

Course Number: CSC 642 / CSC 842

Course Title: Human Computer Interaction

Number of Credits: 3

Prerequisite: A grade C or better in CSC 413 or consent of instructor. Prerequisite for CSC 842: Graduate standing or consent of the instructor.

Note: CSC 842/CSC 642 is a paired course offering. Students who complete the course at one level may not repeat the course at the other level.

Catalog Description

The design, implementation, and evaluation of computer interfaces that effectively meet the human needs. Topics include, foundations of human-computer interaction, user aims and requirements, user-centered design, task analysis and modeling, human computer interface principles and design patterns, usability engineering and evaluation, and distinct HCI methods suitable for effective GUI development.

Expanded Description

The course has the following main components:

- Basic principles (how to design and build simple user interfaces that would do the required tasks more effectively and efficiently)
- What is Human-Computer Interaction?
 - The human (physical capabilities, perception and cognition capabilities, etc.)
 - The computer (display devices and technologies, input devices, tracking devices, advanced interfaces)
 - The interaction (models of interaction, interaction styles, elements of different kinds of interfaces)
- User aims and requirements (user analysis, user profiling, user models, user requirements)
- Human interface principles and design patterns
- Task analysis and task modeling (techniques and approaches to do task analysis and modeling, interviews, questionnaire, ethnographic observation, participatory workshops)
- Usability engineering (the different aspects of usability and how we measure these aspects)
- Usability evaluation and testing (evaluation cycle, evaluation through expert analysis, evaluation through user participation, designing experiments, classification of evaluation techniques)
- Information overloading
- Practical GUI development process (UI design principles, user-centered design, prototyping, mockups, focus groups, use cases, survey, etc.)

Course Objectives and Role in Program

With maturing of SW technologies and with SW applications becoming ubiquitous, the need for teaching students to design, develop, test and evaluate easy to use software systems is becoming critically important. This course is designed to address this issue in a practical way; it is focused on practical principles and best practices for UI design, development, testing and evaluation using modern software tools and frameworks. Towards this objective, this course introduces the skills, concepts, methods, and technologies that enable the computer scientists to build software interfaces, tools, and systems effectively meeting the human needs. This course offers one individual project, which helps students build their portfolio of projects. Both PC and mobile UIs will be covered. In addition, an emphasize will be given to the collaborative team work within the class to do practical work of the learning concepts and techniques as well as improving the teamwork collaboration and management skills. The course may also involve external speakers who will expose students to industrial-strength, state of the art projects in human computer interaction.

Learning Outcomes

At the end of the course students will be able to:

- Simplify system design and UI elements so users would perform the tasks more effectively and efficiently
- Understand the foundations and principles of human-computer interaction and able to describe and discuss current research and technologies in the field of HCI
- Design, implement, test and evaluate system UI sub-systems using fundamental principles of UI design (PC and mobile)
- Work in collaborative teams to bring into practice the concepts and techniques in HCI field following best principles and practices
- Use modern tools and frameworks for UI design, implementation and testing
- Design and implement adequate user evaluation experiments and focus groups

Reading Material

Course slides are based from multiple resources. Slides will describe the source of material. Students are encouraged to read in depth about the discussed topics from these resources:

Main Literature:

- Dix, J. Finlay, G. Abowd, R. Beale: **Human-Computer Interaction**. Prentice Hall 3rd Edition 2004 ISBN 978-0130461094
- J. Maeda: **The Laws of Simplicity**. MIT Press 2006 ISBN 978-0262134729
- Kerren, A. Ebert, J. Meyer: **Human-Centered Visualization Environments**. Springer 2007 ISBN 978-3540719489
- H. Sharp, Y. Rogers, J. Preece: **Interaction Design**, Wiley&Sons 2nd Edition 2007 ISBN 978-0470018668
- Buxton: **Sketching User Experience**. Morgan Kaufmann 2007 ISBN 978-0123740373
- Sears, J. Jacko: **Human-Computer Interaction Handbook**. Lawrence Erlbaum 2nd Edition 2007 ISBN 978-0805858709

Other Resources:

- **ACM SIGCHI**: The ACM Special Interest Group on Computer–Human Interaction
 - <https://sigchi.org>
- **Conferences**:
 - **CHI**: ACM CHI Conference on Human Factors in Computing Systems (The ACM flagship conference)
 - Other ACM SIGCHI conferences
 - + CSCW, IUI, HRI, TEI, UIST, MobileHCI, EICS, IDC, DIS, UbiComp, SUI, ISS, VRST..

Required textbooks

None. Material will be provided in class slides

Method of Evaluation (point distribution may change)

- Collaborative team work within the class : 30/100

- For each week, tasks will be given to the teams, where focus would be on doing practical work of the theory part taught earlier in the class.
- Individual take home project: 50/100
 - Individual take home student project would focus on applying the HCI knowledge to design and development of system UIs.
- Final individual exam (close books, close notes, no mobile): 20/100

Research Paper Presentation (CSC 842 Graduate Students Only)

All the graduate students need to do an allocated research paper presentation during the last quarter of semester.

Tools, frameworks, platforms

Students and teams will propose (and instructors will approve) their own tools and frameworks choosing from leading open source resources. Class will involve both PC and mobile user interfaces.

Attendance:

Attendance is highly recommended. Each week, the class is divided into two parts: the first part is dedicated to learning the concepts, techniques, and principles in HCI, while the second part is dedicated to collaborative team work in order to do practical work on the taught material in the first part. The weightage of collaborative team work towards the final grade is 30%. Often there will be course material or examples that is covered during the lectures but is not in the textbook or slides. Students are responsible for taking notes.

Created by:

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