

Human Factors 1

PGDES1009

MODULE DESCRIPTOR

ECTS credits ¹	5	Programme	MSc 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, Paul Fortune
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Responsibility	The NCAD Academic Council and the School of Design have responsibility for this module.		

1. Introduction

This module aims to introduce students to human factors or ergonomics as approached in the design and development of medical devices. The students are introduced to generative methods of human factors research used in the early stage of the medical device design process. While the methods used are in line with the best international industry standards they will be applied in a real world context in collaboration with clinical professionals. It is important that human factors are taught in an applied real world context as this introduces the students to the real world constraints, hurdles and occasional serendipity of conducting contextual inquiry in medical care environments. This module will be delivered concurrently with the Research Methods Module where the students will be introduced to broader design research methods.

The aims of this module are to:

- Introduce students to generative methods of human factors research in the context of medical device design.
- Allow the students to practice contextual inquiry as conducted in the medical device design industry.
- Introduce students to the Perception, Cognition Action model of task analysis and the creation of instructional materials.
- Introduce students to the building of physical models and allow clinicians to evaluate and provide feedback on them.
- Introduce students to the design of instructional materials in a graphical format.

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

2. 2. What will I learn?

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

1. **Conduct** contextual inquiry in relation to medical procedures.
2. **Analyse** a clinical procedure in order to differentiate the perceptions, cognitions and actions being experienced and completed when conducting a procedure, through the use of human factors tools, ie, Task analysis.
3. **Produce** appropriate instructional materials in an accessible graphical format.
4. **Build** a model or sketch model for the purposes of formative evaluation of human factors.

Module content

This module is delivered in the first six weeks of trimester 1. The module commences with a team-based design challenge to build a task trainer for clinical staff at the Royal College of Surgeons (RCSI) or another clinical training environment. This task trainer will be required to simulate the real experience of conducting a surgical or clinical procedure. The students will be introduced to clinical staff who have expertise in delivering training for the procedure. Where possible the students will be allowed to observe the procedure taking place. In parallel with this design challenge the students will be attending lectures introducing them to human factors, contextual inquiry and task analysis. The students will be introduced to workshop practice, building sketch models and exploring simulation materials. The students will also be introduced to graphic design software in order to present their work in the form of a task analysis poster and instruction booklet outlining the construction of the task trainer.

At the mid-point of the module the students will present the results of their research along with sketch models exploring the materials and construction methods proposed for the simulator. The final task analysis will be produced in a graphical manner and presented along with the final task trainer to the clinical staff along with the instruction booklet at the end of the module.

3. How will I learn?

This module will be taught through a combination of studio practice and taught lecture content. You will learn to work in a multidisciplinary team with students from other backgrounds. While you will have a choice of project topics, teams will be chosen in order to provide a mix of skills and backgrounds. You will be introduced to clinicians and clinical environments in order to conduct your research. You will learn to conduct contextual inquiry in real world environments while using this research to iteratively produce a final design grounded in insights gained through this research. You will learn to work through iterative cycles of analysis and synthesis applying deep knowledge in real world contexts.

Learning tool	Hours
Lectures and seminars	18 hours
Specified Learning Activities	30 hours
Autonomous Student Learning	52 hours
Total Workload	100

4. What learning supports are provided?

Students are guided through the process of human centred research with support in place to enable them to conduct a broad range of primary and secondary research. Workshop materials for this module will be provided. Software used for producing the final task analysis may not be provided but may be purchased as a subscription service at student rates. A laptop will be required to run this software.

5. Am I eligible to take this module?

Module Requisites and Incompatibles

Pre-requisites	None
Co-requisites	To study this module, students must have completed or study Research Methods OR PGVC1001 - Introduction to Research Methods concurrently.
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

6. How will I be assessed?

Assessment tool	% of final grade	Timing
Midpoint Research Presentation	20%	Mid-point of module
Final Instruction Booklet	30%	Module End
Final Task Trainer Presentation	50%	Module End
Total	100%	

You will be expected to conduct human factors research and contextual inquiry in an iterative manner. This will entail the presentation of information to clinical professionals in order to get their feedback on your findings. You will be expected to apply this approach throughout the module however there will be two points during the module where you will have a summative assessment on your presentation of work. The first point will be a mid-point review of research findings at which you will also receive feedback on your human factors research. The second point will be your final presentation at which you should demonstrate an in-depth understanding of the clinical terms and anatomy which you are presenting. You will be assessed on the ability of your task trainer to fulfil the brief. The final outcomes will be subject to the availability of resources in a short time frame and will be assessed on that basis. You will also be required to document the process of building the task trainer and present this as an instruction booklet in accordance with good instructional design practice.

Assessment tool	Learning outcomes assessed
Midpoint Review	1, 2 and 4
Instruction Booklet	3

Presentation of Task Trainer

1, 2 and 4

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 PgDip/MSc 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

Product Design Workshop

RCSI or other clinical training setting

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**