MODULE TITLE: 5E1 Biomedical Engineering MAI Project

LEVEL: Year 5 of the MAI

CODE: 5E1

CREDITS: 25

PREREQUISITES:

Coordinator: Professor Richard Reilly

Supervisor: as agreed with Coordinator

TERMS: Semester 1 and Semester 2

DURATION (WEEKS): 24 WEEKS

AIMS/OBJECTIVES
As a key component of Year Five of the MAI, students in the Biomedical Engineering streams are required to complete an individual research project on a topic of contemporary engineering research interest. This work must be presented in a research dissertation, which provides the main means of project assessment. This is a key element of the MAI, which, together with a supporting module in research methods, accounts for one quarter of the programme and of the overall degree assessment. Projects will involve a substantial element of laboratory or field experimental work and/or engineering analysis/computation.

SYLLABUS
Projects are allocated in areas of research expertise and interest of members of the academic staff with biomedical Engineering expertise in the School of Engineering. The project content is decided by the supervisor for each individual project. The nature and content of the project are discussed by supervisor and student in the first week of the first semester.

Research topics and project titles will be proposed by academic staff in the Department, based on their ongoing research activity. A Biomedical Engineering stream student may undertake a project proposed by academic staff in the Dept of Electronic and Electrical Engineering or in the Dept of Mechanical Engineering. Students may propose their own research topics if they can demonstrate adequate prior knowledge and experience of the field, and if they can identify an appropriate academic supervisor. The project may be undertaken in conjunction with a research group, and/or in connection with industry or another university, where circumstances are appropriate. Whenever a project involves significant collaboration with an industrial or other external partner, an external co-supervisor may also be appointed.

LEARNING OUTCOMES
On successful completion of the research project and dissertation, students will be able to:
1. Frame a research question that can be answered in a limited time period and with limited resources;
2. Identify, assess and synthesize existing literature and research findings in respect of an unfamiliar scientific problem;
3. Develop and justify an appropriate research project design;
4. Apply a range of standard and specialised research tools and techniques;
5. Apply and develop relevant theoretical, scientific and mathematical principles;
6. Apply and develop engineering analysis and design tools;
7. Design and conduct experiments and analyse and interpret data;
8. Demonstrate the research skills required to perform the research work undertaken;
9. Discuss and critically evaluate the research findings;
10. Reflect on the strength and limitations of the research;
11. Assess the implications of the project outcomes for engineering practice;
12. Write a research dissertation to sufficient professional and academic standards;
13. Present complex ideas and material to an academic supervisor and respond effectively to questions and criticism;
14. Contribute individually to the development of scientific/technological knowledge in one or more areas of their engineering discipline.

**TEACHING STRATEGIES**

There are no formal timetabled hours associated with the project but students are expected to dedicate the time necessary to make reasonable progress, and to keep in regular contact with their supervisor. It is recommended that students make a formal arrangement with their supervisors to meet on a weekly basis, preferably at a regular appointed time.

**ASSESSMENT MODE(S)**

5E1 is assessed solely on the basis of the dissertation, which will be marked by both the project supervisor and an assigned second reader. Please see the MAI project-marking sheet used by supervisors in Dept. of Electronic and Electrical Engineering or Dept. of Mechanical and Manufacturing Engineering.

**Dissertation: 100 marks**

A full typed dissertation on the project must be submitted. This should not exceed 80 pages, excluding appendices/annexes if required. The font should be Calibri, or other sans serif font, 12-point, with 1.5-spacing of lines, and standard margins. The dissertation should contain an introduction outlining in detail the aims and objectives of, as well as some background information on, the project. The bulk of the dissertation should discuss in detail the main technical work carried out by the student, with appropriate results, explanations and deductions. The conclusion should comment on the overall outcome of the project. Two soft-bound copies of the dissertation must be submitted by the end of week 12 of the second semester. The dissertation is marked by the supervisor and a second reader.

**The dissertation must be submitted in hard copy to the Departmental office.**

Dissertations are assessed by academics who may not be expert in the precise field of study. The style of the dissertation should be designed for that readership.