

Report of Validation Panel

Date of Meeting: 18/06/2018

Named Award: Master of Engineering

Programme Titles: Master of Engineering in Mechanical Engineering
Master of Engineering in Biomedical Engineering

Award Type: Taught Masters

Award Class: Major Award

NFQ Level: Level 9

Intakes Commencing: September 2019

ECTS/ACCS Credits: 300

PANEL MEMBERS

Name / Function / Institution
Dr. William J Smith, Dept of Mechanical Engineering, University College Dublin [Panel Chairman]
Mr. John Golden, Engineering Manager, Boston Scientific
Prof Garret O'Donnell, Dept of Mechanical Engineering, Trinity College Dublin
Mr Patrick O'Donoghue, Mechanical Eng. Manager, Project Management Group
Prof Noel Barry, Head of Academic Studies, Graduate Studies Office, CIT

PROPOSING TEAM MEMBERS

Name / Function / Department
Dr Matt Cotterell, Head of School of Mechanical Electrical and Process Engineering
Prof. Ger Kelly, Head of Department of Mechanical Biomedical and Manufacturing Engineering
Dr Lorraine Howard, Lecturer, Department of Mechanical, Biomedical and Manufacturing Eng.
Dr Keith Bryan, Lecturer, Department of Mechanical, Biomedical and Manufacturing Eng.
Dr Hugh O'Donnell, Lecturer, Department of Mechanical, Biomedical and Manufacturing Eng.
Mr Michael O'Mahony, Lecturer, Department of Mechanical, Biomedical and Manufacturing Eng.
Prof Roy Sleator, Lecturer, Department of Biological Sciences
Dr Maire Begley, Lecturer, Department of Biological Sciences
Dr Brigid Lucey, Lecturer, Department of Biological Sciences

BACKGROUND TO THE PROPOSED PROGRAMMES

The Department of Mechanical, Biomedical and Manufacturing Engineering (MBM) revalidated all of its programmes in the academic year 2014-2015, including its 90 credit taught M.Eng in Mechanical Engineering developed in response to Engineers' Ireland requirement for a masters qualification for Chartered Engineering eligibility. Recently UCD, Trinity, UL and UCC have offered integrated five year programmes in Engineering with the option to step off at different stages in the 5 year term and receive alternative qualifications.

The Department, at its last programmatic review, outlined a draft proposal for an integrated five year M.Eng in Mechanical Engineering and Biomedical Engineering based around the existing 4 year/stage B.Eng Hons programmes in both disciplines which was unanimously supported by the review panel. The MBM department developed a framework or template for an integrated masters across CIT (as none existed) and subsequently got approval from Academic Council for this proposal. Following on from Academic Council approval, the MBM department is proposing to offer two five year integrated M.Eng programmes, in Mechanical Engineering and Biomedical Engineering, based on the existing B.Eng Hons programmes, pending full revalidation of all programmes within the department over the next two years.

The five year/stage programmes proposed here make no changes to the first three stages of the existing 4 stage B.Eng Hons programmes. At the end of stage 3 students can elect to complete stage 4 and exit with the existing B.Eng Hons award or, subject to academic criteria, complete a further two stages and exit with an M.Eng award. In this case, students complete a modified stage 4 (stage 4*) with up to a maximum of twenty credits different from stage 4 on the existing B.Eng Hons programme, and then complete stage 5 comprised of 30 credits of modules and a 30 credit thesis. Students on the M.Eng programme must complete a minimum of 60 credits of expert modules. Provision exists within the framework to accommodate change of mind and advanced entry. The first instance of delivery of Stage 4* should be in the academic year 2019/20. The proposed 300 ECTS credit programme is Bologna compliant.

FINDINGS OF THE PANEL

The Panel has considered the documentation provided and has discussed the programme with the proposers. Based on this, the Panel has arrived at a number of Findings, Requirements and Recommendations as follows.

1. Programme-Level Findings

1.1 NEED FOR THE PROGRAMME

Validation Criterion: Is there a convincing need for the programme with a viable level of applications?

Overall Finding: Yes

1.2 AWARD

Validation Criterion: Are the level and type of the proposed award appropriate?

Overall Finding: Yes

1.3 LEARNING EXPERIENCE

Validation Criterion: Is the learning experience of an appropriate level, standard and quality overall?

Overall Finding: Yes

1.4 PROGRAMME STRUCTURE

Validation Criterion: Is the programme structure logical and well designed (including procedures for access, transfer and progression)?

Overall Finding: Yes with a number of Recommendations

- 1.4.1 **Highly recommended:** Stipulate modules in years 3, 4 and 5 to be a progression order, and definitely in year 4 and 5, i.e. prior learning requirements should be clearly defined for “Advanced” and for “Expert” level modules to demonstrate the increasing depth. This may not be necessary for all modules, i.e. having a balance of depth and breadth in year 4/5. The use of “or equivalent” may be appropriate to account for transfers from other institutions or other pathways. This is the case for both programmes submitted.
- 1.4.2 The proposed progression requirement at year 3 for the Masters programme is H22, i.e. 50%. The team may want to reflect on this level, perhaps leaving this open in future year to be reconsidered after a period of time, for example moving to 55% or higher.
- 1.4.3 The team should consider clearly articulating the difference between Masters-level project efforts/level/outcomes and Bachelor level project effort/level/ outcomes, and have clear rubrics in place. It may be necessary for Masters level projects to be more

tightly scoped from the start, rather than the current model for Bachelor projects whereby ideas come from PI's on research themes, student ideas, and also ideas from industry internship experiences. The team could reflect on this, perhaps in the early years start by using ideas from research groups or tightly scoped well thought out industrially aligned topics that will have enough content to satisfy a Masters-level project.

1.4.4 The team may wish to reconsider or reflect on the current proposal to have the main thesis activity only taking place in 1 semester i.e. 30 credits of independent project activity in one semester approx 3-4 months. Even though this is proposed as the only activity, it is a relatively short timeframe to develop and assimilate ideas to Masters Level and could be challenging for students.

1.4.5 The team could reflect on the credit allocation to project and related modules (year 5 has 35 credits!). TCD and UCD both have 25 credits for the project and an associated 5 credits of research skills currently, making a 30 credit "research" activity. Look at standard rubric for same.

The CIT proposal for the Level 9 programmes is essentially a "3 + 2" model: *i.e.* having completed year 3 of the Level 8 programme, students with sufficiently high grades can choose to progress to an integrated 2-year programme that will result in a Level 9 qualification. This is very similar to the UCD model.

The team should therefore consider basing a student's Level 9 degree award calculation on the credit-weighted grades obtained in ALL graded modules completed during the 2-year integrated M.Eng. programme. In UCD, 90 of the 120 available credits are graded (the 30-credit Internship is grade-neutral). 25 credits are assigned to the major project, and 65 are assigned to technical modules (including 5 credits for a generic "Research Skills" module). The weighting assigned to the M.E. project in UCD is therefore 25 / 90, or about 30%, of the overall degree award. This contrasts strongly with the 35 / 60 (58%) allocated under the current CIT proposal. However, if CIT were to calculate the degree award based on ALL credits accumulated during the 2-year programme, M.Eng. project weighting would reduce to 35/120 (or 40/120 if the Level 4 Research skills module is included).

1.4.6 Free choice, or elective, modules taken by students in award years 4 and 5 should be of an appropriate level, e.g. "Advanced" or "Expert".

1.4.7 The team should consider making the Work Placement module grade-neutral (i.e. Pass/Fail), particularly if this module were to move to Year 4.

1.4.8 The level 9 proposed offering by CIT, with associated Masters project has the potential to be a flagship for Mechanical and Biomedical Engineering in CIT. The panel suggest that the main, Level 9 artery should be clear and well defined.

1.4.9 Students will probably expect to receive a Bachelor degree at some point along this route – probably after Year 3 or Year 4. A BEng would not be applicable, since the students will not have completed a major project, but perhaps a B.Sc. award would be appropriate.

1.5 PROGRAMME MANAGEMENT

Validation Criterion: Are the programme management structures adequate?

Overall Finding: Yes

1.6 RESOURCE REQUIREMENTS

Validation Criterion: Are the resource requirements reasonable?

Overall Finding: Yes

The Panel was assured that appropriate resources in terms of staffing and facilities will be put in place when the programme is validated.

1.7 IMPACT ON THE INSTITUTE

Validation Criterion: Will the impact of the programme on the Institute be positive?

Overall Finding: Yes

2. MODULE-LEVEL FINDINGS

2.1 As Process and Instrumentation Diagrams (P&ID's) are used so frequently in industry across all sectors it is suggested that additional time be spent focusing on same during existing modules within Level 7 and 8 degrees.

3. CONCLUSION

Based on the above findings, the Panel has arrived at the following Conclusions:

- The Programmes meet the required standards for an award in the Master of Engineering field of study at Level 9 of the National Framework of Qualifications.
- The Programmes meets the criteria for validation of a new programme adopted by the Academic Council of Cork Institute of Technology.

The Panel therefore recommends that the Programmes be validated for five academic years, or until the next programmatic review, whichever is soonest, with due regard to the Recommendations made.

APPENDIX – TIMETABLE

Validation Panel for : **Master of Engineering (Mechanical & Biomedical)**

Date: **18th June 2018**

Venue: **Boardroom, 1st Floor, Tourism Building**

CIT Bishopstown Campus, Rossa Ave., Bishopstown, Cork

Panel Timetable

Time	Session
9:30 am - 9:45 am	Panel Introductions (tea & coffee)
9:45 am - 10:00 am	Private Panel meeting
10:00 am - 11:45 am	Panel Session 1 - need for programme; management structure; resourcing; impact; award level and type; access, transfer & progression; programme structure;
11:45 am - 12:00 am	Break (tea & coffee) Panel Members
12:00 am - 1:00 pm	Panel Session 2 - programme structure (<i>continued</i>); learning experience (incl. individual modules)
1 pm - 2 pm	Lunch (CIT Bistro) Panel Members
2 pm - 3:00 pm	Panel Session 3 - programme structure (<i>continued</i>); learning experience (incl. individual modules)
3:00 pm - 3:30 pm	Private Panel close-out meeting
3:30 pm - 4:00 pm	Brief feedback to proposers

DEPARTMENTAL RESPONSE

	Recommendation	Response
1.4.1	<p>Highly recommended: Stipulate modules in years 3, 4 and 5 to be a progression order, and definitely in year 4 and 5, i.e. prior learning requirements should be clearly defined for “Advanced” and for “Expert” level modules to demonstrate the increasing depth. This may not be necessary for all modules, i.e. having a balance of depth and breadth in year 4/5. The use of “or equivalent” may be appropriate to account for transfers from other institutions or other pathways. This is the case for both programmes submitted.</p>	<p>The MBM department is currently reviewing all module requirements in stages 4/5 and revising recommended and or pre-requisite modules in line with the Panel requirements.</p>
1.4.2	<p>The proposed progression requirement at year 3 for the Masters programme is H22, i.e. 50%. The team may want to reflect on this level, perhaps leaving this open in future year to be reconsidered after a period of time, for example moving to 55% or higher.</p>	<p>The MBM department will review and monitor the performance of students electing to progress to the M.Eng pathway from stage 3, in keeping with the panel recommendation based on their collective experience of running similar integrated programmes.</p>
1.4.3	<p>The team should consider clearly articulating the difference between Masters-level project efforts/level/outcomes and Bachelor level project effort/level/ outcomes, and have clear rubrics in place. It may be necessary for Masters level projects to be more tightly scoped from the start, rather than the current model for Bachelor projects whereby ideas come from PI’s on research themes, student ideas, and also ideas from industry internship experiences. The team could reflect on this, perhaps in the early years start by using ideas from research groups or tightly scoped well thought out industrially aligned topics that will have enough content to satisfy a Masters-level project.</p>	<p>Clear distinctions are currently defined between M.Eng and B.Eng Hons projects on existing Level 8 and Level 9 programmes. The MBM department will work with the Teaching and Learning Unit (TLU) to ensure that the rubrics used to assess project reports clearly align with the learning outcomes of the relevant project module descriptor(s) and reflect the higher standards expected of a masters project. .</p> <p>Selection and scope of masters project will be carefully studied and vetted by the Departmental research teams.</p>
1.4.4	<p>The team may wish to reconsider or reflect on the current proposal to have the main thesis activity only taking place in 1 semester i.e. 30 credits of independent project activity in one semester approx 3-4 months. Even though this is proposed as the only activity, it is a relatively short timeframe to develop and assimilate ideas to Masters Level and could be challenging for students.</p>	<p>The research question will be defined as part of the Research Skills module in semester 2 stage 4. In stage 5 semester 1, a project supervisor will be assigned, and the project scope and methodology will be developed further in the Research Methodology module. This ensures that the students are given in essence two</p>

		semesters to develop their projects to the Masters level.
1.4.5	<p>The team could reflect on the credit allocation to project and related modules (year 5 has 35 credits!). TCD and UCD both have 25 credits for the project and an associated 5 credits of research skills currently, making a 30 credit “research” activity. Look at standard rubric for same.</p> <p>The CIT proposal for the Level 9 programmes is essentially a “3 + 2” model: <i>i.e.</i> having completed year 3 of the Level 8 programme, students with sufficiently high grades can choose to progress to an integrated 2-year programme that will result in a Level 9 qualification. This is very similar to the UCD model.</p> <p>The team should therefore consider basing a student’s Level 9 degree award calculation on the credit-weighted grades obtained in ALL graded modules completed during the 2-year integrated M.Eng. programme. In UCD, 90 of the 120 available credits are graded (the 30-credit Internship is grade-neutral). 25 credits are assigned to the major project, and 65 are assigned to technical modules (including 5 credits for a generic “Research Skills” module). The weighting assigned to the M.E. project in UCD is therefore 25 / 90, or about 30%, of the overall degree award. This contrasts strongly with the 35 / 60 (58%) allocated under the current CIT proposal. However, if CIT were to calculate the degree award based on ALL credits accumulated during the 2-year programme, M.Eng. project weighting would reduce to 35/120 (or 40/120 if the Level 4 Research skills module is included).</p>	<p>Both programmes have been developed with 120 ECTS of advanced or expert level modules across Stages 4 and 5, and the preponderance of modules are at Level 9 across both years.</p> <p>The Department is proposing in line with the panel’s recommendation, that the programme’s award be classified on the basis the credit-weighted grades obtained in ALL graded modules completed in Stages 4 and 5 thus ensuring equal treatment of all modules in both stages.</p>
1.4.6	<p>Free choice, or elective, modules taken by students in award years 4 and 5 should be of an appropriate level, e.g. “Advanced” or “Expert”.</p>	<p>The Department intends to offer Cognate Modules at the appropriate Level (8 or 9) to the student.</p> <p>Current policy allows free choice to Level 6 in all stages. The MBM Department will raise the issue with the relevant academic council committee (Academic Planning and Review) to review free choice in line with the panel’s recommendation.</p>

1.4.7	The team should consider making the Work Placement module grade-neutral (i.e. Pass/Fail), particularly if this module were to move to Year 4.	The Institute is currently reviewing its policy with respect to pass fail classification of certain modules and the department will take due cognisance of recommendations in this regard.
1.4.8	The level 9 proposed offering by CIT, with associated Masters project has the potential to be a flagship for Mechanical and Biomedical Engineering in CIT. The panel suggest that the main, Level 9 artery should be clear and well defined.	<p>The MBM department envisages (based on the experience of other HEIs offering similar programmes) that the Level 9 artery will become the preferred choice of students within a 3-5 year timeframe. However the department will continue to offer and support the four stage B.Eng Hons programme to its student cohort in keeping with Institute wide policy providing pathways to Level 8 for all its undergraduate students.</p> <p>Furthermore the MBM department will develop promotional literature material clearly articulating the Level 9 pathway for dissemination.</p>
1.4.9	Students will probably expect to receive a Bachelor degree at some point along this route – probably after Year 3 or Year 4. A BEng would not be applicable, since the students will not have completed a major project, but perhaps a B.Sc. award would be appropriate.	<p>Students will register initially on four stage B.Eng Hons programmes. At the end of stage 3, students will have the option to continue onto stage 4 of the B.Eng Hons programme or elect subject to certain criteria, to progress to the Level 9 pathway and exit with an M. Eng award.</p> <p>In line with Institute wide policy, The MBM department will consider an exit award at Level 7 for students who wish to exit the B.Eng Hons programme after successfully completing stage 3.</p>
2.2.8	As Process and Instrumentation Diagrams (P&ID's) are used so frequently in industry across all sectors it is suggested that additional time be spent focusing on same during existing modules within level 7 and 8 degrees.	The MBM department agrees to revise relevant modules throughout its programmes to reflect this recommendation at its next programmatic review.