

Conducting an Effective Residential School for an Undergraduate Materials Science and Engineering Course

Patrick Keleher, Central Queensland University, Australia

Arun Patil, Central Queensland University, Australia

ABSTRACT

Residential schools are an important mechanism by which equitable access to laboratory provide hands-on experience and face-to-face learning for students enrolled in distance mode. This paper elaborates on the evaluation of residential school conducted as a part of undergraduate materials science and engineering course for the distance/flexible students enrolled at Central Queensland University, Australia. The students in this course are adult students who are employed full-time as practitioners and juggling with work, family, and study commitments. This cohort differs greatly in their technical knowledge and professional experience from the students who are enrolled internally. Internal students are predominately students who have progressed from secondary school to tertiary education without any workplace experience. A three day residential school provided the opportunity for students to work individually (undertake quizzes) and as a group (conduct laboratories, pursue group project) to ensure they had access to lecturers and their peers in progressing their tasks and assessment items. The students travelled from throughout Australia to attend the residential school and its design acknowledges the need for the time allocated to be focused, meaningful and worthwhile so students can maximise time at the residential (and the subsequent follow up activities) and minimise time away from the workplace.

Keywords: Australia, Central Queensland University, Evaluation, Face-to-Face Learning, Hands-On Experience, Residential School, Student Feedback

INTRODUCTION

It is important to identify and act upon various student support systems in distance or open learning education. As indicated by Tait (2000) there is no universal blue print for the estab-

lishment of student support systems. However, depends on the characteristics of program, demands from students, nature of course delivery, learning management systems and off course the requirement from the professional accreditation bodies, various student support strategies can be formulated and implemented in universities. For example, residential schools

DOI: 10.4018/ijqaete.2012070104

are one of the effective strategies for a student support in distance, open or flexible learning mode which enhances better learning outcomes.

CQUniversity has been conducting residential schools for over 30 years; especially for the science-based programs. The undergraduate Engineering Program has only adopted the practice of conducting residential schools in the last three years. Residential schools are conducted through a number of formats, which include field trips, laboratory sessions, tutorials, lectures and formal assessment sessions. The three day residential school conducted by the lecturers of the second term course ENEG 12005 Engineering Science and Engineering focused upon providing the opportunity for students enrolled in a distance mode to travel to CQUniversity's Rockhampton campus to actively participate in laboratory sessions, tutorials and a formal assessment session.

The course is conducted in an online environment, using Moodle™ with all submission made electronically and extensive use is made of the forums for lecturers to post communications to the students and another forum for general communication which supports student-student and student-lecturer communications.

Prior to arriving to participate in the residential school students have been advised to form a laboratory group and a project group; which may consist of the same members. It is recommended that they communicate through the course's Moodle™ site to establish the group and to have a number of preliminary meetings so that they can review the laboratory procedures, the formal write-up for the laboratories, the project scope and how they think best to proceed with these activities. Once the group is established they notify the course co-ordinator and an area is created within the course Moodle™ site where they can communicate as a group and also share documents and drafts. Access to these individual group areas is limited to the group members and the lecturing staff.

This paper also outlines the findings of an anonymous survey conducted to evaluate the effectiveness of the 2010 Term 2 residential school for the course.

ENGINEERING PROGRAMS AT CENTRAL QUEENSLAND UNIVERSITY

CQUniversity offers a range of engineering programs, including distance or flexible programs. These include, Bachelor of Engineering, Bachelor of Engineering (Co-op) and Diploma of Professional Practice (Engineering), and Bachelor of Engineering Technology (Specialisation) (CQUniversity, 2011).

The student cohort for engineering programs enrolled at CQUniversity are both internal and flexible or distance. Majority of flexible or distance students are adult or matured, and working either full-time or part-time. These students have financial and family commitments while juggling with their study.

Materials Science and Engineering Course (ENEG12005) at Central Queensland University

The Materials Science and Engineering (ENEG12005) was first offered to 2nd year engineering students in 2010 semester 2 at CQUniversity. As the only main course providing the materials science and engineering contents for engineering students in the engineering program and the engineering foundation program. This course is now offered to all students (both on-campus or internal and distance or flexible) in all engineering disciplines (including mechanical, civil and electrical) for engineering undergraduate programs. The course covers a broad spectrum of materials and processes from the theoretical basis to the practical applications and from "small" internal microstructure to "large" macro-structures. The course is offered via traditional face-to-face meetings as well as in the flexible learning mode (i.e., distance education) (CQUniversity, 2010).

The main contents covered by ENEG12005 include mainly the following:

1. Internal structures of materials such as inter-atomic bonding, crystalline structures and defects;

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