UNIVERSITY OF CRETE
COMPUTER SCIENCE DEPARTMENT

COURSE CS-564 (OPTIONAL)
ADVANCED TOPICS
IN HUMAN – COMPUTER INTERACTION

Course Convenor: Constantine Stephanidis

Introduction to Advanced HCI Topics and Concepts

General Description

- Human-Computer Interaction is a multidisciplinary field concerned with the analysis, design, implementation and evaluation of user interfaces of interactive systems, with which the user has the ability to interact, as well as the subjects that concern this interaction

- The course “Advanced Topics in Human – Computer Interaction” studies the Interaction between Human and Computer Systems in a wide multidisciplinary context and is targeted to graduate (and undergraduate) students who have already acquired the related basic knowledge and are interested in this field, particularly in modern research and practice for the design and development of interactive applications and electronic services

Overview

- CS464 – overview
- CS564 – contents
  - Topics
    - Design for All and Accessibility
    - Advanced HCI topics
    - New media and interaction techniques
    - Introduction to AmI
  - Course information
    - Lectures and panels
    - Project
    - Grading
    - Contact and mailing list

Overview of CS-464 (1/2)

- Introduction to HCI
- The Human
- The Computer
- Human – Computer Interaction
- The design process
- User-Centered Design
- The design of everyday things
- Requirements engineering
- Prototyping

Overview of CS-464 (2/2)

- Interaction styles
- Guidelines and style guides
- Web design
- Mobile design
- Web accessibility
- Evaluation

CS-564: Course contents (1/3)

- Accessibility
  - Web accessibility
    - WCAG design guidelines
    - Web accessibility workshop
  - Design for All
- Multimodality and adaptation
  - Definition, motivation for adopting multimodality, modality combinations, multimodal application examples, emerging challenges
  - The need for adaptation, definitions, adaptation models, adaptation examples

CS-564: Course Contents (2/3)

- Advanced topics of mobile interaction
- User experience (UX) and emotion
- Aesthetics
- Computer Supported Collaborative Work (CSCW)
- Social media and online communities
  - Web 2.0
  - Social Networks
  - The cloud

CS-564: Course Contents (3/3)

- New media and interaction techniques
  - Recent and emerging interaction techniques:
    - Gestures and touch
    - Speech, head and pose tracking
    - Eye tracking, brain-body interfaces
  - The new media
    - Smartphones and Tablets
    - Public Displays and Large Screens
    - Wearables
- Augmented reality
  - Categories and applications
  - Interaction techniques for augmented reality, limitations and challenges of augmented reality technologies

Introduction to Ambient Intelligence

- Introduction to Ambient Intelligence topics
  - Definition and term disambiguation
    - Ubiquitous Computing, Pervasive Computing, AmI
  - History and origins
  - Application domains
- AmI challenges and open research questions
  - Context of use
  - Design methodologies and processes
  - Privacy and security
  - Intelligence / Reasoning
  - Cognitive demands
  - Cultural issues, aesthetics

The emergence of a new (interactive) world (1/2)

- For more than two decades the prevalent paradigm of computing was the fixed desktop PC with a mouse and keyboard
- The first giant step towards the new technological reality was made with the availability of the internet to the public
- The second step was the introduction of mobile devices and later the new interaction techniques
  - Mobile phones (mid-to-late 90s)
  - Laptops with Wi-Fi
  - Smartphones (from Blackberries to the iPhone) / Touch and gestures
  - Gaming innovations (Nintendo's Wii, Microsoft's KINECT etc.)
  - Tablets, e-readers
  - Wearables

The emergence of a new (interactive) world (2/2)

- What is next?
  - "Natural" interaction, multimodality, augmented reality, mobile computing, AmI, unprecedented social connectedness
  - The Internet of Things
- Co-existence and concurrent development of new computing paradigms that share a lot of common elements (connectivity, new interaction techniques, multi-device services, etc.)
- The scope of technology growth leads to a change of the way we live that is at our doorstep
- The new interactive world is a world of new HCI issues

Interrelated and recurring issues (1/2)

- "Classic" HCI – discrete issues and almost linear sequence of topics
- Advanced HCI topics: highly interrelated with common themes and issues spreading across different topics
  - Examples:
    - New interaction techniques like touch and gestures are highly interrelated with the new media
    - A multimodal system combines different interaction techniques
    - Adaptation looks at a system/service spread over different devices, or supporting multimodality and providing appropriate interaction techniques according to the current user or context of use
    - Augmented Reality systems touch upon new interaction techniques, tracking, sensing, mobile computing and makes use of various media (mobile devices, wearables or large public displays)
    - Ambient Intelligence combines all of the above

Interrelated and recurring issues (2/2)

- It is inevitable that when discussing various topics there is going to be some overlap in content and recurring issues
- Wherever appropriate, each issue will be re-examined from the perspective of each respective topic
- For each topic there are going to be examples of the technology, application domains and the related theory
  - Some examples can be spread across different topics
  - E.g.: Sixth Sense is a *wearable* that *augments reality* and works with air *gestures*

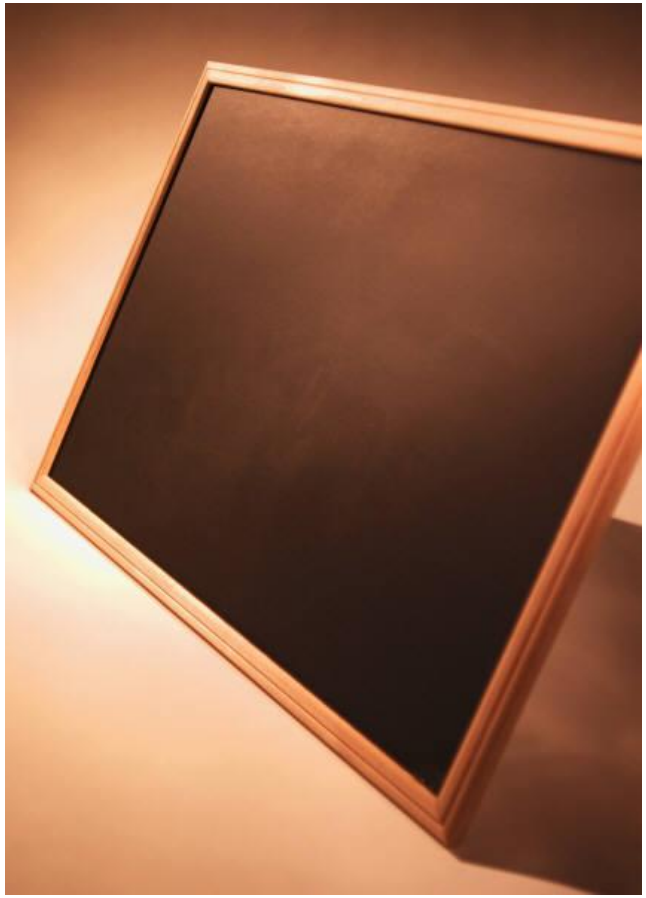
CS-564: Students' assessment

- The assessment of students will be based on their **performance** in:
  - the written exams
  - the course project
  - two workshops
  - the panels
  - the multiple-choice mini-quizzes which will be delivered to the students at the end of each lecture
- The written examination will take place during the exams period. The course does not require written or oral preliminary examinations

Tutorials and Workshops

- Tutorials
  - Kinect I & II
  - Sensors
  - Responsive Web Design
  - Web Accessibility I
- Workshops (graded)
  - Web Accessibility II
  - Evaluation

CS-564: Lectures (1/3)



- Lectures will require active participation from the students
  - The topic of each lecture will be introduced by the course convenor
  - Following, a structured discussion with the students will further elaborate on the related topic and address any questions and open issues
- Each lecture will be assigned to a **panel team**
- The panel team will ask questions to the course convenor in order to:
  - highlight important/challenging issues related to the topic of that lecture
  - facilitate comprehension by the rest of the class
  - encourage a structured discussion between the course convenor and the students

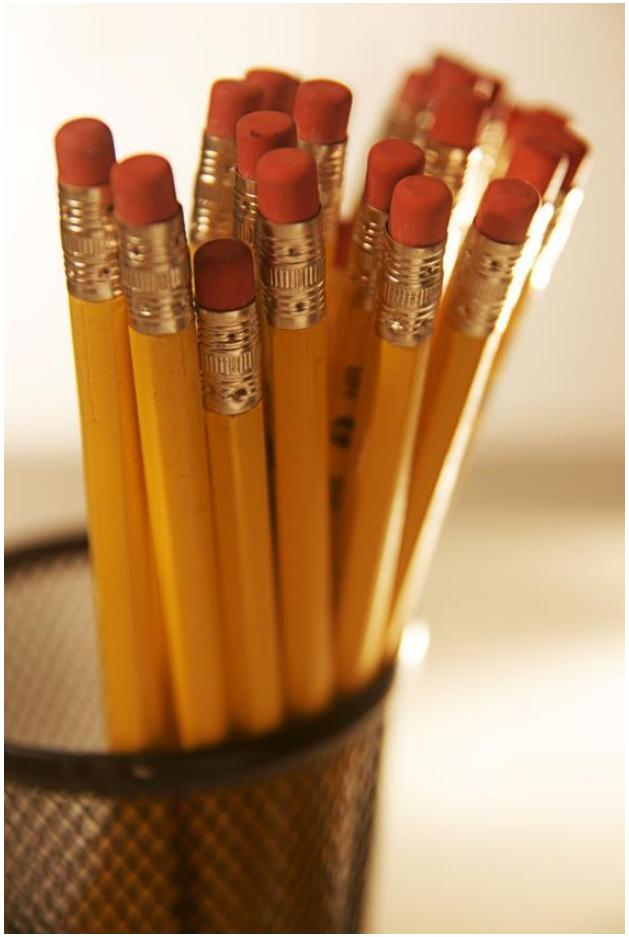
CS-564: Lectures (2/3)

- The panel team must have studied before the lecture all the relevant material that they will be given (lecture slides and additional bibliography)
- Panel teams will be the same as the project teams: small groups of up to 4 individuals
- Each team will have to prepare a panel up to 3 times during the semester
  - Each panel team member must “coordinate” the panel and the structured discussion at least once
- For archiving purposes, after each lecture and within the same day, each panel team should submit via email a document with their questions to the course’s account (hy564@csd.uoc.gr)

CS-564: Lectures (3/3)

- At the end of each lecture, students will be asked to fill-in a mini-quiz consisting of one multiple-choice question (lecture comprehension quiz)
  - Quizzes will be delivered from the second lecture until the seventeenth (according to the course planning twenty lectures will be delivered)
  - Participation in the mini-quiz is optional
  - Quizzes are graded
  - Quizzes affect the final score by 10%
    - For each student, the grades of his/her best twelve (12) quizzes will participate in the final score
- All the course material will be in English
  - Quizzes will be delivered both in English and in Greek

CS-564: Project (1/2)



- The course project is divided in three phases
  - Each phase will be assessed upon submission
  - Some phases might include intermediate deliverables
  - Examination dates will be announced ahead of time. Delayed examinations will not be allowed
- The course project will be assigned to small groups of students consisting of
  - up to 4 students per group

CS-564: Project (2/2)

	Project phase	Start	Intermediate Deliverables	Final Deliverable*
1	Design of an adaptive, multimodal system	25/9/2015	7/10/2015	19/10/2015
2	Implementation of the system	16/10/2015	30/10/2015 20/11/2015	11/12/2015

*** The time schedule will be strictly followed**

CS-564: Project Short Description

- Design and develop a suite of interactive applications for different devices that will support everyday users in the context of a Smart Office
- Devices available:
  - **Mobile smartphone**
  - **Desktop PC**
  - **Large TV and tablet (second screen application)**
- Interaction should be possible through different modalities (at least two) via the following hardware:
  - **USB sensing and control building blocks** (e.g., various touch sensors, temperature sensor, light sensor, etc.)
  - The **Microsoft Kinect©** motion sensing input device that can recognize body posture, gestures and spoken commands
- Projects of **exceptional quality** will be evaluated by the convenor for potential extensions that could result to one or more of the following: a scientific publication, a thesis, an in-vivo installation in a simulation space, and/or an in-vitro installation in a real environment

CS-564: Final grade

- The final course grade will be calculated according to the following formula:
  - FG = 0,35 * Project score (PS)
    + 0,10 * Mini-quizzes score
    + 0,10 * Panel score
    + 0,10 * Workshops score
    + 0,35 * Written exam
    - Each mini-quiz will equally affect the final grade
    - Each workshop will equally affect the final grade
- The project score will be calculated according to the following formula:
  - PS = 0,15*PhaseA1 + 0,25*PhaseA2 + 0,12 * PhaseB1 + 0,18*PhaseB2 + 0,30*Phase B3

Contact information

- Course list
  - hy564-list@csd.uoc.gr
  - Register to the list via email
    - To: majordomo@csd.uoc.gr
    - Subject:
    - Body: subscribe hy564-list@csd.uoc.gr
- Course email
  - hy564@csd.uoc.gr
- Course website
  - www.csd.uoc.gr/~hy564

Teaching Assistants Hours

- Meetings with the TAs should be scheduled in advance via email

Immediate Actions

1. Subscribe to the mailing list
2. Form your team and register it by **Monday 28/09**
   - Send an email to the **course account** (hy564@csd.uoc.gr) with the details of the team members (First Name, Last Name, e-mail address, Student Registration Number)

- Once teams have been determined, a list with the course's lectures will be announced on the website
  - Each team should select 3 specific lectures which they prefer for panel preparation, and send them via email to the course's **mailing list** (hy564-list@csd.uoc.gr)
  - Panels' assignment will follow a FIFO basis (order of priority)
  - The whole process should be finalized by **Thursday 01/10**

The end