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## Evaluating the effectiveness of residential school program for materials engineering course at CQUniversity, Australia

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### ABSTRACT

*An anonymous survey was conducted after students attended the residential school for Materials Science and Engineering (ENEG12005) as a course requirement. The objective of the survey was to evaluate the effectiveness of various learning activities in the residential school and to obtain students' feedback. This paper presents the findings of the survey which was analysed both quantitatively and quantitatively. . The survey findings are very encouraging, and provide evidence of effectiveness of the residential activities on students' learning. Suggestions and comments on the residential school will be used for the course improvement in the future.*

**Keywords:** residential school, student feedback, evaluation

### INTRODUCTION

This paper outlines the findings of the survey conducted to evaluate the effectiveness of residential school for the course Materials Science and Engineering (ENEG12005) at the CQUniversity, Australia.

### Materials Science and Engineering Course (ENEG12005) at CQUniversity

The Materials Science and Engineering (ENEG12005) was first offered to 2<sup>nd</sup> 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.

It is offered to all students in three main engineering disciplines, i.e. mechanical, civil and electrical. 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 (1) internal structures of materials such as inter-atomic bonding, crystalline structures and defects; (2) properties including mechanical, physical, electrical & magnetic properties of various engineering materials; (3) microstructure-property relationships of materials; (4) phase diagrams and heat-treatments; (5) strengthening of metals; (6) processing of materials; (7) corrosion and prevention of materials; and (8) material selection. These course contents are rather unique in CQUniversity because other Australian universities normally offer these components as individual courses delivered by several different departments or schools and offered over the span of 3-4 years

Given the broad spectrum, it is particularly challenging to establish the correct balance between the coverage and depth of this course. Further addition to the challenge is that the course is designed as a six credit point unit, which means that both the teaching team and students are pressed for time in pursuing the course syllabus.

## **Residential School**

Residential school has been implemented in CQUniversity for almost 30 years. It is a three-day event, compulsory for students who are studying in the flexible learning mode. Residential schools are compulsory and involve students studying in flexible mode seeking to release from their work duties and attend this three day event. The schedule includes completion of the practical component of the course involving practical experiments in three laboratories, undertaking a formal quiz, working on group projects and opportunities to meet peers and lecturers face-to-face and to seek advice on the course content.

To ensure that students are fully informed with the relevant content and required standard for the laboratory work submissions, a number of periods have been allocated for them to produce a draft of their first laboratory submission, seek advice and ask questions. Emphasis is placed on students using the residential school timetable so they can complete as much as possible while at the residential school. This enables the students to capitalise the availability of academic staff and complete their study commitments so they are able to slot back into their work commitments without onerous tasks to still needed to be completed from their residential school experience. Academic staff's strategy, in designing the residential school schedule in this way, is also to help students develop for a better work-life balance and to model for them ways in which they can balance this better.

The residential school is also an opportunity for academic staff to gain direct feedback from students, who are practitioners working in industry. This is paramount in providing an insight into current industry practices as well as provides relevant and indirect input to the content of the course. The internal student cohort consists of students who have move directly from the secondary school system to university. Both cohorts of students (flexible and internal) have the opportunity to provide informal feedback at any time during the conduction of the course and there is also a formal questionnaire towards the end of the academic term.

## FEEDBACK SURVEY

An anonymous feedback survey was conducted immediately after the 3-day residential school to obtain feedback from the students. The questionnaire consists of two parts. The first part consists of four sections with 11 items. These sections were:

- Facilitator (Attitude and Practices)
- Laboratory Sessions
- Class Quiz, and
- the Least Appealing Features

Section one on Facilitator (Attitude and Practices) consists of a set of 5 items as listed in Table 1. Students were requested to respond to each item in the questionnaire using a five point Likert scale; Very Poor, Poor, Average, Very Good, Excellent and Unable to Comment. The second part comprises the open ended questions for the students to comment on their experience in order to collect qualitative feedback on the residential school. This open-ended response is available in each of the 4 sections stated above.

**Table 1: A list of questions/items used in the survey for students' feedback**

No	Items
1	Facilitators' enthusiasm on the course.
2	Facilitators' encouragement for me to do my best work.
3	Facilitators' helpfulness in answering my questions and queries.
4	Facilitators' sensitivity to an individual's way of learning.
5	Facilitators' preparation/organisation of residential school.

## Findings

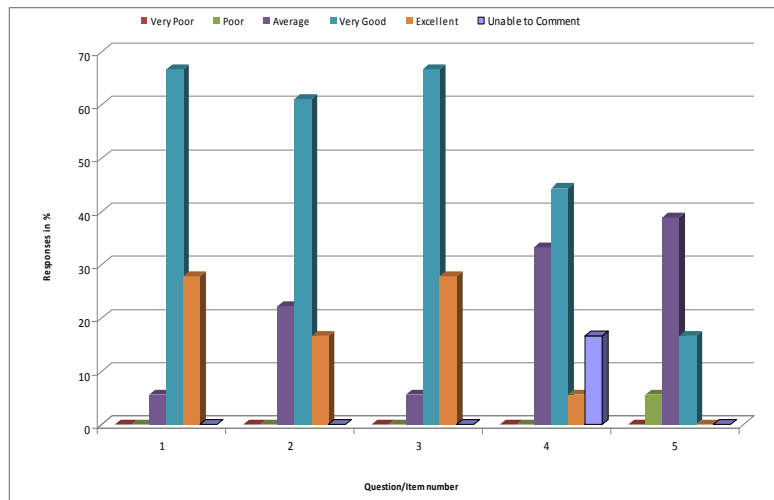
The response rate for this survey was 100% (N=18). The overall results obtained from the survey were very positive as discussed in the following sections. Table 2 presents a response summary of the collected data.

The survey results suggest that students attending the residential school of this course were extremely happy with the facilitators' overall attitude and practice in handling the residential school activities.

**Table 2: Response summary of the survey data collection.**

Item	Very Poor	Poor	Average	Very Good	Excellent	Unable to comment	Rating Average	Response Count
1	0.0% (0)	0.0% (0)	5.6% (1)	66.7% (12)	27.8% (5)	0.0% (0)	4.22	18
2	0.0% (0)	0.0% (0)	22.2% (4)	61.1% (11)	16.7% (3)	0.0% (0)	3.94	18
3	0.0% (0)	0.0% (0)	5.6% (1)	66.7% (12)	27.8% (5)	0.0% (0)	4.22	18
4	0.0% (0)	0.0% (0)	33.3% (6)	44.4% (8)	5.6% (1)	16.7% (3)	3.67	18
5	0.0% (0)	5.6% (1)	38.9% (7)	38.9% (7)	16.7% (3)	0.0% (0)	3.67	18

Table 2 shows that more than 70% of the respondents are extremely positive (a combined percentages of very good and excellent feedback) of the facilitators' enthusiasm, encouragement and helpfulness. Figure 1 below gives a graphical presentation of the survey results on the effectiveness of residential school activities. The outstanding feedback on the facilitators is probably due to the excellent teaching strategies applied by the facilitators during the 3-day event. Other reasons for this good response warrant further research.



**Figure 1: Chart showing survey results on the effectiveness of residential school in the course. (N=18).**

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Most of the respondents agreed that, the Enthusiasm of the facilitators for the course and Facilitators' helpfulness in answering their questions and queries were extremely useful and effective (Very Good 66.7%, Excellent 27.8%). Students have further agreed that facilitators' sensitivity to an individual's way of learning was also very good (Very Good 44.4%, Good 33.3%).

### **Qualitative feedback**

As stated earlier, the questionnaire is divided into two parts whereby the second part consists of open ended questions in each section of the questionnaire. This allows the students an opportunity to comment on the residential school. It has also helped in collecting useful qualitative feedback from the students on the effectiveness of residential school activities. The remarks below are gathered from the open ended responses in the three sections of the questionnaire.

This student below viewed the facilitators as qualified and skilled in handling the residential school activities:

*All facilitators very approachable and very professional. [They] have a genuine interest in how the course is running and how students are going.*

Apart from the facilitators' attitude and practice, students were also convinced with the way the laboratory work is organized:

*[The laboratories] were worthwhile because the opportunity to ask questions and get clarifications. Also good to have contacts with other students.*

Commenting on the quizzes, this student felt that the quizzes have actually enhanced his understanding of the course concepts, as he stated below:

*[The quizzes are] worthwhile as it gives us an understanding of what may be expected for the exam.*

### **CONCLUSION**

CQUniversity has been conducting residential schools for the range of courses for over 30 years and they have been found to be a valuable and relevant type of instruction and engagement with the student cohort studying in flexible mode. The residential school conducted for this course engages well with students' needs and requirements.

It has also enhanced their understanding of the content material, the expectations of lecturers in completing their tasks and the standard requirement needed in demonstrating their knowledge, understanding and competency in their respective engineering courses.

## REFERENCE

CQUniversity Australia (2010). Course profiles. Accessed at <http://courseprofile.cqu.edu.au/CourseProfile/index.jsp> on 24 December 2010.

## APPENDICES

### Appendix 1: Outline of the time-table for the residential school.

<b>Day 1:</b>	<b>9<sup>th</sup> August</b>
1:00-1:30p.m.	Welcome
1:30 to 2:30 p.m.	Laboratory Session 1  Laboratory Supervisor (including brief safety induction) (Group A Investigation of Cast Iron Structure , Group B Tensile and Hardness Tests, Group C Ductile-Brittle (Demonstration) + Charpy Test
2:30-3:00 p.m.	Outline laboratory write-up
3:00-5:00 pm	Private time/Library research and write-up Laboratory Session1 (Location: Library)
5:00 p.m.	Day concludes
<b>Day 2:</b>	<b>10<sup>th</sup> August</b>
9:00 -9:30a.m.	Questions and Clarifications about laboratory write-ups
9:30 -10:30 a.m.	Laboratory Session 2  Laboratory Supervisor Group A Ductile-Brittle (Demonstration) + Charpy Test , Group B Investigation of Cast Iron Structure, Group C Tensile and Hardness Tests

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10:30-11:00a.m.	Morning Tea
11:00-1:00p.m.	Quiz (using prescribed text)
1:00-2:00p.m.	Lunch
2:00 – 3:30p.m.	Laboratory Session 3 - Laboratory Supervisor Group A Tensile and Hardness Tests, Group B Ductile- Brittle (Demonstration) + Charpy Test, Group C Investigation of Cast Iron Structure
3:30-5:00p.m.	Private time to write up Laboratory Session 2 and 3
<b>Day 3:</b>	<b>11<sup>th</sup> August</b>
9:00-10:30a.m.	Discussion of course assessment Quiz feedback, discuss of laboratory reports, project, examination preparation
10:30 to 11:00a.m.	Morning Tea
11:00 – 12:00noon	Q and A Course organisation and students' suggestions/ comments for improvement
12:00 p.m.	Completion of Residential School

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