NEW v2	**HUMAN FACTORS IN COMPUTING SYSTEMS**
Level	**H**
Credit value	**20 (ECTS equivalent credit value 10)**
Effective from	**September 2013**

PRE-REQUISITES AND CO-REQUISITES
None

AIMS
This unit is designed to provide students an understanding of the role of Human Factors (HF) and integration of its elements into the development of complex socio-technical systems. This unit will present Human Computer Interaction (HCI) research that is sufficiently generic to apply to a range of software and systems engineering projects. Students will be equipped with the knowledge and skills in the areas of HCI design processes, standards and guidelines; usability tools and techniques; and situational awareness and workload measurement approaches. Topics such as soft systems, Human Factors Integration (HFI), training, trust, organisational learning, information and knowledge management will be examined through heterogeneous case study analysis.

INTENDED LEARNING OUTCOMES

Having completed this unit the student is expected to:

1. Critically review the benefits of adopting Human Factors approaches in addressing socio-technical problems.
2. Align HCI design processes, standards and guidelines with the systems development processes.
3. Apply user experience (UX) techniques – design and conduct usability and accessibility tests to evaluate interactive systems.
4. Conduct situational awareness and workload measurements in trials, experiments or exercises.
5. Apply soft systems methodology to analyse real world situations.
6. Reflect on industrial case studies to demonstrate the use of Human Factors in addressing technical and organisational complexity.

LEARNING AND TEACHING METHODS

The unit will be delivered through a combination of:

- Lectures, to introduce the concepts, processes, tools and techniques.
- Seminars, to include individual and group exercises and presentations to demonstrate the understanding of approaches covered.
- Heterogeneous case studies delivered by industrial guest speakers.

ASSESSMENT

Summative Assessment

ILOs 1-6 will be assessed by 100% coursework equivalent to 5000 words.

Indicative Assessment Information

All ILOs will be assessed through coursework which will focus on in-depth analysis of a socio-technical case study from a Human Factors perspective.

INDICATIVE CONTENT

Human Computer Interaction (HCI) Design Processes, Standards and Guidelines
HCI design processes, particularly focusing on User-Centred Design techniques such as ethnography and participatory design.

Presentation of the ISO 9241-201: Human-centred design process and World Wide Web Consortium (W3C) standards.

Usability Evaluation and Accessibility
Principles and strategies to design universally usable interactive computer systems.
Phases of the usability process and overview of the usability evaluation techniques.
Choosing an evaluation method and discussion of benefits and limitations.
Hands-on exercises focusing on cognitive walkthroughs and thinking aloud techniques.

Human Factors Integration (HFI)
Overview of the HFI plans, domains and initiatives.
Integration of Human Factors elements into the entire lifecycle of systems from the concept phase through to decommissioning.

Situational Awareness (SA) and Workload
Models and measurements of SA. Overview of the NASA-TLX workload measurement.

Soft Systems Methodology (SSM)
Overview of Checkland's SSM including the seven stages, CATWOE and conceptual models of the human activity systems.

Heterogeneous socio-technical case study analysis
Discussion of other HF related issues such as training, trust, organisational learning, information and knowledge management through using real life case study material.

INDICATIVE KEY LEARNING RESOURCES

Books
Checkland, P. (1999) 'Soft Systems Methodology: a 30-year retrospective', in Checkland, P. & Scholes, J. (1999) Soft Systems Methodology in Action, Chichester, John Wiley & Sons.
Endsley, M. R. and Garland, D. J. (eds.) (2000) Situation Awareness Analysis and Measurement. Mahwah, NJ: Lawrence Erlbaum Associates.
Norman, D. (1988) The Design of Everyday Things. New York: Doubleday.
Preece, J., Rogers, Y. & Sharp, H. (2011) Interaction Design: Beyond Human – Computer Interaction. 3rd Edition. New York: John Wiley & Sons.
Stanton N. A., *et al*. (2005) Human Factors Methods: A Practical Guide for Engineering and Design. Burlington, VT: Ashgate Publishing Company.

Journals
ACM Transactions on Computer-Human Interaction
Applied Ergonomics - Human Factors in Technology and Society
Ergonomics - The Official Journal of the Institute for Ergonomics and Human Factors
Human Computer Interaction
International Journal of Human-Computer Interaction

Web-based sources
Human Factors Integration Defence Technology Centre: http://www.hfidtc.com/
Institute for Ergonomics and Human Factors: http://www.ergonomics.org.uk/
Interaction – a specialist HCI group of BCS: http://www.bcs-hci.org.uk/
Useit – Nielsen's Usability and Web Design: http://www.useit.com/
World Wide Web Consortium (W3C): http://www.w3.org/