



## Report of Validation Panel

Date of Meeting: 31/May/2010

**Named Award:** Master of Engineering  
**Programme Title:** Master of Engineering in Mechanical / Structural / Chemical & Biopharmaceutical Engineering  
**Award Type:** Masters Degree  
**Award Class:** Major  
**NFQ Level:** 9  
**Intakes Commencing:** September 2010  
**ECTS/ACCS Credits:** 90

### PANEL MEMBERS

Name
Dr Michael Creed, Department of Civil & Environmental Engineering, UCC
Mr Charles Dolan, Eli Lilly S.A.
Dr Huw Lewis, Department of Manufacturing & Operations Engineering, University of Limerick
Mr Pearse Sutton, O'Connell Sutton Cronin Consulting Engineers
Dr Gavin Walker, School of Chemistry & Chemical Engineering, Queen's University Belfast
Mr Ed Riordan, Deputy Registrar & Head of Academic Quality, CIT

### PROPOSING TEAM MEMBERS

Name
Mr Michael Loftus, Head of Faculty of Engineering & Science
Mr Matt Cotterell, Head of School of Mechanical & Process Engineering
Dr Joe Harrington, Head of School of Building & Civil Engineering
Mr John O'Shea, Head of Dept of Chemical & Process Engineering and Acting Head of Dept of Mechanical Eng.
Mr Des Walsh, Head of Department of Civil, Structural & Environmental Engineering
<b>In attendance:</b>
Mr Daithí Fallon, Head of Department of Manufacturing, Biomedical & Facilities Engineering,
Dr Ger Kelly, Department of Manufacturing, Biomedical & Facilities Engineering
Mr Noel Duffy, Department of Chemical & Process Engineering
Dr Michael J. O'Mahony, Department of Mechanical Engineering
Dr Lorraine Howard, Department of Mechanical Engineering
Mr Chris Gibbons, Department of Mechanical Engineering
Mr John J. Murphy, Department of Civil, Structural & Environmental Engineering
Mr John P. Murphy, Department of Civil, Structural & Environmental Engineering
Mr Brian O'Rourke, Department of Civil, Structural & Environmental Engineering
Dr Niamh Power, Department of Civil, Structural & Environmental Engineering
Mr Kieran Ruane, Department of Civil, Structural & Environmental Engineering
Ms Mary Moloney, Department of Civil, Structural & Environmental Engineering
Ms Norma Hurley, Department of Civil, Structural & Environmental Engineering
Mr Gerard O'Donovan, Head of School of Business

### BACKGROUND TO THE PROPOSED PROGRAMME

This proposal seeks validation of three taught Masters degrees in Mechanical, Structural, and Chemical & Biopharmaceutical Engineering. In developing these taught Masters programmes the Faculty of Engineering & Science is endeavouring to create additional progression routes for its engineering graduates, with a view to increasing their career opportunities. The Faculty is conscious of developments with regard to Engineers Ireland accreditation in the future, in particular the graduate credits required for Chartered Engineer status. The Faculty also wishes to support the strategic direction of the Institute in the provision of a range of taught Masters programmes.

## FINDINGS OF THE PANEL

### 1. General

The Panel commends the proposing team from the various departments in the Faculty of Engineering & Science, and welcomed the lively discussion during the validation meeting. The panel also commends the Faculty on its efforts to develop these programmes.

*NOTE: In this report, the term “Requirement” is used to indicate an action or amendment which in the view of the Panel **must** be undertaken prior to commencement of the Programme. The term “Recommendation” indicates an item to which the Institute/Academic Council/Course Board should give serious consideration for implementation at an early stage and which should be the subject of ongoing monitoring.*

### 2. Validation Criteria

The Panel has considered the documentation provided and has discussed the programmes with the proposers. The Panel has concluded that the MEng in Structural Engineering programme meets the required standards in the Engineering field of study at Level 9 of the National Framework.

The proposed Programme Outcomes for the MEng in Structural Engineering, as presented to the Panel, are attached as Appendix 1. The semester schedules are attached as Appendix 2.

The Panel has specific requirements and recommendations with regard to the MEng in Mechanical Engineering and MEng in Chemical & Biopharmaceutical Engineering. These requirements and recommendations should be considered and implemented as appropriate by the proposers and revised documentation submitted for a final validation review process.

#### 2.1 Need for the Programmes; Likely Level of Applications

The proposers see these programmes primarily as a continuation of the relevant specialist undergraduate honours degree programmes, and as progression routes for the Institute’s Level 8 Engineering graduates. Notwithstanding this, while the first cohort would be composed of 2010 graduates, there have been enquiries from previous years graduates who are looking to reposition themselves or strengthen their qualifications. In line with Institute policy in this regard, all such applications will be assessed on a case-by-case basis. The proposers will be cognisant of the Institute’s obligations in deciding on the initial cohort of 20.

The standard minimum entry requirement will be a result of H2.2, in line with NFQ guidelines. The proposing team envisage that the entry standard in reality will be higher, probably at H2.1 level. A competitive entry process is anticipated, with more applicants than available places.

**Recommendation:** The panel recommends that a 60-credit Postgraduate Diploma be built into the programmes. This would stand as an exit award for students who do not attain the required standard/knowledge for the full Masters including Project.

#### 2.2 Are the level and type of the proposed award appropriate?

Yes, for all three programmes.

#### 2.3 Is the learning experience of an appropriate level, standard and quality?

Yes, for the MEng in Structural Engineering programme.

## 2.4 Is the programme structure logical and well designed (including procedures for access, transfer and progression)?

The Panel notes that the structure of the proposed programmes has already been the subject of external peer evaluation. Notwithstanding this, the Panel notes the following:

- *Sustainable Development* is an elective module on the Structural Engineering programme, whereas it is a mandatory module on the other two programmes. The indicative content in this module is somewhat generic and is considered too broad-based for a Masters programme.

**Recommendation:** The panel recommends that this module could be revised to include topics such as energy efficiency and renewable materials.

**Recommendation:** It is advised that this revised module be made mandatory.

- The *Research Dissertation* is a 30-credit module, which has two 5-credit modules supporting it, namely, *Engineering Research Skills* in semester 1 and *Project Research Development* in semester 2

**Recommendation:** It is advised that the Engineering Research Skills module be made an elective.

- Mechanical Engineering and Chemical Engineering have much shared material, as is evident from the semester schedules. In the proposed Chemical Engineering programme, and to a lesser extent the Mechanical Engineering programme, the proposal does not (in its current form) impress as a distinct discipline-specific Masters degree.

- **Requirement:** Review the Mechanical and Chemical Engineering Masters structure to foreground advanced modules within the respective fields. The balance in the current proposals between “deepening” and “broadening” in the opinion of the Panel is too much towards the latter. Nevertheless, it is fully acknowledged that the proposed add-on Masters degrees are in each of these cases topping out accredited honours degrees of very high quality.

## 2.5 Are the programme management structures adequate?

Yes, for all three programmes.

## 2.6 Are the resource requirements reasonable?

The Panel was assured by the Head of Faculty, on behalf of the President, that appropriate resources in terms of staffing and facilities will be put in place when the programmes are validated.

## 2.7 Will the impact of the programme on the Institute be positive?

Yes. The proposed programmes support the Institute’s mission and draw on its strengths.

## 3. Specific Modules

The Panel notes that many modules on the proposed programme are pre-approved modules derived from related programmes in the CIT Modular system. The Panel was also informed that the new draft modules have been the subject of internal and external scrutiny by the CIT module moderator and external reviewers.

In exercising its brief to consider the overall standard and appropriateness of modules, the Panel wishes to add the following observations:

### MEng in Structural Engineering

- With regard to the *Sustainable Development* module, the Panel and the prior external assessor raised the possibility of designating this module as mandatory rather than elective. The programme team will reconsider this issue.
- *Advanced Structural Design Office* – this is one of the key modules on the programme, and the workload attached lends itself to a 10-credit module. The structure of the module means that splitting the module into

two 5-credit modules is not practicable. The case for a 10-credit module is strengthened by the fact that this is not an off-the-shelf module, and will not be offered anywhere else in the college.

**Recommendation:** The Panel supports this being retained as a 10-credit module.

**Recommendation:** The Panel recommends that the teamwork aspect of this module should be emphasised, with the possibility of students doing joint-projects being considered. This module is assessed by 100% continuous assessment, with re-assessment by repeat of coursework, not repeat exam.

**Recommendation:** In general, the Panel recommends that the use of continuous assessment versus terminal exams should be looked at again, so that the assessment regime is based on the most appropriate method of assessing the learning outcomes of the module. For example, the Panel suggest that the module “Advanced Geotechnical and Foundation Engineering” might have a terminal examination element.

**Recommendation:** The assessment schedule arising from the modules as proposed (seen from the students’ perspective) should be drawn up and reviewed by the proposers. This is to ensure that the assessment load is fair and reasonable.

### **MEng in Mechanical Engineering**

- The programme team informed the panel that formal feedback from employers and graduates was not sought regarding the content of the proposed programme.
- The Panel notes that there is only one terminal exam in semester 2. The timing of the assessments needs to ensure that students are not overloaded with assessments at any one time.

**Recommendation:** The panel recommends that the programme team should revisit some of the timings on the assessment schedule, to ensure that the assessment load is fair and reasonable.

**Recommendation:** The panel suggests that certain modules from the Chemical Engineering programme could be offered as electives on this programme, e.g. quality engineering.

### **MEng in Chemical & Biopharmaceutical Engineering**

- The composition of modules on this programme was derived primarily from feedback from the department’s industry liaison panel. The department is aware that it needs to deepen the technical content of some modules, while at the same time broadening into the business/management subjects.
- The *Secondary Processing* module is not of a good standard, and should be revised.

## **4. Conclusions**

The Panel recommends that the MEng in Structural Engineering programme be validated for five years, or until the next programmatic review, whichever is soonest, subject to implementation of the Requirements above, and with due regard to the Recommendations made.

With regard to the MEng in Mechanical Engineering and MEng in Chemical & Biopharmaceutical Engineering, the Panel would like to see its requirements and recommendations considered and implemented as appropriate. The Panel will review amended documentation for both programmes before final validation. The Panel reiterates its respect for the quality of the undergraduate honours degree programmes in each of the three discipline areas; however, it is felt that in the case of Mechanical and Chemical & Biopharmaceutical Engineering the Masters level proposals need some work to enhance their attractiveness and the level of discipline-specific material.

## APPENDIX 1 – Proposed Programme Outcomes –Structural Energy

### Programme Outcomes

On successful completion of this programme the learner will be able to demonstrate:

<b>PO1</b>	<b>Knowledge - Breadth</b>	a wide and systematic knowledge of scientific principles and the design process in Structural Engineering; an understanding of the key parameters and the technical, economic, environmental and social issues pertaining to Structural Engineering
<b>PO2</b>	<b>Knowledge - Kind</b>	a critical awareness of current issues in Structural Engineering, a knowledge of the latest mathematical, scientific and ICT techniques and their limitations in their practical application to ill defined complex problems of Structural Engineering
<b>PO3</b>	<b>Skill - Range</b>	mastery of a range of specialised research and design tools and methods of investigation and analysis in the field of Structural Engineering; the ability to use engineering principles to design and develop new solutions to complex Structural Engineering problems
<b>PO4</b>	<b>Skill - Selectivity</b>	the ability to select appropriate advanced skills and use new methods required for novel situations and the ability to develop, to a high level, new skills in emerging techniques as required in Structural Engineering design and analysis; the ability to undertake analysis of a design and justify decisions throughout a particular design process
<b>PO5</b>	<b>Competence - Context</b>	the ability to act at a variety of professional levels, particularly in the initiation, development and promotion of design solutions in Structural Engineering; the ability to identify potential projects and opportunities, conduct appropriate research and undertake the design and development of solutions to ill-defined and complex engineering problems
<b>PO6</b>	<b>Competence - Role</b>	that they have the technical competence necessary to take significant responsibility for the work of individuals and groups, lead and initiate activity in Structural Engineering
<b>PO7</b>	<b>Competence - Learning to Learn</b>	the ability to evaluate their own learning, identify knowledge gaps, and take responsibility for the pursuit of academic professional development pathways
<b>PO8</b>	<b>Competence - Insight</b>	an awareness of the impacts of Structural Engineering infrastructure on society and the ability to critically evaluate the technical, economic, environmental and social implications of Structural Engineering solutions.

## Appendix 2 – Semester Schedules

### Semester Schedules

#### Semester 1

Mandatory								
Mod Code	Module Title	Co-ordinator	Level	Credits	FT Hours	PT Hours	Course Work	Final Exam
No Code Yet	Structural Engineering (Pending Approval)	DES WALSH	Expert	5.0	3.00	0.00	40.0%	60%
No Code Yet	Bridge Engineering (Pending Approval)	DES WALSH	Expert	5.0	3.00	0.00	50.0%	50%
No Code Yet	Computational Solid Modelling (Pending Approval)	MATTHEW COTTERELL	Expert	5.0	3.00	0.00	100.0%	0%
No Code Yet	Advanced Geotechnical & Founda (Pending Approval)	DES WALSH	Expert	5.0	3.00	0.00	100.0%	0%
No Code Yet	Engineering Research Skills (Pending Approval)	DES WALSH	Expert	5.0	2.00	0.00	100.0%	0%
Elective								
Mod Code	Module Title	Co-ordinator	Level	Credits	FT Hours	PT Hours	Course Work	Final Exam
No Code Yet	Sustainability in Engineering (Pending Approval)	DES WALSH	Expert	5.0	3.00	0.00	50.0%	50%
MGMT8017	Strategic Business Management (Approved)	CAROLINE O REILLY	Advanced	5.0	3.00	0.00	30.0%	70%

#### Semester 2

Mandatory								
Mod Code	Module Title	Co-ordinator	Level	Credits	FT Hours	PT Hours	Course Work	Final Exam
No Code Yet	Advanced Structural Design Off (Pending Approval)	DES WALSH	Expert	10.0	6.00	0.00	100.0%	0%
No Code Yet	Infrastructure/Special Structu (Pending Approval)	DES WALSH	Expert	5.0	3.00	0.00	30.0%	70%
No Code Yet	Project Development (Pending Approval)	DES WALSH	Expert	5.0	1.00	0.00	100.0%	0%
Elective								
Mod Code	Module Title	Co-ordinator	Level	Credits	FT Hours	PT Hours	Course Work	Final Exam
No Code Yet	Eng. Project Management (Pending Approval)	DES WALSH	Expert	5.0	2.50	0.00	100.0%	0%
No Code Yet	Computational Fluid Dynamics (Pending Approval)	MATTHEW COTTERELL	Expert	5.0	3.00	0.00	100.0%	0%
No Code Yet	Leadership & Change Management (Pending Approval)		Expert	5.0	3.00	0.00	100.0%	0%
MGMT9003	Managing Innovation (Approved)	CAROLINE O REILLY	Expert	5.0	3.00	3.00	100.0%	0%

#### Semester 3

Mandatory								
Mod Code	Module Title	Co-ordinator	Level	Credits	FT Hours	PT Hours	Course Work	Final Exam
No Code Yet	Project Realisation (Pending Approval)	DES WALSH	Expert	30.0	0.50	0.00	100.0%	0%