

Fundamentals of Medical Device Design

PGDES1004

MODULE DESCRIPTOR

ECTS credits¹	5	Programme	MSc in Medical Device Design
NQF level	9	School	School of Design
Stage	1	Module Co-ordinator	Enda O'Dowd
Trimester	Autumn	Module Team	Enda O'Dowd, Derek Vallence and Anne McLellan
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Responsibility	The Academic Council and the School of Design Board have responsibility for this module.		

1. Introduction

This module aims to give students of medical device design a broad understanding of the design of medical devices. For many it will be their first introduction to the design of physical objects while for others it will be their first introduction to the complex highly regulated world of medical device design. This module aims to introduce students to the history of medical devices, the regulatory constraints of the medical device design process and the materials and manufacturing processes used in their production.

This module is designed to support and underpin learning in the subsequent studio based collaborative industry projects. It will allow students to be rigorous in the presentation of research and final design stages of projects and introduce them to the industry terminology which will be used in these projects. It is taught as a series of lectures, seminars and workshops. Assessment of the module is in the form of reports and written assignments in order to prepare the students for the rigorous scientific and cultural analysis necessary in the medical industry and academia.

2. What will I learn?

On completion of this module, students will be able to:

1. Describe and critically analyse the history of medicine and medical devices.
2. Identify and differentiate the social and cultural drivers that contribute to the development of medicine and medical devices.
3. Critically evaluate important developments in medicine and medical devices.
4. Analyse a product from a materials, manufacturing and use perspective.
5. Identify, classify and describe in a comparative manner the most important materials for use in medical devices.

¹ European Credit Transfer and Accumulation System, where 60 ECTS credits equate to the workload of a full-time academic year

6. Translate the functional requirements of a product into quantifiable physical and mechanical properties.
7. Select an appropriate material for a design from material data and defend in a scientific manner the merits of choosing a particular material.
8. Build basic components and assemblies in Computer Aided Design (CAD).

Module content

- History of Medicine and Medical Device Design – Lecture series
- Materials for Medical Device Design – Lecture series
 - The material families and regulatory environment
 - Translating functional requirements into material properties
 - Material selection - Granta EduPack software
 - Manufacturing process selection - Granta EduPack software
- Introduction to Computer Aided Design (CAD)

3. How will I learn?

This module will be taught through a combination of lectures in class or online. These lectures will be supported by seminars, tutorials, workshops and laboratory software sessions also delivered either in studio classes or online depending on the circumstances and the nature of the activity.

Learning tool	Hours
Lectures and seminars	24 hours
Specified Learning Activities	36 hours
Autonomous Student Learning	40 hours
Total Workload	100

4. What learning supports are provided?

Software packages will be provided for this class including Solidworks and Granta EduPack. These programs will require a laptop capable of running Windows 10 or later.

5. Am I eligible to take this module?

Module Requisites and Incompatibles

Pre-requisites	None
Co-requisites	None
Incompatibles	None
Prior learning	Where a student can demonstrate that they have achieved at least 80% of the learning outcomes of this module, by academic certified achievement, or through quantifiable and documented experience, they can apply to the School for that prior learning to be recognised. Applications must be received prior to the commencement of delivery of the module.

Recommended	None
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6. How will I be assessed?

Assessment tool	% of final grade	Timing
History Essay	40%	End of Trimester 1
Product Analysis and Material Selection	40%	End of Trimester 1
CAD assignment	20%	End of Trimester 1
Total	100%	

Assessment of the 'History of medicine and medical device design' component of this module will be on the basis of an essay on a choice of topics. The product analysis and material selection exercise will be carried out on a product related to the first collaborative studio project. As some students may have no experience of Computer Aided Design (CAD) the assignment for this component will be an introductory one.

Assessment tool	Learning outcomes assessed
History Essay	1, 2 and 3
Material selection report	4, 5, 6 and 7
CAD assignment	8

7. Feedback, results and grading

This module will be graded in accordance with the standard NCAD grading criteria and will contribute to the overall programme award of GDip or MSc in Medical Device Design.

8. What happens if I fail?

Resit Opportunities

Opportunities will be provided during or at the end of Trimester 2 to students who do not complete all assessments in Trimester 1, but students will not be able to progress to the next stage of the programme until they have successfully completed all Trimester 1 and 2 modules, equivalent to 60 credits.

9. When and where is this module offered?

Medical Device Design Studio

Seminar rooms

Online

Autumn Trimester (September to January)

10. How will I have the chance to evaluate the module?

It is important to NCAD that students inform the development of teaching and learning at NCAD. We encourage all students to communicate their concerns and their observations about their study to members of staff so that any changes can be made in a timely manner.

About two-thirds of the way through the year, a student forum will be convened to gather students' comments about their study and the delivery of the programme. In addition, at the end of Trimester 2, students have the opportunity to complete an online evaluation of their study and experience at NCAD. These evaluation events are important to current and future students, to ensure we can enhance the delivery of programmes at NCAD.

In addition, you are invited to discuss your experience on the module with your lecturers at any point during the year. You can also relay your comments to the class student representative who will communicate your comments to the staff.

**For further details on the content of your module and teaching arrangements,
consult your Programme or Module Handbook**