

# ACADEMIC BOARD PHASE THREE REVIEW

## REVIEW TEAM REPORT

Faculty of Engineering and Information Technologies



20 March 2008

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## SECTION I: PREFACE

### (1) Background

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The Academic Board reviews are intended to encourage in faculties an academic culture that values scholarship, free inquiry and intellectual rigour and honesty, supporting, in turn, the development and maintenance of high standards of teaching, scholarship and research.

In 2001, the Academic Board initiated a cycle of collegial reviews of the academic activities within faculties with a view to supporting faculties in developing effective academic quality assurance process. These were followed up in 2003 with a second phase of faculty reviews, which expanded the scope to include all elements within the University Strategic Plan.

The Phase 3 Review is based on the Faculty's Self-Evaluation Report (SER) which provides an overview of the Faculty's assessment of the culture which supports, and the processes that lead to, continuous quality improvement in the Faculty at the time of the Review. To guide the development of the SER, faculties were invited to address criteria adapted from the Baldrige Education Criteria for Performance Excellence 2007.

### (2) The Review Process

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The Faculty presented its SER to the Academic Board on 14 September 2007 along with a number of supporting documents and relevant data. The Review Team met on 5 October 2007 to consider these materials.

The review visit took place on 11 October 2007. The key purpose of the visit was to enable the Review Team to assess the robustness and validity of the Faculty's judgements.

This final report has been reviewed by the Learning and Teaching and the Research and Research Training Committees of the Academic Board and approved by the Academic Board. A copy will be posted on the University's quality assurance website at [www.usyd.edu.au/quality](http://www.usyd.edu.au/quality)

#### **Implementation**

Within six weeks of the date of approval by the Academic Board, the Faculty is required to provide the Board with a response to the Recommendations contained in the Review Report, indicating how the Faculty will build the Recommendations into Faculty planning processes.

Twelve months after the date the Report was approved by the Academic Board, the Faculty is required to provide the Board with a progress report responding to the Recommendations.

### (3) Membership

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#### **Review Team**

Professor Bruce Sutton, Chair  
Associate Professor Tania Gerzina, Faculty of Dentistry  
Dr Tom Hubble, Faculty of Science (Geosciences)  
Dr Simon Hayman, Faculty of Architecture and Design  
Professor Catherine Stampfl, Faculty of Science (Physics)  
Mr Alan Masterton (Observer)

#### **Senior Faculty representatives**

Professor Greg Hancock, Dean  
Associate Professor David Airey, Associate Dean, Teaching and Learning  
Dr Doug Auld, Associate Dean, Undergraduate Studies

Associate Professor Geoff Barton, Head, Chemical and Biomolecular Engineering  
Mr Dominic Curtin, Finance Director  
Professor Simon Fleming, Director, OFTC  
Dr Liaquat Hossain, Associate Dean, Postgraduate Coursework  
Professor Ron Johnston, Executive Director, ACIIC  
Professor Assaad Masri, Associate Dean, Research and Research Training  
Professor Kim Rasmussen, Head, Civil Engineering  
Associate Professor Steve Simpson, Electrical and Information Engineering  
Professor John Small, Civil Engineering  
Professor Liyong Tong, Associate Dean, International  
Mr Eric Van Wijk, Faculty Executive Officer  
Dr Tim Wilkinson, Associate Dean, Information Technology  
Professor Lin Ye, Head, Aerospace, Mechanical and Mechatronic Engineering  
Professor Albert Zomaya, Head, Information Technologies

### **Students**

The Review Team met with two groups of students: six undergraduate students; and two research higher degree students, together with three postgraduate coursework students (joint meeting).

The Review Team acknowledges the need to be careful about generalising the views of a small group of students, with strong representation from one School, to the whole student body.

## SECTION II: OUTCOMES

This section summarises the main findings and lists the commendations, affirmations and recommendations. It should be noted that, in addition, other favourable comments and suggestions for improvement are mentioned throughout the text of the Report. The report draws on the information provided in the Self-Evaluation Report as well as discussion with staff and students. In some places, text from the Self-Evaluation Report has been incorporated directly into the text of this report.

### (1) Introduction to Findings

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The Faculty of Engineering and Information Technologies consists of five Schools:

- Aerospace, Mechanical and Mechatronic Engineering (AMME)
- Electrical and Information Engineering (EIE)
- Civil Engineering (Civil)
- Chemical and Biomolecular Engineering (CBE)
- Information Technologies (SIT)

and the Australian Centre for Innovation and International Competitiveness (ACIIC), which provides the Dean with management advice and research and teaches management subjects across the Faculty.

The Faculty is one of the leading engineering research faculties in Australia. It has an international reputation for teaching and research excellence and has strong links with Australian and increasingly international industry.

The Review visit reinforced evidence presented in the Self-Evaluation Report of a strong, vibrant Faculty with a clear sense of purpose.

The Self-Evaluation Report and discussions with staff and students during the review visit brought out a number of issues which are addressed further within this Report, as follows:

1. The Faculty's aspirations are focused on the quality of its staff and students. It does not aspire to grow its undergraduate numbers further but to focus on the quality of the intake.
2. The Faculty sees its future increasingly as a Graduate School of Engineering and Information Technologies. This could include a Professional Masters degree in Engineering, and does envisage increasing growth in postgraduate coursework in all disciplines. There is specific strength in postgraduate coursework in IT (Master of Information Technology).
3. Staff are ambitious and productive, but with a clear focus on research productivity. At the same time, the low and continuing downward trend of the Faculty's CEQ scores, reflective of the students' perceptions of the quality of teaching in the Faculty, was the most serious issue raised during the Review.
4. Recent growth in student numbers has been accompanied by a decrease in staff numbers. There is a sense that the staff workload may be unsustainable although there was no indication from staff that they were unwilling to provide the extra hours required.
5. The integration of the School of Information Technologies into the Faculty has created a range of issues arising from a significant downturn in undergraduate enrolments in that area (although there has been a turnaround and IT-based courses are becoming more popular).
6. A summary of Commendations, Affirmations and Recommendations follows. Note that these are not prioritised by the Review Panel. They are listed below in the order in which the relevant issues appear in the SER.

## (2) Commendations

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Areas where the Academic Board commends the practices of the Faculty are as follows:

1. The Dean and senior leaders are commended for their leadership and communication style. The Dean's Communique is an example of good practice in communication.
2. The Faculty is commended for implementation of its successful Flexible First Year program and for the completion of the recent comprehensive review of this program incorporating student and stakeholder feedback
3. The Academic Board commends the Faculty and Schools on the structures they have in place to build a sense of community for students.
4. The School of Chemical and Biomolecular Engineering is commended for the successful restructuring of its curriculum.

## (3) Affirmations

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Areas where the Academic Board affirms the Faculty's identification of the need for improvements to its practices are as follows:

1. The Academic Board affirms the need identified by the Faculty to redesign the Masters Coursework program in line with the recommendations of the iTEV Study.
2. The Academic Board affirms the Faculty's view that there is a need for significant change in the School of Information Technologies since the School is not financially viable in its current form.
3. The Academic Board affirms the Faculty's commitment to work in partnership with Human Resources to develop a talent management program including staff development and leadership development.
4. The Academic Board affirms the Faculty's desire for more central support for policy implementation so as to facilitate greater understanding and compliance at the Faculty level.
5. The Academic Board affirms the Faculty's commitment to work with ITL to understand the factors impacting on CEQ results and whether these can be used as indicators of the success of Faculty initiatives in learning and teaching.
6. The Academic Board affirms the Faculty's commitment to the development of a staff mentoring program for more especially for more junior staff and recommends that such a program also provide a stronger focus on teaching.
7. The Academic Board affirms the Faculty's recognition that that its activities are limited in many areas by problems arising from services provided by Information and Communications Technology (ICT) and that it needs to work more closely with ICT to improve the services they deliver to the Faculty
8. The Academic Board affirms the Faculty's intention to consider the implementation of formal Faculty-wide processes to improve the quality of supervision.

#### (4) Recommendations

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Areas where the Academic Board recommends improvements to the practices of the Faculty are as follows:

1. The Academic Board recommends that the School of Information Technologies be encouraged to consider the contributions it can make to key communities both within and outside the University of Sydney. On the basis of this, the School might proceed to formulate a business case that could help to ensure its future viability.
2. The Academic Board encourages the Faculty to develop strategies that will ensure the ongoing sustainability of quality learning, teaching and research in all disciplines.
3. The Academic Board recommends that the Dean and Faculty be encouraged to develop mechanisms to enhance and reward good teaching.
4. The Academic Board recommends that the Faculty explore mechanisms to make it easier for students to access equipment in other areas of the University and make the guidelines for this cooperation clearer.
5. The Academic Board recommends that the Faculty develop, implement and evaluate strategies to improve the supervision of research higher degree students.

## SECTION IV REPORT

### (1) INTRODUCTION AND FACULTY PROFILE

The key theme that has emerged from the Review is the Faculty's focus on excellence in research and quality of student intake. There is also an increasing focus on the Faculty as a Graduate School of Engineering and Information Technologies.

The Review Team was particularly interested in exploring with the Faculty the implications of its recent substantial growth rate, whether this is sustainable and if the Faculty is close to maximum capacity. Staff are talented, committed and ambitious but there are some concerning indicators about the ongoing sustainability of the workloads imposed by teaching and research.

The students who met with the Review Team expressed pride in the international standing and high standards set by the Faculty.

The Faculty has drawn attention to a number of challenges, which are addressed below:

#### 1.1 Degree structures

The potential impact of the Bologna Process and the implementation of the Melbourne Model were discussed during the Review visit. A key issue for consideration is the extent to which the Faculty might wish to move to a professional master's degree. There were considerable accreditation issues to take into account and the Dean advised that Engineers Australia had accredited a 3+2 program for the University of Melbourne, i.e. not just the 2-year master's degree. However, a professional master's degree might suit the nature and aspirations of staff better than an undergraduate degree.

There were significant cost implications and it would also raise issues of parallel teaching in undergraduate and postgraduate teaching. However, this was a factor in the international landscape.

#### 1.2 Attracting the highest quality students

##### (a) Research students

It is difficult to persuade local students to undertake PhD degrees as there is high marketplace demand for graduates. There is huge international demand from students, but insufficient numbers of international scholarships. There remains much room for growth in research student enrolments in the Faculty.

##### (b) Undergraduate Students

The focus has been on the development of combined degrees and increasing the quality of student intake. The emphasis has been on reducing the tail of students with lower UAIs. There is the potential for negative impact from the UNSWS HSC+ initiative and the Faculty is taking steps to address this at Careers Fairs. UAC first round applications look strong for the Faculty but there is a danger that this could change following applicants' Change of Preferences in early 2008. The Faculty was aware of the importance of ensuring that students are informed about its Flexible Entry Scheme. At the same time, the Faculty was cautious about enrolling students with a UAI lower than about 85. The Dean advised that evidence indicated that students with higher UAIs had better degree outcomes, as well as better employment prospects.

During the visit, undergraduate students interviewed commented that they had been attracted to the Faculty because of its international standing. The geographical location of the Faculty was also of some importance. Other attractions were the combined degrees and the flexible first year. These views confirmed the advice provided by the Faculty in the SER.

(c) **Postgraduate coursework students**

The Faculty has been proactive in considering how it can attract postgraduate coursework students and acknowledges that there is significant room for growth. A Feasibility Study for Postgraduate Engineering Programs was commissioned by the Faculty in 2006 with the assistance of iTEV. This study made a number of recommendations for change, including a greater degree of industry focus and some associated practical application. The Faculty's emphasis is on aligning programs with industry requirements and improving both the flexibility and the quality of programs.

**Affirmation 1**

The Academic Board affirms the need identified by the Faculty to redesign the Masters Coursework program in line with the recommendations of the iTEV Study.

(d) **International recruitment**

The Faculty actively promotes itself internationally and has achieved an increase of 8% in international enrolments since 2003. The Review Team noted that the Faculty has a significant degree of dependence on the fee income it receives from international students. The Melbourne Institute Report Rating Major Disciplines in Australian Universities: Perceptions and Reality 2006 indicates that the Faculty is ranked first in Australia by overseas respondents.

**1.3 Financial Sustainability of the School of Information Technologies**

A group of staff from SIT took the opportunity to meet with the Review Team during the open session. The discussion focussed on how to achieve financial sustainability for the School while not damaging the existing curriculum or research activities. The Chair encouraged the School to think creatively about its future and to develop a sound business case on which its future could be built. This could include, for example, strategic alliances across the University and externally. The Dean acknowledged that there was concern at potential damage to the research productivity of the School and it was important that changes be undertaken without damaging its good performance.

**Affirmation 2**

The Academic Board affirms the Faculty's view that there is a need for significant change in the School of Information Technologies since the School is not financially viable in its current form.

**Recommendation 1**

The Academic Board recommends that the School of Information Technologies be encouraged to consider the contributions it can make to key communities both within and outside the University of Sydney. On the basis of this, the School might proceed to formulate a business case that could help to ensure its future viability.

## (2) LEADERSHIP

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### 2.1 How Senior Leaders Lead

#### (a) Leadership Team

The Faculty's core senior leadership team, the Dean's Advisory Committee, has broad representation from across the Faculty. The Review Team formed the view that there are robust mechanisms for communication across the Faculty and particularly commended the Dean's Communique. The Review Team did not obtain a clear view on how senior leaders assess their own effectiveness although it was noted that some have attended leadership training programs.

#### **Affirmation 3**

The Academic Board affirms the Faculty's commitment to work in partnership with Human Resources to develop a talent management program including staff development and leadership development.

#### (b) Communication and Faculty Performance

Within the overall Faculty culture, the Faculty recognises that each School has its own culture, leadership and communication style. The Review Team was informed of structures that have been created within individual Schools to improve communication between all levels of staff. Senior staff advised that communication works well within each School, through their committee structures. In fact, there is a danger of communication overload, with the same message, with slightly different emphases, coming from central University, Faculty and School levels. Other staff also confirmed this. Staff were enthusiastic in their praise of communication mechanisms within Schools and across the Faculty, with some staff stating that it was the best they had ever experienced in their working career. One Head pointed out that students are taught that leadership is a distributed attribute, which must be developed at an individual level. This is important in becoming a successful engineer. As noted in the SER, however, there is significant variation in the effectiveness and system of leadership within Schools.

Postgraduate research students informed the Review Team that there was a postgraduate research student committee and postgraduate coordinator in each School. This worked well and they felt that there was a place for them to be heard. They were able to refer to their postgraduate coordinator with any problems.

Cross-communication between Schools does not always work as well. This seems to depend on individuals and the Review Team noted that there is room for more integration between the different discipline areas in the Faculty. However, the Review Team formed the view that, in general, communication channels in Schools operate very effectively.

#### **Commendation 1**

The Dean and senior leaders are commended for their leadership and communication style. The Dean's Communique is an example of good practice in communication.

### 2.2 Social responsibilities

The Faculty has detailed structures in place to ensure that University policies governing ethical behaviour, in particular the Codes of Conduct, are drawn to the attention of staff and students. The SER advised that there were sometimes problems in implementing policy at Faculty and School levels arising from poor communication of requirements and resource implications. Concern was raised at the lack of coordination of the information flow on key policy issues received from central administration by the Faculty and Schools. With emails and documents coming from different sources yet covering the same topics, information could easily be lost despite the best efforts of the Faculty.

It was hoped that the recent appointment of a Faculty Secretary would assist with the interface between the Faculty and central administration. One staff member pointed out that the University now had good websites for Students at Risk and Plagiarism but these were not widely known. However, the key policy issues related to HR issues.

**Affirmation 4**

The Academic Board affirms the Faculty's desire for more central support for policy implementation so as to facilitate greater understanding and compliance at the Faculty level.

### (3) STRATEGIC PLANNING

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#### 3.1 Strategy Development

The Faculty sets its strategic directions through a formal Strategic Planning Process, School Reviews and ongoing discussions at the Dean's Advisory Committee. The Faculty Retreat in 2002 and the Faculty Strategic Planning Session in 2004 have clarified the major challenges facing the Faculty and have developed strategies that will help the Faculty achieve its mission of providing innovative world class teaching to develop Engineers who contribute to wealth creation and enrich the quality of life. There has been broad participation in the strategic planning process across the Faculty.

Achievement of Faculty goals is primarily a Dean's responsibility, filtering through Faculty Committees, Schools and School Committees. During the review visit, staff confirmed that they were involved in the strategic planning process at the School level and were satisfied with how the process worked.

The Review Team explored with senior staff the Faculty's strategies for maintaining quality in its academic programs when there was an imbalance between revenue and costs. It was noted that there was cross-subsidisation from research and consultancy to teaching and fee income from international students also cross-subsidised other teaching areas. It was noted that the Faculty is strengthening its position with respect to the potential vagaries of income from international students through the implementation of agreements with international universities.

#### **Recommendation 2**

The Academic Board encourages the Faculty to develop strategies that will ensure the ongoing sustainability of quality learning, teaching and research in all disciplines.

#### 3.2 Strategy Deployment

The SER provided examples of how the Faculty turns its strategic plan into action plans for implementation. At the School level, targets are set in alignment with Faculty goals, and Schools work towards these. These included at Faculty level, setting targets to improve research completion rates. Examples were also provided at School level, including in Civil, where management meetings discuss targets for the year and align them with strategic goals. Typically two or three goals are selected, e.g. the introduction of Faculty scholarships. The Review Team formed the view that the Faculty had well developed mechanisms for strategy deployment.

## (4) STUDENT AND STAKEHOLDER FOCUS

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### 4.1 Knowledge of students and stakeholders

The Faculty advised that its focus on students and stakeholders includes listening to and addressing anticipated requirements, needs and desires through the use of feedback through formal mechanisms such as teaching quality surveys and key performance indicators (such as retention, progression and attendance rates), as well as through informal feedback mechanisms. This feedback is then filtered back into the Faculty's processes to both improve current services and to inform strategic planning for future Faculty activities.

### 4.2 Obtaining and using student, stakeholder and market knowledge

Formal feedback mechanisms such as the USE, CEQ, SCEQ and enrolment surveys, are important components of the data available to the Faculty from student feedback. This is also addressed under 4.2 Student and stakeholder relationships and satisfaction, below.

The Flexible First Year program provide a strong case study of how the Faculty uses student and stakeholder feedback within its quality improvement process cycle to develop and innovate programs to meet student requirements. The Flexible First Year program allows students to take a common set of first year units and then decide after first semester or at the end of first year in which stream they wish to complete their degree. A survey of this program has recently been completed and has provided valuable insights for the Faculty.

#### **Commendation 2**

The Faculty is commended for implementation of its successful Flexible First Year program and for the completion of the recent comprehensive review of this program incorporating student and stakeholder feedback.

### 4.3 Student and stakeholder relationships and satisfaction

#### (a) Building relationships and growing student and stakeholder satisfaction

The Faculty advised that relationships are built through strategies designed to:

- build a sense of community, inclusion and support for students;
- provide forums for engaging industry and employers;
- provide opportunities for feedback on the quality services, such as student evaluation methods and accreditation processes;
- demonstrate the Faculty's responsiveness to students and stakeholders.

#### (b) Building a sense of community

Each School has a number of activities for building cohesive student cohorts. These seem to be working well and students were enthusiastic in their praise of their Schools for building friendly and supportive environments. Students in combined degrees found that there were many more opportunities for interaction in EIT than in their other Faculty. Students found it easy to seek assistance from staff and discussion groups worked well. Social activities such as weekly BBQs were particularly effective in building a cohesive student cohort. Particularly in a smaller School such as CBE, both undergraduate and postgraduate students felt that they were well informed and had ready access to staff.

Student bodies such as SUWIE (Sydney University Women in Engineering), SUEUA (the Sydney University Engineering Undergraduates Association) and SUCE (Sydney University Civil Engineers Association) worked very well. The Review Team obtained a particularly favourable impression of CBE's activities to create a bonded student community.

### **Commendation 3**

The Academic Board commends the Faculty and Schools on the structures they have in place to build a sense of community for students.

#### **(c) Determining student and stakeholder satisfaction**

The Faculty has acknowledged the importance of addressing the reasons for its poor CEQ scores. The Review Team explored with the various groups the factors which have the strongest influence on these scores.

Some of the reasons put forward by senior staff were:

- Students may feel they are pushed too hard as the curriculum is very intensive.
- Accreditation requirements mean that a large amount of material needs to be covered.
- Poor staff/student ratios.
- Accommodation problems: students do not even fit into lecture theatres. Staff felt that that there had to be a halt to growth in student numbers.
- Staff tend to focus on research rather than the development of teaching skills. It was noted that the Faculty no longer provided any teaching awards.

It was noted that USE results were generally good, but there is an unexpected and unexplained disconnect between USE and CEQ scores. The Faculty was trying to determine what was behind these poor scores. While they were not out of alignment with CEQ scores in some other GO8 Engineering faculties (UNSW, University of Melbourne) the University of Queensland scores were much higher and the Faculty would be doing some benchmarking against that Faculty. It was felt that the University of Queensland and the University of Melbourne had a more student-focused approach. The Faculty was looking at the initiatives being developed at the University of Western Australia. One approach favoured was an Integrated Learning Centre to focus more on team-based work.

The Review Team found that the opportunities for student feedback in the Faculty worked well. Several of the students interviewed had participated in feedback groups, which comprised representatives from each year, both students and lecturers. The purpose of the feedback groups was to try to understand the reasons for the low CEQ scores. Some of the issues raised were:

- Students are not always clear what is expected of them
- Assessments were not always seen as fair – they might relate to content and material not covered in classes and not available on the web. Staff pointed out that students did not always feel that thesis marking policies were fair.
- Lecturers see the ‘big picture’ and do not always realise that the foundation knowledge on which topics are built might be lacking in their students. There are frequently gaps in students’ knowledge that are not covered.
- Students found a variety of abilities and approach in their lecturers which had a considerable impact on their learning experiences. Some students gain the impression that staff are not interested in teaching.

The Review Team was concerned, however, that while the Faculty had invited student participation from a wide range of Schools, the students interviewed were mostly from one School in the Faculty.

The Review Team explored staff attitudes towards teaching. It was noted that the Faculty does not have any internal teaching awards, although the reinstatement of a teaching award was on the Faculty’s agenda. There is a tendency in a high research-performing faculty such as this to concentrate on research at some expense to the development of teaching skills. Concentration on research output may impact on CEQ scores. A view was expressed that staff learned their teaching skills early in their academic careers and that they could concentrate on developing their research thereafter, with this skill base firmly established. Although all new staff must

now undertake the Graduate Certificate in Education for confirmation, there did not appear to be any mechanisms in place to ensure that excellence in teaching is a valued and entrenched attribute in all staff.

Nevertheless, there is evidence of excellent teaching in the Faculty. The revised curriculum in CBE had been very well received. The curriculum was integrated across the whole degree, with project work cutting across a number of units of study. Project work was based on the stage students had reached in their core courses and could be a physical (built) project/laboratory-based/or theoretical. Similar curriculum structures operated in AMME, but not in Civil. It was suggested that the Dean might wish to look into this further.

**Recommendation 3**

The Academic Board recommends that the Dean and Faculty be encouraged to develop mechanisms to enhance and reward good teaching.

The Review Team explored with both staff and student groups the strategies the Faculty has in place to handle Students at Risk. It was clear that staff have mechanisms for recognising potential problems, and try to deal with issues before they reach a serious stage. For example, staff acknowledge that some research students try to overachieve and supervisors are able to step in an intercept problems at an early stage.

**Affirmation 5**

The Academic Board affirms the Faculty's commitment to work with ITL to understand the factors impacting on CEQ results and whether these can be used as indicators of the success of Faculty initiatives in learning and teaching.

**Commendation 4**

The School of Chemical and Biomolecular Engineering is commended for the successful restructuring of its curriculum.

**(5) MEASUREMENT, ANALYSIS AND KNOWLEDGE MANAGEMENT**

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The Review Team notes that Faculty's summary of the data used to measure performance and support Faculty decision making.

## (6) WORKFORCE FOCUS

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### 6.1 Workforce Engagement

#### (a) Workforce enrichment

The Faculty advised that its approach to leadership and strategic planning drives its approach to workforce engagement. To achieve its mission, the Faculty recognises that it must attract, reward, retain and develop high-performing staff and create a workplace environment that encourages and enables them to do their best work. All academic staff appointed to the Faculty are expected to have the potential to progress to Level E within ten years.

For this reason, the Faculty has identified *Recognition and Reward of Staff* as one of the three key factors critical to the achievement of the Faculty's overall mission. Three of the seven strategies set out in the Strategic Plan relate to creating a workplace culture that fosters high performance:

- Improve Graduate Quality
- Improve Research and Teaching Infrastructure and Capability and
- Recruit, Develop and Retain (through reward, recognition and support) our People.

#### (b) Faculty culture and motivation of workforce

The Faculty's culture is such that all staff are strongly encouraged to achieve their potential. The Faculty places a strong emphasis on informal mentoring and the Review Team explored this strategy in some depth. Each Head of School has developed an informal mentoring structure, where a more senior professor within each discipline provides guidance and support to less experienced staff members. Mentoring applied even to new Level E appointments. An effective mentoring system to support junior researchers in their applications for external research funding has been developed across the Faculty. Academic staff belong to research groups and new staff are assigned to research groups, which have a mentor. Staff confirmed during the review visit that research mentoring works well generally, but was not necessarily consistent across the Faculty. Staff appreciated the external consultants available to the Faculty to assist with grant proposals through the Research Office. The Review Team noted, however, that there is no formal mentoring program for teaching.

#### **Affirmation 6**

The Academic Board affirms the Faculty's commitment to the development of a staff mentoring program for more especially for more junior staff and recommends that such a program also provide a stronger focus on teaching.

#### (c) Workforce and leader development

The PM&D process is used for staff development purposes and is also used as an effective focus for mentoring. The Review Team noted that the Faculty had achieved a high level of promotions to Levels D and E in the period 2002-2006.

#### (d) Workforce Engagement

It is clear that there is a high level of workforce engagement in the Faculty, as evidenced by the

- Competitive position of the Faculty both nationally and internationally (see Section I) – for example the iTEV Report has found that *the Faculty at University of Sydney enjoys stronger local support than that at other Sydney based Engineering Faculties*.
- High levels research productivity
- Membership of relevant professional associations by a significant proportion of staff
- The extent to which staff are prepared to exert discretionary effort to enable fulfilment of their teaching, research and administrative responsibilities at a time of ever-increasing student-staff ratios.

The Review Team noted that all staff had a very high workload. There were increasing numbers of students, decreasing numbers of staff, and a very high expectation of research productivity, along with increasing administrative workloads in recent years. Some staff with Faculty management responsibilities, such as Associate Deans, were finding it difficult to maintain their research. Other staff worked at unreasonable hours in order to ensure they had some family time. The Review Team was concerned as to whether this heavy workload was sustainable and encouraged the Dean to explore this in more depth.

There was some discussion on the development of a workload model and there was a range of views on whether a workload model could be effective. The Dean advised that he was developing a workload model.

## **6.2 Workforce Environment**

The Faculty's strategic planning process forms the basis on which it determines how it will position itself to address current and emerging academic needs. This includes "recruiting, developing and retaining (through reward, recognition and support) our People to ensure a workforce of the highest capability." To ensure that the Faculty engages the highest quality staff at the time of recruitment, new appointees are assessed against their potential to assume senior roles within the Faculty. Each School is responsible for the management and organisation of its staff and for creating a positive and productive work environment. The Review Team formed the impression that staff were satisfied with their workforce environment although, as mentioned above, there were concerns about workload expectations.

## (7) ACADEMIC PROCESS MANAGEMENT

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The Faculty seeks input from a broad range of stakeholders and is involved in a continuous cycle of review and quality enhancement for all its undergraduate programs which are fully accredited by Engineers Australia and the Australian Computer Society. The Review Team was impressed with the strategies the Faculty has in place to ensure high academic quality, address student and stakeholder needs and achieve sustainable educational programs.

### 7.1 Coursework Program Design and Delivery

#### (a) Core Competencies/Course development process/Coursework program design

Core curricula in the Faculty must satisfy the accreditation requirements of Engineers Australia and the Australian Computer Society which specify both the generic skills required of graduates and the technical competencies required in specific professional areas. In determining core curricula the Faculty also considers the recommendations of international professional bodies (e.g. IChemE, IEEE, ASCE, ACM, ACS, RAeS, and AIAA) which provide published guidance on expected technical competencies.

The Review Team explored the extent to which opportunities to change curricula are constrained by the accreditation process. It was explained that this comes from both sides – the requirements of accreditation and the requirements of the University and Faculty both apply. CBE recently rewrote its curriculum and this was accepted by the accrediting bodies – this was an example of how Schools can sometimes lead in curriculum development, whereas at other times they are required to follow the requirements of accreditation. Accreditation is important for international students and accreditation under the Washington Accord means that students can work anywhere.

Coursework program design and its impact on workload and satisfaction was explored with the undergraduate students. The transition to university was often difficult because of the independent learning environment at University compared to the High School learning environment.

Students found the workload very heavy and often struggled to maintain a balance with other commitments. It was noted that most students had some form of part-time employment. Students in combined courses observed that they could afford to skip the occasional lecture in other faculties, but not in Engineering, because of the essential nature of the content of engineering lectures. Undergraduate students found the workload very heavy particularly in the final year. A view was expressed that some units may have workload requirements out of scale with their credit point value. Integration of the assessment timetable was also seen as something of a problem. Undergraduate students confirmed that their learning was competency based. They were required to pass every component of a unit of study and found that there was good articulation into the workforce.

Postgraduate coursework students commented that the quality of teaching was variable and lecturers did not always motivate students. As with undergraduate students, postgraduate students all had very heavy workloads but had a lot of self-motivation and took a great deal of pride in what they had learned. All felt very confident about the workplace skills they were gaining. Postgraduate coursework students found that the most stimulating aspect of their courses were site visits and industry experience. Students were encouraged to be self-learners and were provided with good support structures. All had very positive experiences (although were all from one School in the Faculty).

Aspects of their coursework programs they did not like were:

- Group work, where poorer students pulled down the grades of better students

- Some problems when they were in the same classes a 4<sup>th</sup> year honours students who had a better understanding of a particular issue (.e.g. Design).

The groups of students with whom the Review Team met were mostly from one School in the Faculty, hence the Team has had to use caution in extrapolating their comments across the Faculty. However, it is suggested that the Dean may wish to explore the generality of the student workload issues raised.

**(b) Coursework Delivery**

The delivery and appropriate resourcing of programs are the responsibility of the various Heads of School and program leaders. There are continuing review processes to allow the continued checking of a program's outcomes against the initial proposal. The Faculty employs a combination of delivery and learning strategies to engage students in active learning, stimulate their curiosity and enhance their motivation to learn. It also emphasises the importance of research-led teaching in the design and delivery of coursework.

**(c) Support for Teaching and Learning**

The SER commented on the effectiveness of a range of key services supporting program delivery. Delivery of IT services was a cause for some concern. The Associate Dean advised that the Faculty was looking at forming a Faculty-wide IT team. The Faculty preferred to have control of its own systems rather than having them under the central control of ICT.

**Affirmation 7**

The Academic Board affirms the Faculty's recognition that that its activities are limited in many areas by problems arising from services provided by Information and Communications Technology (ICT) and that it needs to work more closely with ICT to improve the services they deliver to the Faculty.

## 7.2 Research and Research Training

**(a) Core Competencies**

The core competencies of the Faculty are closely related to its mission and consistent with its Strategic Plan which, in turn, is aligned with that of the University of Sydney. In identifying new core competencies, the Faculty is guided by:

- National research priorities
- Government research policies
- Needs of Australian industry
- Strategic plan of the University of Sydney
- New and outstanding scientific issues
- Issues affecting standards of living in Australia
- Concerns of national and international society

The Faculty has the following core competencies in research:

- Bioengineering
- Systems and Control
- Energy, environment and sustainability
- Materials and structures
- Product and process engineering
- Information and communication technologies

**(b) Research**

The Faculty is one of the leading engineering research faculties in Australia and has the greatest national competitive grant income per equivalent academic staff member of any engineering faculty in Australia. It is currently ranked amongst the top three engineering faculties in Australia and is ranked first in Australia in the Shanghai Jiaotong Index. When queried on the

level of research depth across the Faculty, the Dean advised that all Schools had considerable research depth, with the possible current exception of Civil. The reason for this was that the School is being rebuilt following the departure of some senior research-active staff.

While acknowledging this research excellence, the Review Team also found that there is a limited amount of research collaboration between Schools. Some staff found this a problem and it very much depended on individual staff to find mechanisms to make this work.

**(c) Research Training**

To maintain its status as the premier choice for postgraduate study and research in Australia, the Faculty endeavours to continuously enhance all stages of the research training experience from enrolment to graduation. There was some discussion with staff on the advisability of coursework training with the PhD. There were varying views on this. Some felt that coursework in the first year would be beneficial. However, this might extend candidature, which would not be a good thing. It could be a good idea for it to become a component in probationary candidature, one advantage of this being that students would have better understanding of the University system. One of the problems, however, would be ensuring that the unit was at an appropriate level.

PhD students raised the following issues during the review visit:

- they are encouraged to publish and attend conferences but are not provided with other skills training eg writing grant applications. There is some, limited, mentoring of undergraduate honours students
- the strongest elements of their courses were their links with industry. They wanted their doctorate studies to provide them with a wide range of options, both within academia and industry.
- there is not enough integration of research groups. In CBE the research committee has helped to break down barriers and research seminars have also helped.
- the cost of living is very high –they needed to live close to the University and rents were very high. Time constraints made it difficult to find part-time work to subsidise scholarship income.
- they did not always have access within the Faculty to the equipment they needed for their research. This was particularly the case with Biomaterial equipment. It was acknowledged that this was expensive equipment and the numbers of students who required it is relatively small, but it was often difficult to access the equipment in other areas in a timely manner.

**Recommendation 4**

The Academic Board recommends that the Faculty explore mechanisms to make it easier for students to access equipment in other areas of the University and make the guidelines for cooperation clearer.

**(d) Research Supervision**

The Faculty acknowledged the need to improve the quality of its research supervision. This was being driven by PREQ outcomes and strategies include:

- Awards
- Staff/student meetings
- Establishment of supervisory teams

**Affirmation 8**

The Academic Board affirms the Faculty's intention to consider the implementation of formal Faculty-wide processes to improve the quality of supervision.

**Recommendation 5**

The Academic Board recommends that the Faculty develop, implement and evaluate strategies to improve the supervision of research higher degree students.