Faculty of Engineering
School of Computer Science and Engineering

COMP3511 / COMP9511
Human Computer Interaction

Session 2, 2010
COURSE STAFF  

COURSE DETAILS  

COURSE AIMS  

LEARNING OUTCOMES  

RATIONALE  

TEACHING STRATEGIES  

ASSIGNMENTS  

ASSESSMENT  

ACADEMIC HONESTY AND PLAGIARISM  

TEXTBOOKS  

OTHER MATERIALS  

OTHER RESOURCES  

COURSE EVALUATION AND DEVELOPMENT  

COURSE SCHEDULE  

OTHER MATTERS

Course staff
• Dr. Daniel Woo, Lecturer in Charge
  o Room K17-307
  o 9385 6495
  o danielw@cse.unsw.edu.au
• Dr. Nadine Marcus
  o Room 401B-K17
  o 9385 5173
  o nadinem@cse.unsw.edu.au
• Your tutor will also be able to answer questions in your tutorial/laboratory
• For course management related issues e-mail cs3511@cse.unsw.edu.au
• Individual consultation appointments can be arranged by e-mail
• Some issues can be dealt with during the breaks in the lecture
Outside of consultation times use the on-line forums on the class web site http://www.cse.unsw.edu.au/~cs3511 or e-mail the specific staff.

Course details
- 6 units of credit (UoC)
- Pre-requisites
  - Data Structure and Algorithms COMP2091 (undergraduates)
  - No pre-requisites for postgraduates
- This course is a pre-requisite for COMP4511 User Interface Design and Construction and any HCI related thesis.
- The lectures (Monday 6-9pm) are common for undergraduates and postgraduates.
- Each student should be enrolled in one of the designated 2 hours tutorial/laboratory time slots
- Tutorial/Laboratory will start in Week 2 and go through until Week 13
- There will be a Week 13 lecture time slot, compensating for the public holiday on October 4.
- Tutorial/laboratory and assignment checkpoints will take place every week in G11-K17 (Mac laboratory) also known as the “CHIL” (Computer Human Interaction Laboratory)
- Postgraduates are assigned an additional prescribed textbook on which discussions and exercises will be based. An additional assignment (compared with undergraduate submissions) will be generated.

Course aims
- to develop your skills in the area of user-centred design
- to provide the background knowledge about how people think and process information
- to demonstrate techniques/heuristics necessary to evaluate systems for their usability
- to give you the capability of executing a user-centred design process
- to give you experience in using paper-based design techniques
- to give you experience in the formal evaluation of user interfaces
- to give you experience in developing electronic prototypes of user interfaces
- to ensure that your design work includes user needs analysis
- to give you an awareness of user centred design tools, methods, and techniques
- above all, maintain a real-world perspective to applying this knowledge in industry

Learning outcomes
- Through using a design diary, develop an understanding of design conceptualisation, technical and creative thinking
- Distinguish (user centred) design from (code) implementation
- Design a project plan that includes the important role of the user in the software design lifecycle
- Be able to prepare a project plan that is based on user centred design principles that incorporates an iterative design approach
- Critique a user interface basing your evaluation on design principles, usability goals and user experience goals
- Be able to use the heuristic evaluation technique for evaluating user interfaces
- Be able to present a user interface evaluation report (written and oral)
- Describe the characteristics of human cognitive and perceptual capacities and their relationship to user interaction
- Understand the different methods people use to solve problems
- Describe the basic human cognitive architecture
- Understand the strengths and limitations of human cognition and memory
- Be able to define and describe (with examples) the cognitive load theory principles including the redundancy effect, split attention effect, worked example effect and modality effect
- Be able to apply cognitive load theory to the design of more usable interfaces that do not cognitively overload users.
- Develop an understanding of the nature of human expertise
- Develop an understanding of novices' capabilities and needs
- Use this knowledge of experts and novices to be able to design interfaces appropriate to a particular group of users
- Understand the relationship of scientific method to the user centred design approach
- Understand the difference between quantitative and qualitative research methodologies
- Construct a questionnaire or survey to obtain pre- and post-test information from users
- Understand the importance of ethics and privacy and be able to carry out user-centred design activities in accordance with these requirements
• Understand the different phases of the user centred design approach
• Be able to identify and distinguish users and stakeholders for a particular design situation
• Create scenarios and personas and apply them throughout the design and evaluation process
• Be able to deconstruct a system design into information, interaction and visual design components
• Appreciate the complexities of visual design and the role of graphic and visual designers
• Apply data analysis techniques to understand and refine information architecture and system requirements
• Carry out design activities to design, evaluate and refine user interaction
• Design and sketch primarily with paper to obtain rapid solutions to design questions
• Design on your own and in small groups, consolidating individual designs to understand the importance of design decisions and the process by which selection is made
• Prepare a usability walkthrough / evaluation test plan
• Carry out usability walkthroughs to evaluate paper-based designs
• Prepare structured reports that quantify the issues discovered from evaluation activities
• Understand the user interface design issues surrounding web design
• Develop an understanding of conventional and future input and output devices that extend the user experience beyond the graphical user interface
• Construct non-functioning visual electronic prototypes based on previous paper based design activities
• Appreciate the special needs of other people, being able to define the goals of Universal Access and understand how user centred design processes should also be inclusive of special needs
• Understand the broader issues that technology, organisational change and user interfaces play in the area of occupational health and safety
• Become aware of the design issues for preparing user interfaces for international audiences (those other than English) and how this relates to considerations that need to be made in the implementation phase
• Understand the issues surrounding the design of social and collaborative software, and the need for this type of software
• Be able to quantify user interaction in terms of low level interactions and understand some of the mathematical techniques used to measure that interaction
• Become aware of the scientific and research approaches used in user interface design research

Rationale

Failing to take into consideration the needs of your software user audience will lead to costly disaster. People will become frustrated because the application does not work the way that they expect. You know it yourself – you have encountered web sites that are difficult and non-intuitive to use. We aim to show you a design process that helps reduce such user interface difficulties before users are unleashed on your software. It starts with design and understanding people. The process involves an on-going working relationship with potential users during the entire design of a system; not just in the software testing phase.

However, engineers have created many software applications without consultation with the immediate user audience. They may have talked to the managers of the software (those that will pay the development cost bills) but have not talked to the end users. The end users have valuable insight into the workflow of organizations but this is complimented with knowledge from other stakeholders.

The intention is not for lectures to reiterate the text material but to re-activate it, re-represent it, elaborate it, and demonstrate the application of it to design. This implies, and it will be assumed, that you have done the reading prior to lecture. If you have questions about the reading, the lectures, or the interrelation between the two, make sure that you ask in lectures or via the various consultation methods described below.

Teaching strategies

Monday 6-9pm is a common lecture that will have both lecture material, design diary exercises and small group activities. Given the late time slot we will endeavour to make this more engaging than a typical lecture format. The lecture period will need your participation to make this work successfully. You will need to bring your design diary. You may be called (randomly) in lecture to present your design diary work or be involved in panel discussions. Your participation will count towards your participation component.
Each week you will be required to participate in your timetabled tutorial/laboratory class. This will be held in the CHIL (Computer Human Interaction Laboratory) G11-K17, ground floor Mac lab. Bring your design diary to tutorial class and remember to date each page. It will act as evidence of your original design and assignment work.

Regular progress on assignment work is required and checked with weekly or fortnightly deliverables. This is designed to keep you working regularly on your assignments so that you don’t leave things until the last minute. During some scheduled tutorial classes (see web site and assignment pages for dates) there will be assessable in-class activities and checkpoints (due at the beginning of the class) relating to assignment milestones. Late penalties will be applied if you have not adequately prepared for these activities.

This will also be a time for you to ask questions of your tutor, and for your tutor to give you some feedback on your work.

The practical periods in the tutorial/laboratory are intended to facilitate group discussion and to give you the ability to work through practical examples.

Your design diary will be collected at the end of the semester for assessment and review. Your tutor will date stamp the diary in tutorial class. You are encouraged to find your own design examples of bad user interaction experiences. This may involve you taking a photograph, as an example, and gluing a print of that photo into your diary and writing up your ideas as to why the interaction is poor and solutions to improve.

This course appears to some as being “easy” but the reality is that it isn’t. (This comment comes from student feedback). Many unfortunately don’t make this realisation until the final weeks.

• There is a lot more reading than other courses
• Unlike code, you cannot hack out a solution the night before
• Design takes a lot more thinking and conceptualisation to explore the problem space
• The process is iterative and you have to demonstrate improvements that evolve from iteration
• Your design work involves discussing issues with potential users
• Your design work involves discussing and working with others in your group

Assignments
The assignments differ between postgraduate and undergraduate to cater for the different experiences and learning approaches. This strategy has been formulated based on our own observations and feedback from students.

All students will complete 3 assignments.

Postgraduates (COMP9511)
• Assignment 1 – Museum Visit – Individual Design Critique
• Assignment 2 – Group User Interface Design
• Assignment 3 – User Interface Design Process – Individual Essay / Review

Undergraduates (COMP3511)
• Assignment 1 – Individual Design Critique / Individual Design
• Assignment 2 – Group User Interface Design
• Assignment 3 – Group User Interface Design Refinement / Individual Design Experience

Assignment 1 is focussed around heuristic evaluation, design principles and usability principles. For postgraduates you will apply your understanding of these concepts when evaluating a series of museum “interactives”. Undergraduates will need to demonstrate how they have applied these ideas to an individual design that they have created.

Assignment 2 is a group design activity where the group will carry out a full user centred design process to create a series of paper prototypes of a system. The process starts with design conceptualisation, analysing user needs and goals, through a number of design iterations, with ongoing evaluation. You will discover though your testing that your first design will have flaws and not
work the way the user expects. Iteration becomes an essential technique to improve the situation. Iteration is combined with an evaluation process to formally analyse whether improvements are being made.

Assignment 2 is heavily focused on paper design and introduces the formal evaluation process. The first phase will be based on individual design work, whilst the second phase will be carried out with a team of 3-4 students to consolidate individual designs. Group members must be from the same tutorial class because assessable exercises are carried out in tutorial time – so all group members must be present.

For the undergraduate individual design (Assignment 1), a short written report will be submitted with the design concepts. Each individual will introduce his or her design to the group. This process ensures that each person has a thorough understanding of the design problem and the consolidation process requires healthy debate and discussion concerning user-centred design issues.

In week 7, a formal usability evaluation will be run by your group and observed and assessed. The outcomes of the evaluation and the subsequent design discussion will be written up and added to the final group report. This provides an opportunity to incorporate feedback from experienced tutors. In addition to the report, a group presentation of the design will be presented in tutorial class.

Assignment 3 builds on the outcomes of the Assignment 2 group paper design, but introduces electronic prototyping techniques (not code implementations). Such techniques provide a better platform for assessing some forms of user interactivity. You will discover that there is a role for both paper and electronic prototyping techniques. Through experience you will come to understand when it is appropriate to use which technique. In Assignment 3 you will further improve and enhance your design with a focus on using electronic prototyping to improve the user experience.

Your group work will be presented and assessed. The group is expected to demonstrate how the design was evaluated using the user-centred design process and how considerations for heuristics, cognitive load, design principles etc. have been applied.

Each person in the group will carry out a review of the processes used in Assignment 2 and 3 and submit a report reflecting on the design process and the overall outcomes.

Assignment 3 for postgraduate students will be a written essay based around a prescribed text and additional readings (Cooper, The Inmates are Running the Asylum). The goal is for you to review and critique the user-centred design processes and describe their application in a software development context. Cooper's book describes some of the realities of software development organisations in contrast with the user-centred design perspective. Having the experience of a postgraduate you should have had more exposure to organisations that have had to develop a system (web site or internal software). This should also consider the business and management side of developing software with a user interface component. We are considering an approach where postgraduates will use undergraduate groups as part of a case study to be discussed in the assignment.

**Assessment**

- Late penalties for assignment work will be applied to submissions received after the due date. 10% of the total assignment mark will be deducted from the assigned mark per day late.
- Late penalties for tutorial deliverables will be applied if they are not received or completed by the beginning of class.
- All electronic work submitted will be retained by the University of New South Wales and can be used for teaching, research and review purposes. We will acknowledge your contribution if you wish, or withhold your name should you choose to remain anonymous.
- All submissions can be checked for plagiarism.
- Peer review software will be used for group projects, to assess relative contribution of each group member to the assignment. Marks will be scaled according to individual level of contribution. Details will be released with the assignment. It is to be noted that group assignment marks will not be released until ALL group members have completed a peer review.
Assessment
(IND)=individual (G)=group

<table>
<thead>
<tr>
<th>Task</th>
<th>COMP3511</th>
<th>COMP9511</th>
<th>Week Due</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assignment 1 User Interface Analysis</td>
<td>10%</td>
<td>15%</td>
<td>Week 4 (IND)</td>
</tr>
<tr>
<td>Assignment 2 Consolidated Group Design and Evaluation</td>
<td>15%</td>
<td>20%</td>
<td>Checkpoint Week 5 (G)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Final Report Week 6 (G)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Usability Evaluation Assessment and Group Assessment Week 7 (G)</td>
</tr>
<tr>
<td>Assignment 3 Group Design</td>
<td>15%</td>
<td></td>
<td>Week 10 (G)</td>
</tr>
<tr>
<td>Assignment 3 Individual Design Reflection</td>
<td>10%</td>
<td></td>
<td>Week 11 (IND)</td>
</tr>
<tr>
<td>Assignment 3 Inmates / UCD Process Critique</td>
<td>15%</td>
<td></td>
<td>Week 9 (IND)</td>
</tr>
<tr>
<td>Design Diary</td>
<td>5%</td>
<td>5%</td>
<td>Week 12 (IND)</td>
</tr>
<tr>
<td>Laboratory / Tutorial attendance, On-line forum, Lecture participation</td>
<td>5%</td>
<td>5%</td>
<td>Weeks 2-13 (IND)</td>
</tr>
<tr>
<td>Final Exam*</td>
<td>40%</td>
<td>40%</td>
<td>(IND)</td>
</tr>
</tbody>
</table>

*Note: you must achieve at least a pass on the examination to pass the subject. A harmonic mean will be applied to the final mark to ensure the mark reflects consistent performance across all areas of assessment. See http://www.cse.unsw.edu.au/~teachadmin/info/harmonic3.html

Peer review and scaling will be applied to group marks.

Academic honesty and plagiarism

**What is Plagiarism?**
Plagiarism is the presentation of the thoughts or work of another as one’s own.* Examples include:

- direct duplication of the thoughts or work of another, including by copying material, ideas or concepts from a book, article, report or other written document (whether published or unpublished), composition, artwork, design, drawing, circuitry, computer program or software, website, Internet, other electronic resource, or another person’s assignment without appropriate acknowledgement;
- paraphrasing another person’s work with very minor changes keeping the meaning, form and/or progression of ideas of the original;
- piecing together sections of the work of others into a new whole;
- presenting an assessment item as independent work when it has been produced in whole or part in collusion with other people, for example, another student or a tutor; and
- claiming credit for a proportion a work contributed to a group assessment item that is greater than that actually contributed.†

For the purposes of this policy, submitting an assessment item that has already been submitted for academic credit elsewhere may be considered plagiarism.

Knowingly permitting your work to be copied by another student may also be considered to be plagiarism.

Note that an assessment item produced in oral, not written, form, or involving live presentation, may similarly contain plagiarised material.
The inclusion of the thoughts or work of another with attribution appropriate to the academic discipline does not amount to plagiarism.

The Learning Centre website is main repository for resources for staff and students on plagiarism and academic honesty. These resources can be located via:

www.lc.unsw.edu.au/plagiarism

The Learning Centre also provides substantial educational written materials, workshops, and tutorials to aid students, for example, in:

- correct referencing practices;
- paraphrasing, summarising, essay writing, and time management;
- appropriate use of, and attribution for, a range of materials including text, images, formulae and concepts.

Individual assistance is available on request from The Learning Centre.

Students are also reminded that careful time management is an important part of study and one of the identified causes of plagiarism is poor time management. Students should allow sufficient time for research, drafting, and the proper referencing of sources in preparing all assessment items.

* Based on that proposed to the University of Newcastle by the St James Ethics Centre. Used with kind permission from the University of Newcastle
† Adapted with kind permission from the University of Melbourne.

Textbooks
Required Text Book (all students)
- Additional readings are posted on the library MyCourse site. A link will be available from the class web site.

Required Text Book (postgraduates)
- Cooper (2004), The Inmates are Running the Asylum, Sams Publishing

References
- Goodwin (2009), Designing for the Digital Age, John Wiley
- Nielsen (1993), Usability Engineering, Morgan Kaufmann.
- Snyder C (2003), Paper Prototyping, Morgan Kaufmann

Other Materials
- Design Diary A4, A5 or A3 bound sketchpad for design work. This will be assessed during tutorial/laboratory.
- Post-it Notes™, coloured pens and pencils will be used as part of the design work. Please use only Blu-Tack™ for placing posters on walls. Do not use sticky or masking tape.

Other Resources
- Students seeking resources can also obtain assistance from the UNSW Library. One starting point for assistance is:
  info.library.unsw.edu.au/web/services/services.html
## Course schedule
This is the intended course schedule. Subject to changes. Web site will contain the up to date schedule.

<table>
<thead>
<tr>
<th>Wk</th>
<th>Mon</th>
<th>Lecture Topics</th>
<th>Tutorial/Laboratory</th>
<th>Assignment Deliverables</th>
</tr>
</thead>
</table>
| 1  | 19/7| Course Introduction  
Design Principles  
Usability Principles  
Heuristic Evaluation  
Task Analysis  
Scenarios/Personas  
Assignment 1 | No tutorials in week 1 | |
| 2  | 26/7| Accessibility  
Conceptual Design  
Design Diary  
Creative/Visual Thinking | Commence in CHIL G11-K17  
Critique, heuristic evaluation activity | |
| 3  | 2/8 | Observation  
User Centred Design Process  
Prototyping Processes | Interview and Observation Activity | Assignment 1 Individual Due (in lecture) |
| 4  | 9/8 | Evaluation Techniques | Individual Design Observation | |
| 5  | 16/8| Surveys + Statistics  
Interviews  
Problem Solving  
Memory (Part 1) | Design Presentations | Assignment 2 Group Check Point (in Tutorial/Lab) |
| 6  | 23/8| Memory (Part 2)  
|    | 30/8| Mid Semester Break | | |
| 7  | 6/9 | Electronic Prototyping  
Input/Output Devices | Group Assessment | Assignment 2 Group Design Evaluation |
| 8  | 13/9| CLT + Heuristics  
Scientific Methods  
Visual Design | Tutorial Activity | |
| 9  | 20/9| Expert Novice  
OH&S  
Internationalisation | Tutorial Activity  
Assignment Checkpoint | Postgraduate Assignment 3 Due |
| 10 | 27/9| Social Computing  
Collaboration and the Web | Tutorial Activity | Assignment 3 (UG) Group Assessment |
| 11 | 4/10| Public Holiday – No Lecture | Tutorial Activity | Assignment 3 (UG) Reflection Due |
| 12 | 11/10| TBC | Tutorial Activity | |
| 13 | 18/10| Review | Final Presentations | |
Course evaluation and development

- We will use both paper-based and electronic survey tools throughout the session to gather feedback about the course. This is used to assess the quality of the course in order to make ongoing improvements. We do take this feedback seriously and approach the design of this course using the user centred design philosophies.

Other matters

- Students are expected to attend all classes
- Students are expected to read their CSE emails regularly.
- Please review the official school policies that are all available online at the school web site: [http://www.cse.unsw.edu.au/~studentoffice/policies/yellowform.html](http://www.cse.unsw.edu.au/~studentoffice/policies/yellowform.html). This site contains important information regarding use of laboratories, originality of assignment submissions and special consideration. Note that in order to receive a CSE login account you must have agreed to the conditions stated in that document.
- The Yellow Form also states the supplementary assessment policy and outlines what to do in case illness or misadventure that affects your assessment, and supplementary examinations procedures within the School of Computer Science and Engineering
- Please read and understand the School Policy in relation to laboratory conduct.
  - Note that no food or drink is permitted in the laboratory. CSE fines will apply.
  - The laboratory is to be secured at all times. No equipment or furniture can be removed from the laboratory.
  - You are not permitted to provide unauthorised access to this laboratory.
- UNSW Occupational Health and Safety policies and expectations
- Computer Ergonomics for Students
- OHS Responsibility and Accountability for Students
- Students who have a disability are encouraged to discuss their study needs with the course convener prior to, or at the commencement of the course, or with the Equity Officer (Disability) in the Equity and Diversity Unit (9385 4734). Information for students with disabilities is available at: [www.equity.unsw.edu.au/disabil.html](http://www.equity.unsw.edu.au/disabil.html)
  Issues to be discussed may include access to materials, signers or note-takers, the provision of services and additional examination and assessment arrangements. Early notification is essential to enable any necessary adjustments to be made. Information on designing courses and course outlines that take into account the needs of students with disabilities can be found at: [www.secretariat.unsw.edu.au/acboardcom/minutes/coe/disabilityguidelines.pdf](http://www.secretariat.unsw.edu.au/acboardcom/minutes/coe/disabilityguidelines.pdf)