Module Organisation

The module runs for 12 weeks of the academic year and comprises two lectures and one tutorial per week (except the study week). Total contact time is 33 hours.

<table>
<thead>
<tr>
<th>Start Week</th>
<th>End Week</th>
<th>Lectures per week</th>
<th>Lectures total</th>
<th>Tutorials per week</th>
<th>Tutorials total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>12</td>
<td>2</td>
<td>22</td>
<td>1</td>
<td>11</td>
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Module Description

There is an escalating need for trained engineering (design) professionals, who can translate design requirements into a design, which is both, technological innovative, aesthetic but at the same time is satisfying, easy and safe to use. This module is designed for students who would like to play an active role in the development of innovative products and services from an engineering design perspective making a real and lasting difference to develop innovative products and services, which are high in user experience, easy to use and provide safety.

Students will learn how engineering and design decisions affect the user and will learn how to identify and select appropriate engineering principles to design and develop for innovation, ease of use, user experience and safety. Associated methods as applied to products, interface and task design are introduced to identify users capabilities and motivations, and understand how to facilitate these within the design process to drive a user centred innovation process. The role and importance of the human factor in the design (process) is explained drawing examples from software products, automotive, aviation and medical device industry. Students will experience how (engineering) design can be informed and shaped by user’s capabilities (physical and cognitive), user preferences, task, environment and context of use in their own design project.

User centred design theory and practise is introduced. They will experience how this knowledge informs decisions in the iterative engineering design process and learn how to implement innovation strategies such as design thinking in their own design project. They will also learn how to assess existing products and equipment and to test for its usability in order to inform, specify, design and test new product and system developments.

Learning Outcomes

On successful completion of this module, students will (be able to):
• Understand human factor concepts and methods and how to use methods in the design process
• Understand all relevant human factors, which impact use, user experience and safety of a product or service including software design in the product development process
• Understand the user and associated abilities and preferences
• Knowledge of methods to identify and test for human factors implementation in design solutions
• Apply those methods successfully to a varied field of products for example consumer, software or medical products
• Understand how environment, context of use and task design impact human abilities
• Understand how the combination of use, task and context/environment informs (engineering) design decisions
• Develop ability to identify environmental and task factors and how they affect product performance in a variety of different product development areas from consumer to medical products and have relevant knowledge in this areas
• Use human factors knowledge effectively to create human centred innovative products and services

Module Content

• Introduction to human factors
• Human factors concepts underlying technology design
• Human factors in consumer products
• Human factors in biomedical products
• Human factors in Interface Design
• Concepts of creating user experience
• Human cognitive ability
• Concepts of system trust, task management, situation awareness, situation assessment, decision making
• Understanding task activity
• Task analysis and synthesis
• Task automation
• Workload, fatigue, stress
• Designing user centred technologies in the context of the broader operational process/system
• Design of Equipment and Work place Systems
• Patient safety and human factors
• Behavioural safety
• Environment Ergonomics
• Human Performance and Error
• Training and Simulation
• Cognitive ergonomics
• Safety, Risk and Reliability Engineering
• Accident Investigation
Module Notes

WebCT or equivalent

Teaching Strategies

Teaching is delivered by human factors/ Ergonomics experts and invited speakers from industry and human factors practice. The course is based on project based learning by integrating and applying theory, worked examples and experiences, making use of a combination of tutorials and seminars, case studies, group work, individual projects, business games, visits and guest lectures. Students are required to carry out a group project ideally with an industrial partner. Assessment is by continuous assessment throughout the semester, presentation of project prototype and submission of project report.

Assessment Modes

Project report (60%), continuous assessment (20%), final project presentation (20%)

Recommended Text(s)

Selected chapters in:

* Handbook of Human Factors in Medical Device Design by Matthew Bret Weinger
* Engineering psychology and human performance by Christopher D.Wickens
* Human memory by Alan Baddeley
* Questionnaire Design by A.N. Oppenheim