

## **ENGINEERING PROGRAMME STRUCTURE REQUIREMENTS FOR BOLOGNA COMPLIANCE**

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### **ABSTRACT**

In 1999 twenty nine European countries have signed the Bologna Declaration to establish a common European higher education system as for the year 2010. Engineering Ireland has decided that the education standard for the title of CEng and MIEI should be raised to Master Degree in engineering accredited by Engineers Ireland with effect from programmes completed in 2013”

This paper focuses on engineering programme structure in our school. Further discussions will be carried out to present the current engineering programmes in our school and the future vision to compliance with Bologna treaty.

### **INTRODUCTION**

The School of Mechanical and Manufacturing Engineering at Dublin City University was established in 1987. The school already runs four undergraduate degree, the B.Eng. in Mechatronic Engineering, the degree of Biomedical Engineering, the degree in Mechanical and Manufacturing Engineering and the degree in Manufacturing Engineering with Business Studies Figure 1 represent the mechanical engineering structure in our school.

In this paper degree of Manufacturing Engineering with Business Studies “BME” will be presented and discussed in details as an example of our programmes, then all these current programmes and future vision will be discussed in relation with Bologna treaty.

### **BME DEGREE OBJECTIVE**

The specific objectives of the programme are:

- (a) To provide a firm foundation of engineering principles, mathematics and computing.
- (b) To promote the use of computer based tools and their development for a wide range of engineering applications, including design, manufacturing, marketing and plant operation.



Figure 1: Mechanical and Manufacturing Engineering Programmes at DCU

- (c) To allow students to carry out in-depth studies of the core and option subjects, and in-depth investigative studies of projects chosen from relevant areas.
- (d) To enable students to be familiar with the principles of enterprise management and with basics of entrepreneurship.
- (e) To familiarise the students with aspects of business, economics, and HRM pertaining to engineering product development and industrial practice.
- (f) To enable the students to learn effective engineering communication practice.
- (g) To involve the students in engineering practice through the period of INTRA placement in industry.
- (h) To enable graduates to attain the status of Chartered Engineer in Ireland and internationally.
- (i) To enable graduates the opportunity to communicate engineering concepts and ideas and to assimilate, interpret and evaluate information in English and German or French.

### **CHARACTERISTICS OF GRADUATED ENGINEER**

To comply with Bologna treaty and Engineering Ireland recommendations the outcome of the engineering degree should support the industrial market with excellent engineering qualities which can be characterized with the following points:

- High quality of technical knowledge.
- To be able to learn, develop and improve.
- To be flexible in adapting to change.
- To be able to manage and motivate employee
- To be able to manage project and event.

- High communication quality.
- Focus on business.
- Team working and multidisciplinary culture.
- Proving leadership and vision
- Commitment to ethical and social responsibilities.
- Commercial and finance knowledge.

## **FUTURE VISION OF MECHANICAL ENGINEERING PROGRAMMES**

As mentioned before that the European universities should provide a qualification of Bachelor and Master cycles with a total of 300 ECTS. The first Bachelor cycle could be equal to 180 to 240 ECTS, while the second cycle could be equal to 60 to 120 ECTS depends on the adapted cycles (3+2 or 4+1). In the example of our school, it would be possible to have 3 or 4 years Bachelor degree and 1 or 2 years of Master degree with different specialization such as: Mechatronic Engineering, Mechanical Engineering, Manufacturing Engineering, Bio-Medical Engineering, Manufacturing Engineering with Business Studies, Sustainable Energy Engineering,.....etc.

Figure 2 presents the future vision of mechanical engineering in compliance with Bologna treaty. In the case of first cycle of 180 ECTS the student will complete the degree in 3 years (60 ECTS per year). After completing the first cycle, the student with H2.2 (55%) would be allowed to carry on the second cycle of 120 ECTS for 2 years to obtain master of engineering. This Master would include 30 to 60 ECTS for professional developments in the form of industrial replacement for 6 to 12 months. The other possibilities that the student can do 4 years degree of 240 ECTS, in this case, the student will do 30 ECTS as professional developments in the of industrial replacement for 6 months. Then student with H2.2 would be allowed to go for the second cycle to obtain a master degree of 60 ECTS. Figures 3 and 4 present a summary of the above described engineering programme models.

## **CONCLUSIONS**

This paper has contributed in presenting the following points:

- School of Mechanical and Manufacturing Engineering current degree programmes.
- Degrees engineering objective for BME degree as case study.
- Engineers characteristics in this growing global market.
- Proposed engineering programme to comply with Bologna treaty.

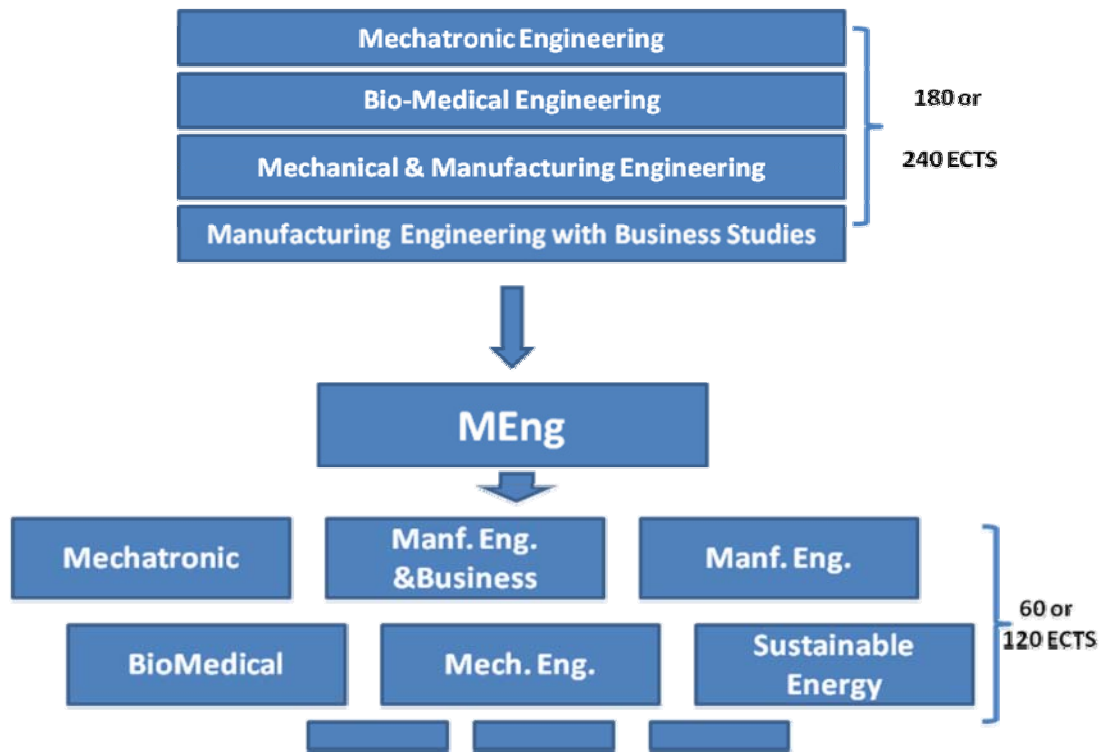


Figure 2: Future vision of the different programmes (3+2 and 4+1)

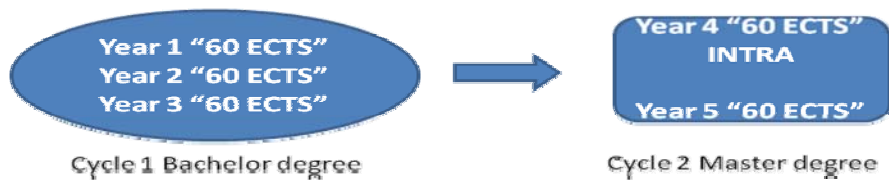


Figure3: Engineering programme with 3 + 2 degree

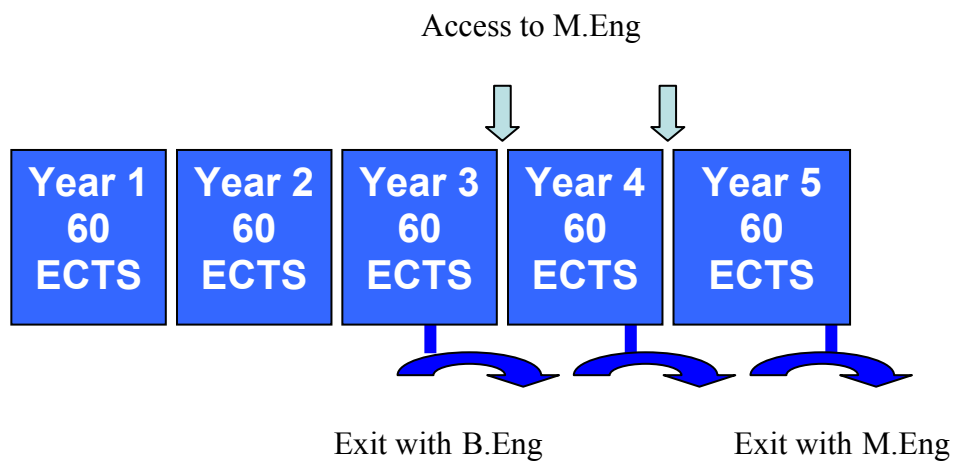


Figure 4: Flexible engineering programme in compliance with Bologna treaty