

MT5004: User-centred Engrg & Product Development

Workload: 3-0-0-4-3

Description:

The first part covers fundamentals of User-Centred Engineering, various techniques and tools for obtaining Voice of Customers, Data analyses, Utilization of multi-source data, and application of these to create decision support tools for product Design and implementation of Product Development roadmaps. The second Part covers case studies in different product domains with relevant small projects to familiarize students with the various usability-engineering processes and reinforce classroom learning. The course aims to provide the students with knowledge of user-centred engineering principles and tools and equip them to manage and better leverage User-centred Engineering resources in product development.

Syllabus:

1. User-Centred Engineering – an introduction
Human Factors Engineering, Ergonomics, Hedonomics, User Experience, Affective designs.
2. Who are the Users?
Identifying the users, Unarticulated and Unmet needs.
3. Data gathering – Methods
Surveys, Focus Groups, Shadowing, Usability Testing, Story Telling, Cognitive Walk-throughs, Ethnographic Studies, Simulation & Prototyping.
4. Data Gathering -- Making sense of the data
Statistical analyses, Operator / User Modelling, Reliability and validation, Data Integration, How to present the data, Product definition from qualitative data, Management decision tools
5. Data gathering - Case Studies
PCs, Consumer appliances, Large Systems, Advanced technologies.
6. Managing Product Design Resources
Forming the user-centred design team, Stakeholders – Accountability and responsibilities, Role of (a)Marketing (b)Human Factors Engineering (c)Industrial Design (d) Marcom (e)Manufacturing.
7. Management's Role in Overcoming Communication Barriers
Global Design Teams, Cultural factors, 'Abrasive' Creativity, Creating an Innovative Culture, Knowledge networks.

8. Simulation and Prototyping Tools
Utility of Low cost visualization tools, Story-Boarding, Video Prototypes, Animation.
9. User-Centred Engineering – revisited
User-centred design as a product differentiator, When Imitation does not work, Impact on development cycle time and common-platforms.
10. New Technology - Product Innovation
Drivers of innovation, What to build, Innovation workshops, Emotive Designs.
11. Conclusion: Future of User-Centred Engineering

References:

Complusory Readings:

1. Kin Vincentre, *The Human Factor – Revolutionizing the way people live with technology*, 2004.
2. Donald Norman, *Emotional Design – Why We Love (or hate) Everyday Things*, 2003.

Supplementary Readings:

3. Tom Kelley, *The Art of Innovation : Lessons in Creativity from IDEO, America's Leading Design Firm*, 2001
4. Martin Helander, *A guide to Human Factors & Ergonomics*, 2005
5. K Kroemer & E Grandjean, *Fitting the Task to the Human: A Textbook of Occupational Ergonomics*, 1997
6. Donald Norman, *The Psychology of Every Day Design*, 2002
7. S. M. Casey, *Set Phaser to Stun: And other true tales of Design, Technology and Human Error*, 1998
8. E McCormick & Mark Sanders, *Human Factors in Engineering and Design*, 1992
9. Robert I Sutton, *Weird Ideas That Work*, 2002