a balance of teaching laboratories and open access areas for students.

The Sydney library is currently acquiring engineering textbooks and students will have the same access to electronic material as students on the Rockhampton, Mackay and Gladstone campuses.

A well resourced Learning Skills Unit presents a comprehensive orientation program to all students and provides on-going support.

The Sydney campus is committed to teaching engineering and is developing a budget to ensure all needs are met in 2009 and that the Engineering Centre is completed for 2010.

## **Learning Outcomes**

The program will be taught in Sydney in the same manner as in Rockhampton. Students will have access to course websites and use video conferencing facilities. During Term 1 students will all have two industry visits and in Term 2, all students will complete a project in industry. To broaden student exposure to different aspects of engineering, a program of guest speakers is being developed for both Terms 1 and 2.

## **Quality Framework**

The University has a well-developed policy framework for delivering courses on multiple campuses with a policy that details roles, responsibilities and processes. The engineering program is taught in team frameworks that already function over multiple campuses.

The Engineering Coordinator has visited Rockhampton, participated in the first week of the course, and in the moderation of first year engineering skills portfolios at the end of Term 1. By the end of 2008, the Coordinator will have visited Rockhampton four times as well as monitoring course websites and being in regular email and telephone contact.

## **Accreditation**

A proposal to extend Engineers Australia accreditation to the Sydney campus is in the final stage of preparation.

## **Future Development**

An Engineering Centre is being planned and will be completed for the start of the 2010 academic year to accommodate both first and second years of the engineering program and will have all the facilities and equipment needed to teach the first two years of the program. The centre will have:

- classrooms,
- laboratories,
- student project rooms,
- computing facilities and
- workshop.

## **Conclusion**

Introducing an engineering program on a new site has been traditionally achieved by utilising the existing infrastructure and staff in place to teach science programs. We have outlined a strategy to begin teaching engineering using existing teaching facilities while building laboratories and acquiring equipment. Further progress will be reported at the conference along with the progress of research relating to international students and project based learning.

## **References**

### **Online source**

CQUniversity 2006, *Strategic Plan (2007 – 2011)*. Accessed 21 Jul 2008

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