GMIT

INSTITIÚID TEICNEOLAÍOCHTA NA GAILLIMHE-MAIGH EO
GALWAY-MAYO INSTITUTE OF TECHNOLOGY

Report of External Peer Review Group for the Programmatic Review of:

Named Award:	Bachelor of Science (Honours)
Programme Title(s):	BSc (Honours) Physics and Instrumentation L8 (4 years) BSc Physics and Instrumentation L7 (3 years) L8 (+ 1 year)
Exit Award(s):	Higher Certificate in Science in Physics and Instrumentation L6 (2 years)
Award Type:	Degree, Honours Degree
Award Class:	Major
NFQ Level:	Level 7 and Level 8
ECTS / ACCS Credits:	180 and 240
Location:	Galway
Minor Award(s):	N/A

Panel Members

Name	Position	Organisation
Dr Michael Hall	(Chairperson)	Registrar, IT Tralee
Mary Rogers	Secretary	Head of Building and Civil Engineering, GMIT
Dr. Guillaume Huyet	IOT Member	CIT
Prof John Corish	University Member	Fellow Emeritus and Former Professor of Physical Chemistry, TCD
Aidan O'Mahony	Professional Practitioner	Hanley Calibration Services
Geraldine Toner	Institute Graduate	

Programme Board Team

Dr Brian Ashall	Gareth Roe
Dr Gary Kenny	Tricia O'Connell
Dr Deirdre Ryan	Jenny Ryan
Dr Louise Cannon	Seamus Lennon
Dr Des Foley	
Michael Fitzgerald	
Clare Lundon	

1 Introduction

The following report to Academic Council is the report of the Expert Panel on its review, as part of the Institute's Programmatic Review, of the Self-Evaluation Report and meetings with programme delivery teams in relation to the following programmes:

BSc (Honours) Physics and Instrumentation L8 (4 years) and the BSc Physics and Instrumentation L7 (3 years) L8 (+1 year)

The report is divided into the following sections:

- Background to Proposed Programme
- General Findings of the Validation Panel
- Programme-Level Findings
- Module-Level Findings

2 Background to Proposed Programme

See Programme Self Evaluation Report (SER) for more detailed information.

3 General Findings of the External Peer Review Group

The above programme has been recommended for revalidation.

Feedback from the panel was that the Self Evaluation document was well presented; there was excellent engagement with the panel and questions were well answered. The team were seen as vibrant and energetic, with an obvious ability to develop this discipline, though staff numbers was seen as a threat. Student feedback in terms of work placement was good, albeit both student and industry feedback would prefer if it was longer, ranging from 10 weeks to 5 months – flexible approach.

Furthermore, greater use of equipment on campus prior to work placement would be an advantage, and it was also noted that the equipment on campus tended to be older and not in line with what industries use, in particular in relation to basic calibration equipment, flow meters and pressure generators which would allow students and graduates to begin work on placement or in first employment with minimum initial equipment training.

No major concerns were raised; however programme titles /options will need clarification, in addition to clarifying what the students will encounter on the CAO website /handbook, as there appears to be one entry point with several possible outcomes. Some recommendations were suggested and these will be outlined later in the document.

It was also noted that a common first year is imperative to the course survival, as students tend to not fully understand the course in first year, particularly instrumentation.

A Maths support centre was also discussed. A possible threshold of maths in first year, governing progression to this programme, might support retention (not having excessively weak students in physics / maths progressing to 2nd year. A ready reckoner perhaps might be beneficial in suggesting other options to students, particularly those who are barely passing maths.

It was also noted that there is a very high employment rate on completion of the course.

Having considered the documentation provided and discussed it with the programme development team; the External Peer Review Group recommends the following:

Bachelor of Science / Bachelor of Science (Honours) Physics and Instrumentation
Place an x in the correct box.

Accredited for the next five academic years or until the next programmatic review, whichever occurs sooner	
Accredited subject to conditions and/or recommendations	x
Re-designed and re-submitted to the same External Peer Review Group after additional developmental work	
Not Accredited	

Note:
Approval is conditional on the submission of a revised programme document that takes account of the conditions and recommendations outlined below and a response document describing the actions of the Department to address the conditions and recommendations made by the External Peer Review Group (EPRG). In this report, the term Condition is used to indicate an action or amendment which in the view of the EPRG must be undertaken prior to the commencement of the programme. Conditions are mandatory if the programme is to be approved. The term Recommendation indicates an item to which the Programme Board should give serious consideration for implementation at an early stage and which should be the subject of on-going monitoring.

4 Programme-Level Findings
This section of the report addresses the following programme level considerations:
- Evidence of reflection by the programme board to include, where relevant evidence of collaboration and engagement with other programmes from a similar discipline area within GMIT
- Demand
- Award
- Entry requirements
- Access, transfer and progression
- Retention
- Standards and Outcomes
- Programme structure
- Learning and Teaching Strategies

- Assessment Strategy
- Resource requirements
- Research Activity
- Quality Assurance
- Internationalisation
- Professional Practice (Work Experience / Internship etc)

4.1 Reflection, including internal and external engagement

Consideration for the panel:	Is there evidence of reflection in the SER of how the programme performed since the last programmatic review.
Overall Finding:	Yes

Commendation(s):
- Lecturers are very engaging, with an obvious ability to develop this discipline.
- Work Placement coordination is commendable.

Condition(s):
- None.

Recommendation(s):
- More programming and MacLab in first year, plus support for IT skills. Focus more on industry-authentic programming languages.
- Programme titles /options need clarification. Clarify what the students will encounter on the CAO website / handbook. One entry point with several outcomes.
- Maths: suggest a threshold for entry to Physics and Instrumentation in second year to support retention. Students have noted a big jump in maths in second year.
- As the research activity of the staff is currently very low, suggest trying to strategize research efforts at small scale in undergraduate projects and by combining expertise within a finely focussed area. This activity will help with team building and enhance the depth of the taught programmes, and possibly point to additional programmes.
- Current Year 3 workload is seen as high. Ensure laboratory sessions relate to programme.
- Students support the proposed division of electromagnestism and optics.
- Meet with the international office to determine potential markets. In addition, determine strategy for marketing the programme in secondary schools and to PLC graduates.
- Greater connectivity between modules in first year and other years, so as to promote identity and knowledge of the careers.
- Engage with other departments in programme / option development in terms of integration and development.
- Mention outline strategy (including new programme areas) in executive summary.
- Report – Good idea to have core information clearly set out in the document with overall success rate of this programme. Contact time for each year, staff-student ratio, project titles, work placement details and context to publications.
- Should provide external examiner reports (actual)
- It was difficult to find the stakeholder feedback /recommendations and whether it has been implemented, in the document.
- Review the Equipment / Instrumentation to ensure that it is industry relevant, including basic industry-relevant testing instruments – flow meters, calibration equipment, temperature bath, pressure generators, control valves, instrumentation for sending

electronic signals, tachometers, instruments for process control, etc. Perhaps use these items for practicals.

Noted:
- Lots of projects and students would feel very confident and competent in this area: experience in the laboratory is seen as an advantage for a research role in a company.
- Evident that if the programme wasn't common in first year that it would not go ahead
- Very high employment rate on completion of the course.
- The ethical side is seen to be as important as the scientific side.

4.2 Demand

Consideration for the panel:	Is there a need for the programme and has evidence been provided to support it?
Overall Finding:	Yes

Noted:
- Very high employment rate on completion of the course, and overall student feedback was that the programme was a positive experience.

Commendation(s):
- Lecturers are very engaging with an obvious ability to develop this discipline.

Condition(s):
- None.

Recommendation(s):
- None

4.3 Award

Consideration for the panel:	Is the level and type of the award appropriate?
Overall Finding:	Yes

Commendation(s):
- None

Condition(s):
- None.

Recommendation(s):
- Programme titles / options need clarification. Clarify what the students encounter on the CAO website / handbook. One entry point with several outcomes.

4.4 Entry Requirements

Consideration for the panel:	Are the entry requirements for the proposed programme clear and appropriate? Is there a relationship with this programme and further education?
Overall Finding:	Yes

Commendation(s):
- None

Condition(s):
- None.

Recommendation(s):
- Programme titles / options need clarification. Clarify what the students encounter on the CAO website / handbook. One entry point with several outcomes.

4.5 Access, Transfer and Progression

Consideration for the panel:	Does the proposed programme incorporate the procedures for access, transfer and progression that have been established by the HEA and as contained in the Institute's Quality assurance Framework (QAF) COP No.4?
Overall Finding:	Yes

Commendation(s):
- None

Condition(s):
- None.

Recommendation(s):
- See Section 4.14 for related commentary

4.6 Retention

Consideration for the panel:	Does the proposed programme comply with the Institute norms for retention, both in first year and subsequent years? Are both elements of the First Year Experience {(i) Learning to Learn (now Learning and Skills Innovation) and (ii) PASS} embedded in this programme? Evidence of other retention initiatives?
Overall Finding:	Yes

Noted:
- Learning to learn being revised to reflect requirements of the programme.
- Maths and Physics – motivation is a key objective of first year; to develop appreciation of the subject areas.

Commendation(s):
- None

Condition(s):
- None.

Recommendation(s):
- Maths: suggest a threshold of maths in first year to support retention (not having excessively weak students in Physics /maths progressing to 2nd year. Students have noted a significant increase in the required standard of maths in 2nd year.

4.7 Standards and Outcomes

Consideration for the panel:	Does the proposed programme meet the required award standards for programmes at the proposed NFQ level (i.e. conform to QQI Award Standards)? For parent award? For exit award (if applicable)? For Minor Award (if applicable)? For Special Purpose Award (if applicable)?
Overall Finding:	Yes

The awards standards requirements for programmes on the NFQ Framework can be found at http://www.hetac.ie/publications_pol01.htm

4.8 Programme Structure

Consideration for the panel:	Is the programme structure logical and well designed and can the stated programme intended learning outcomes in terms of employment skills and career opportunities be met by this programme?
Overall Finding:	Yes

Commendation(s):
- None

Condition(s):
- None.

Recommendation(s):

- Programme Structure - More programming and MacLab in first year, plus support for IT skills. Focus more on industry-authentic programming languages.
- Maths: suggest a threshold of maths in first year to support retention (not having excessively weak students in Physics /maths progressing to 2nd year. Students have noted a big jump in maths in 2nd year.
- Current Year 3 workload is seen as high. Ensure laboratory sessions relate to programme.
- Students support the proposed division of electromagnestism and optics.
- Greater connectivity between modules in first year and other years, so as to promote identity and knowledge of the careers.
- Engage with other departments in programme / option development in terms of integration and development.

4.9 Learning and Teaching Strategies

Consideration for the panel:	Have appropriate learning and teaching strategies been provided for the proposed programme that support Student Centred Learning (SCL)? Evidence of consideration of flexible delivery methods including eLearning?
Overall Finding:	Yes

4.10 Assessment Strategies

Consideration for the panel:	Have appropriate programme assessment strategies been provided for the proposed programme (as outlined in the QQI/HETAC Assessment and Guidelines, 2009)?
Overall Finding:	Yes

Assessment strategies are required in line with HETAC's Assessment and Standards and should be considered by the programme EPRG. See (HETAC (2009) Assessment and Standards, Section 4.6.1, page 33). Accordingly the assessment strategy should address the following (See (HETAC (2009) Assessment and Standards, Section 2.2.5, page 13) :

- Description and Rationale for the choice of assessment tasks, criteria and procedures. This should address fairness and consistency, specifically their validity, reliability and authenticity;
- Describe any special regulations;
- Regulate, build upon and integrate the module assessment strategies;
- Provide contingent strategy for cases where learners claim exemption from modules, including recognition of prior learning;
- Ensure the programme's continuous assessment workload is appropriately balanced;
- Relate to the learning and teaching strategy;
- Demonstrate how grading criteria will be developed to relate to the Institutional grading system.

Note: No Special Regulations

4.11 Resource Requirements

Consideration for the panel:	Does the Institute possess the resources and facilities necessary to deliver the proposed programme?
Overall Finding:	Yes

Noted: Staff Employment Control Framework is seen as a challenge.

4.12 Research Activity

Consideration for the panel:	Evidence that Learning & Teaching is informed by research? Number of staff engaged in institutional/pedagogical research?
Overall Finding:	Yes

Noted: Research, where published could be included in a table in the document. Also, noted that research activity at present is very low among the staff.

Commendation(s):
- None

Condition(s):
- None.

Recommendation(s):
- Strategise research efforts at small scale in undergraduate projects and by combining expertise within a finely focussed area. This activity will help with team building and enhance the depth of the taught programmes, and possibly point to additional programmes.

4.13 Quality Assurance

Consideration for the panel:	Does the proposed programme demonstrate how the Institute's quality assurance procedures (QAF) have been applied and that satisfactory procedures exist for the on-going monitoring and periodic review of programmes?
Overall Finding:	Yes

4.14 Internationalisation

Consideration for the panel:	Does the proposed programme demonstrate how the syllabi represent an international dimension? Is there evidence of approaches to induct international students?
Overall Finding:	Yes

Commendation(s):
- None

Condition(s):
- None.

Recommendation(s):

- Meet with international office to determine potential markets / marketing the programme in secondary schools.

- **Noted:** Yes there is a certain level of engagement with the Atlantic school to target international students, and also with NUIG in terms of work placement and project work.

4.15 Professional Practice (Work Experience / Internships etc)

Consideration for the panel:	Does the proposed programme incorporate professional practice as per the Institute's policy on professional practice (PP)? If not, is there evidence that PP is under consideration by the programme board?
Overall Finding:	Yes

Commendation(s):
- Work Placement Coordination

Condition(s):
- None.

Recommendation(s):
- Review the duration of the work placement
- Ensure that the equipment / instrumentation used on campus is industry relevant and made familiar to students.

5.0 Module-Level Findings: General

In relation to the modules, the panel suggest that there is a review of the modules in terms of commonalities, and try to amalgamate where possible.

Commendation(s):
- None

Condition(s):
- None.

Recommendation(s):
- Greater connectivity between modules in first year (and other years) so as to promote identity and knowledge of the careers.

5.1 Module Assessment Strategies

Consideration for the panel:	Have appropriate module assessment strategies been included in each Module Descriptor?
Overall Finding:	Yes

Note: Project descriptor workload/hours should be reviewed and revised.

5.2 Module Level-Findings: Specific Named Modules

5.2.1 Module (Electromagnetism and Optics)

Commendation(s):
- None

Condition(s):
- None.

Recommendation(s):
- Support the proposed division of electromagnetism and optics.

5.2.2 Student Findings

Two students gave their feedback. The student feedback was that the overall experience was positive and there seemed to be a very high employment rate on completion of the course. In addition, the level of interaction was excellent between the lecturers and students. The work placement was also very positive, however felt that more use of campus equipment in advance of the work placement was required, and also that the duration be reviewed. They also noted a massive jump between year 1 and 2, and that knowledge of computer programming is required in 1st year. The workload in 4TH year was seen as very heavy; particularly the Lab projects report.

However they did feel that there was a good balance overall on the contact hours in 4th year. They also noted that there should have been more maths and statistics content in year 3 and 4. They felt that there was enough problem solving skills developed as they were asked to work things out for themselves quite a lot. They felt that there should be more focus on industry-authentic programming languages and also a big limitation was the fact that there was no medical physics. Overall the students were happy with the lectures and college experience.

6.0 Stakeholder Engagement

No concerns were raised in relation to the level of stakeholder engagement, other than to show how stakeholder feedback was considered and incorporated (or not) into the proposed programme modifications.

7.0 Future Plans

It is the intention of the programme board to look at what is working and develop that, in addition to looking at what others in the sector are doing and review same. Review and explore more well defined exit specialisations. Review the CAO website / handbook to make it more specific to what the outcome will be in terms of programme titles / options.
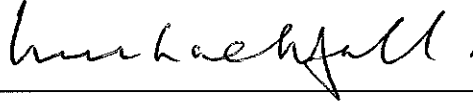
Consideration for the panel:	Evidence that the programme board considered and identified opportunities and signalled proposals for related new programme and

	award development.
Overall Finding:	Yes

Validation Panel Report Approved By:

Signed:

[signature]

Dr Michael Hall
Chairperson

Date: 24 April 2015