Bachelor of Engineering in Marine Electrotechnology (Level 7)

VALIDATION PANEL

Tuesday 23rd March 2010

Panel:
Dr Michael Farrell, Head of Department of Electrical Engineering, DIT
Mr Aidan Jennings, Marine Survey Office, Department of Transport
Mr David Thomas, Electrical Engineer, Carnival Corporation & plc
Professor Patrick Murphy, Department of Electrical & Electronic Engineering, UCC (retired)
Mr Ed Riordan, Deputy Registrar and Head of Academic Quality, CIT

NMCI Staff:
Captain John Clarence, Head of College
Dr Noel Barry, Head of Academic Studies
Mr Ian Black, ETO Programme Coordinator & Lecturer
Mr Michael O'Donovan, Lecturer
Mr Gerard Horan, Lecturer

INTRODUCTION
Capt. J. Clarence and the proposing team introduced the programme by stating that there has been a significant change in the past 25 years in the technology used on board vessels, with consequences for the profile of the engineers who work in the industry. Traditionally the shipping industry employed electrical engineering graduates and trained them for careers on board ship. This has changed, with companies now seeking to employ fully trained specialist maritime graduates with a diverse range of skills. The proposed Level 7 Bachelor of Engineering programme has been developed by NMCI in response to industry demand for Electrotechnology Officer (ETOs) graduates, and it will consist of three years full-time education at NMCI, and one years work placement at sea.

The proposers stated that the skills and training required for a career at sea can be delivered at NMCI, alongside the technical engineering tuition. The specialised hands-on skills required of the graduates will be gained during the one-year work placement at sea which will be organised by NMCI.

In developing this programme, NMCI sought advice from cruise companies and shipping companies as well as from the Department of Transport (DOT). NMCI also sought advice from an educational institution in Poland which was the first educational institution in Europe to develop an ETO qualification. Evidence indicates that there has been significant and sustained demand for ETO graduates internationally.

DISCUSSION
Overall Structure of the Programme & Justification

- The statistical justification for the programme in the proposal document only provides figures up to 2005. While the proposers concede that these statistics are dated given the current economic situation, it was stated by them that there is sustained industry demand for these graduates. The current global economic downturn has had a negative impact on certain vessels such as container ships and bulk vessels, while other types of vessels have not been hit as badly, or not at all.

  The programme title as presented will accurately reflect the qualification of the graduate, and is an internationally recognised title.

- The programme has been structured so that the first year is common with that of the existing Level 7 Bachelor of Engineering in Marine Plant Engineering programme. The proposers envisage that both cohorts will sit in class together during this first year. Aside from the resource efficiencies that will be

achieved through the sharing of modules, the ETO graduates will also be in a position to gain a DOT Watchkeeping Certificate after successful completion of their first year of study. The proposers state that having this additional qualification will be beneficial to graduates in seeking employment as it will allow an ETO to act as a Watchman on board vessels should this be required. This Watchkeeping Certificate has a significant value for shipping companies.

The panel however does not accept that the first year as presented is the best option for an ETO programme. The panel are concerned that importing in its entirety the existing first year of the Bachelor of Engineering in Marine Plant Engineering programme has constrained the development of the programme. Changes could and should be made – see "Findings" section of this report. It should prove possible to retain the Watchkeeping certification while improving and tuning the proposed programme.

- Providing a common entry for both Marine Electrotechnology and Marine Plant Engineering has been the subject of general discussion within the College. While other common entry programmes have been developed in CIT, there are certain drawbacks which need to be considered before ultimately deciding on a common or designated entry scheme. It is understood that the new programme will be launched with its own (separate) entry point through the CAO.
- The panel expressed concern with the lack of ICT content in the programme. While the proposers confirm that some aspects of ICT are taught in the semester 1 *Creativity Innovation & Teamwork* module, this is not considered sufficient.
- The resource requirements to operate the programme are stated as 1.5 lecturers. It was noted that there are 11 full-time lecturers in NMCI, with 15 service-in lecturers from CIT's Bishopstown campus.
- In general, the provision of shared-delivery modules between CIT and NMCI presents problems given the geographical distance from the Bishopstown campus.
- The proposers stated that having the one-year work placement at the end of 2nd year is the best option. The practical experience gained during the first two years of full-time study is necessary for students to get the optimum experience from the work placement. Putting the work placement earlier in the programme would mean that finding placements for students on suitable vessels might not be feasible, nor would they gain the suitable level of expertise from this experience. The proposers do not envisage problems in securing suitable placements for their ETO students. Currently, NMCI has no issues in sourcing placements for the 35 marine plant engineering students.
- The programme's entry requirements were the subject of some discussion. While the standard national Level 7 entry requirements will apply, it was stated by NMCI that additional restrictions may have to be applied, due primarily to difficulties in obtaining discharge certificates for certain students, depending on their nationality. NMCI became aware of this restriction quite recently.

  The Panel expresses its disquiet at any procedures which would have the effect of debarring non-Irish EU applicants. This is a matter which the NMCI and senior CIT management must discuss and resolve. Attention must also be paid to general entry procedures affecting for example non-EU and mature entrants. The course literature needs to be carefully and fairly worded in this regard.

Discussion of Individual Modules

- A mathematics module is listed in every semester, albeit as a free choice module in some semesters. In practice it is envisaged that students will opt to take the mathematics module on offer as a cognate elective. The Panel is concerned that the free choice scheme may be operating in a somewhat disingenuous manner, and this is perhaps a wider feature of the CIT M & S system which should be considered when M & S is reviewed by the Institute in the next year.
- In all modules with high levels of continuous assessment, much fuller information regarding laboratory topics and assessment methods should be given.
- *Sem 3 Marine Analogue Electronics* – check for consistency of the use of analogue/analog throughout this module. The "analogue" spelling is suggested..
- *Sem 3 Digital Systems for Marine* – this is a generic digital systems module. Either a pre-existing Digital Systems module should be used, or specific marine applications should be included in the module outcomes and content.
- *Sem 3 Marine Communications* – assessments are set by DOT standards as regards hours and assessment type. The original module was delivered over a 3-week period, but the ETO module will be delivered across a semester. The proposers should revisit how this module is presented in the document.
- *Sem 3 Marine Automation* – this semester 3 module should be a mandatory module. The *module description* should be rewritten to include specific reference to some key topics .
- *Sem 4 Marine Power Systems* – add references to the regulations/standards which apply to the marine environment. Check resources listings.
- *Sem 4 Marine Electrical Diagnostics* – make specific reference to marine plant specifications.
- *Sem 4 Shipboard Management for ETOs* – the special regulation for this module (regarding the DOT) should be checked, as the four specific DOT short courses are not listed in the learning outcomes or indicative content. If they are covered in this module they need to be listed and referred to in the content, assessment and coursework breakdown.
- *Sem 5 Marine Electrical Auxiliaries* – add a specified additional text to the list of recommended resources.
- *Sem 5 Marine Power Electronics* – indicative content needs to be updated to reflect modern practice.
- The timing of the *Mathematics 6* and *Electrical Control Engineering* modules (both in Semester 5) should be revisited. Some of the mathematics content needed for the control module is being delivered at the same time.
- *Sem 6 Marine Electrical Propulsion* – some of the power electronics elements of this module could be delivered earlier in the programme. The overlap in material delivery should be revisited and amended where possible. This would allow new material to be introduced into this module.
- *Sem 6 Marine Navigation & Communications Systems* – add content relating to ECDIS.
- *Sem 6 Marine Data Networks* – this is a traditional networks module, specific marine references should be included where possible.

Panel Findings

- The panel are satisfied that this programme will produce sound ETO graduates who should find suitable employment on graduation. NMCI are commended for the initiative, which should be welcomed by the industry.
- The NMCI facilities are excellent and can more than adequately support such a programme. The familiarisation of the students with the environment in which they will gain employment is very valuable.
- Launching the programme with an intake of approximately 15 would be feasible and would allow NMCI to increase that intake in the future.
- Several examples were noted where generic modules were presented as "Marine", but without the marine applications and content. Tagging the term "marine" onto the title of an existing module is not appropriate. Modules should either be used in their generic form, where this is appropriate, or strongly adapted to specific needs of the industry. Applications such as cranes, lifts etc should be covered in the appropriate modules.
- It is imperative that NMCI would clarify with senior CIT management the regulations surrounding the application process for EU and non-EU prospective students. Short-listing of prospective non-standard CAO applicants by NMCI needs to be in line with standard CIT practice.
- Progression opportunities need to be confirmed and listed in the course documentation. Possible links with the CIT honours degree in Electrical Engineering should be mentioned, as well as the future development of the Marine Engineering honours degree. Transfer-in opportunities should also be detailed in the programme document.
- The lack of computing and related content on the programme is a concern. The proposers are required as a matter of urgency to revisit this. There should be a stronger emphasis on ICT in first year, and more digital signal processing, networks and smart control fundamentals in later stages.
- The extensive 1st year mechanical workshop content should be reduced where possible. Further discussions with DOT need to take place on the composition of this workshop. If (in order to retain certification) the hours cannot be reduced, at the very least the composition of the laboratories/workshops should be moved more towards the electrical/communications topics.
- The panel advises that the extensive range of marine electrotechnology literature which is available should be reviewed and included in the individual module resources sections as appropriate.
- The sequencing of the mathematics modules needs to be revised, not only in terms of mathematics module 6 being delivered before module 5, but also in the timing of the delivery of some material.
- CIT is advised to review the operation of the free choice module scheme, which as regards this proposal does not enhance transparency or mobility.
- The panel recommends that the module resource listings should be revised. In general, additional references should be listed under the supplementary resources heading. The most recent texts should be included, and appropriate marine regulations referred to.

The Panel wishes to thank the NMCI staff for their courtesy and clarity during the process.

Academic Council is requested to approve the validation of this programme, and to make the necessary arrangements for the implementation of the above recommendations and findings.