



## Development of a Collaborative, Distance Learning Based route to BEng/MEng qualifications for Engineers in Employment.

Tania Humphries-Smith

School of Design, Engineering & Computing

Bournemouth University (BU) and Bournemouth & Poole College (BPC)

### Abstract

This report presents the development of an integrated programme entitled MEng Engineering that will provide an opportunity for engineers already in the workforce to engage with upskilling that can lead to their gaining professional recognition. Progression will be provided directly from level HNC/HND/FdSc qualifications for engineers already in employment to gain BEng and MEng qualifications by part time distance learning mode. The programme will be jointly delivered by BU and BPC, the award will be a BU award. The programme will be delivered in 2-6 years depending upon entry and exit points and amount of credits studied in an academic year. The programme has been developed through close discussion with various employer representatives.

It is the intention that the programme will be submitted to the Institution of Engineering Designers (IED) and the Institution of Mechanical Engineers (IMechE) for Engineering Council accreditation for the academic requirements of IEng/CEng as appropriate to level.

Keywords: engineering; upskilling workforce; professional accreditation; distance learning

### Background

A study on behalf of the Engineering Council UK undertaken in October 2009 ("A Feasibility Study for the Development of Research-Focused Work-Based Masters Degrees in Engineering Leading to Professional Qualification") has revealed the need for a route for those in work to gain CEng status. The STEM subjects are seen to offer secure employment opportunities (see Smallpeice Trust's report 2011 'Securing Tomorrow's Workforce' which claims that 680,000 STEM related jobs will need to be filled in UK by 2017). The House of Lords' Science and Technology Sub-Committee launched an inquiry (Nov 2011) to investigate how the UK will build the educational foundations it needs to face the challenges of the future. It is based on an understanding of the central place of the STEM subjects in providing growth for the UK economy and the necessity of being able to address global challenges. At the heart of this is the provision of 'a well educated, well motivated and inspirational cadre of graduates in the key areas of science, technology, engineering and mathematics'. The inquiry chairman acknowledges that there are 'clear warning signals from industry and academia that the supply and quality of STEM graduates needs to be addressed urgently'.

There is very little alternative provision accessible for employers based on the south coast of the UK. While BEng/MEng in a variety of engineering disciplines are common most do not enable the student to continue in employment while engaging with the academic programme of study. Exceptions are:

Buckinghamshire New University – BEng/MEng Mechanical Engineering Design – a part time programme but requiring weekly attendance at the university so not accessible for engineers in the south.

Open University – BEng/MEng – obviously a part time, distance learning programme but feedback from many employers indicate that many students find it difficult to engage with OU programmes and would not consider this option.

Portsmouth University – BEng Mechanical and Manufacturing Engineering and BEng Electronic Systems Engineering – both are distance learning programmes but only offer a top-up with no optionality.

Staffordshire University - BEng/MEng Electrical Engineering– distance learning programme.

There is also the possibility of undertaking a Further Learning Programme through the IMechE, an example of which has recently been approved at BU, or the Technical Report route through the IED. However, neither option gives the student any academic qualification which many potential students are seeking.

## Rationale

### Aim:

The aim of this project was to provide an accessible and flexible opportunity for upskilling the workforce in the engineering sector. This will be through the provision of a programme which allows engineers qualified to HNC/D/FdSc level to obtain BEng and MEng qualifications (accredited to IEng and CEng respectively) while remaining in work.

### Objectives:

1. Obtain formal agreement for collaboration arrangements
2. Obtain approval to develop programme
3. Develop programme to meet the needs of stakeholders
4. Obtain formal validation to deliver programme
5. Market programme and recruit students to commence Sept 2012.

## The Approach

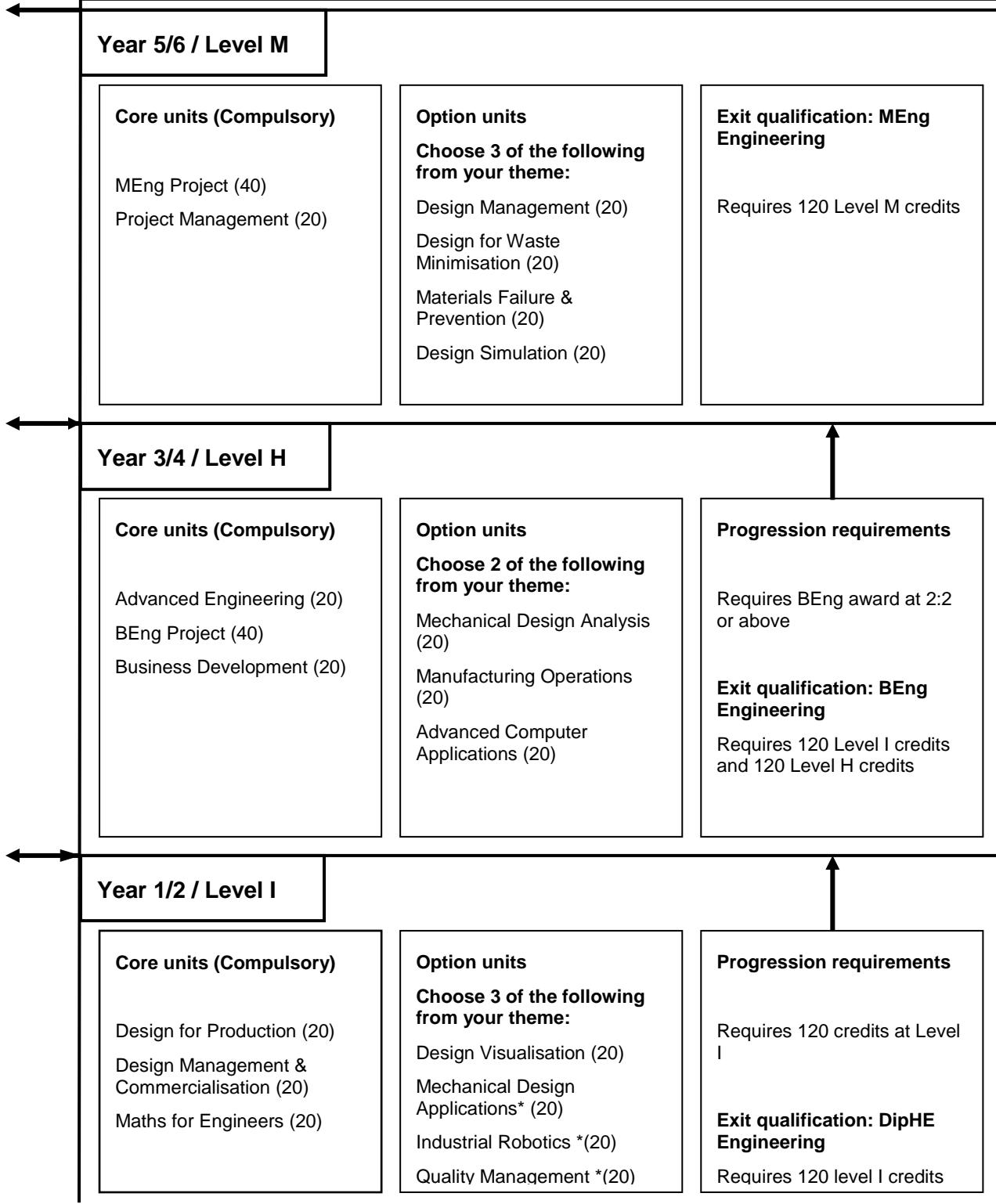
This initiative started with discussions with one our industry partners (BAE Surface Fleet), for whom staff within the School of Design, Engineering and Computing at BU were conducting research, that many of their engineers lacked higher level qualifications and this was becoming a business issue for them. Further investigation as discussed in the 'Background' section indicated this was a widespread problem, hence, the application for funding being reported upon here. Initial discussions indicated that a breadth of technical specialisms would be required which lead to linking with a partner HEI. However, unforeseen changes in that HEI lead to another partner needing to be found. Consultation with our industry partners indicated that a local provider was considered essential and that they would be very comfortable with an FE college as they already had links through apprenticeship training with the FE sector. Hence, BPC became the education partner. In hindsight this has worked better than anticipated proving beneficial in terms of providing further and greater opportunities for employer engagement than were likely if the relationship had continued with the HEI.

The structure of the programme can be seen in Figure 1. With the core and option units clearly indicated which allows for a breadth of technical specialisms to be incorporated. The figure also indicates the nature of the subject areas to be covered which currently tend towards either a mechanical or manufacturing engineering pathway. This emphasis concurs with current feedback on demand from local engineering employers. An emphasis on simulation as a tool for designing engineering solutions can also be seen. This also reflects the outcomes of discussions with employers who strongly indicated their desire to move away from engineering being taught through practical experimentation to engineers being taught how to develop their solutions using simulation tools.

As part of this consultation it became evident that while distance learning was required as a delivery mode, due to the difficulty in releasing reasonably senior members of staff during working

## PROGRAMME DIAGRAM

### BEng/MEng Engineering (Part time)



\*Indicates unit delivered by Bournemouth & Poole College

**Figure 1. – Programme Structure**

hours, 'local' delivery which could facilitate some face-to-face was considered essential. Hence, the development of the model of delivery to be used for this programme which comprises of each unit (being 20credits or 200 hours of learning) being delivered over 10 weeks by on-line learning using the BU VLE as a platform. However, this on-line learning will be supported by an initial 1 day introduction to each unit followed by an afternoon mid-point tutorial both being delivered face-to-face at either BU or BPC. The programme has been designed so that students take the units sequentially as feedback from other academics running part time programmes indicate that students find it difficult to focus on more than one unit at a time alongside work commitments.

The programme has also been designed to conform to the requirements of Engineering Council UK-SPEC and will be submitted to IED and IMechE during 2012 for accreditation for the academic requirements of IEng and CEng as appropriate. As many staff members in the School of DEC are Chartered Engineers this will enable the opportunity for students working at the appropriate level with their employers to be mentored towards submitting applications for IEng/CEng while completing their academic qualifications, thus enabling them to become professionally qualified very quickly after receiving their academic qualifications.

## Assessment

Assessment of the taught units will also take place largely on-line. The BU VLE allows students to upload course work as a variety of file types, potentially including Computer Aided Design (CAD) software files. The VLE also allows students to sit tests and examinations on line for both formative and summative assessment. Indeed, current full time students on some technical units already utilise on-line assessment. The use of on-line assessment will enable the student to remain remotely located geographically while engaging in a full range of assessment types.

## Evaluation

Views from industry were collected through informal discussions with students and their employers studying on the part time FdSc Engineering running at BPC and through informal discussions with specific industry partners for the part time route, namely BAE Surface Fleet and Paragon Skills Ltd. Andy McMinn of Paragon Skills Ltd provided further evidence of demand – "As a provider we are developing HE options as the continuation of training/ education is essential to the Engineering Industry as technology and practices develop over time. We welcome this opportunity and will play an active role driving forward the link and continuation of developing skills for the future." Similarly Professor Cripps of BAE indicated – "As you know I am a great believer in having courses that meet the needs of industry both now and in the future. Therefore I would be very happy to support this initiative and I would welcome the opportunity to discuss the matter in more detail."

At a Business Breakfast to disseminate information on this development, held on 6th Dec 2011 at BU and attended by 30 representatives of local employers, the following questions were asked in a questionnaire, with a summary of the responses received.

Questions	Summary of the 12 responses
Would you or staff in your company be interested in enrolling on MEng programme?	8 said yes
At what level of study would you be looking to enter? - 2 <sup>nd</sup> year (ie from HNC), - BEng (ie with HND or FdSc) - MEng (ie with BSc or BEng)	4 starting at Level I 1 starting at Level H 2 starting at all levels
Are there any topics or areas of study that you would wish to study that are not included in the courses presented?	1 Robotics - higher than Level I 1 Electronics 4 Composites

Are there other modes of delivery that would be more suitable for you or your company?	4 mentioned day release as an option
Do you consider professional qualifications to be important for your staff/company?	7 regarded professional qualifications as important

## Discussion, Summary

The development of this flexible programme will enable engineers currently in employment with sub-Bachelor level qualifications to increase their skill sets while gaining academic qualifications which together can lead to professional qualifications and potential career progression opportunities. The development of these engineers also has benefit for their employers as the programme will provide them with a leading edge skill set in engineering simulation which can be transferred to business advantage for their employers. Additionally, the engagement of their employees with an HEI provides the potential for exploring other knowledge transfer opportunities offered for HEI/industry engagement.

It should be noted that alongside the development of this part time programme BU has taken the opportunity to develop a new full time BEng/MEng Engineering course. This course enables the traditional entry after 'A' level or equivalent qualifications and will also become the 'top-up' Honours qualification for the newly validated full time FdSc Engineering programmes at BPC. The development of the part time and full time routes simultaneously means that students can be offered flexibility to swap between modes of delivery dependent upon their employment situation at any particular time.

## Further Development

The programme will continue to be developed with additional optionality being offered in response to demand from industry. It is envisaged that electronics options will be offered in the foreseeable future as there is already indication of demand in this subject area.

## References

Engineering Council UK, October 2009, A Feasibility Study for the Development of Research-Focused Work-Based Masters Degrees in Engineering Leading to Professional Qualification accessible at

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## Further Reading / Bibliography

IED, Non-standard routes to membership, accessible at <http://www.ied.org.uk/non-standard+routes>

IMechE, Further Learning, accessible at <http://www.imeche.org/membership/professional-registration/eligibility/academic-requirements/further-learning/further-learning>