Faculty of Engineering

School of Computer Science and Engineering

COMP3511 / COMP9511

Human Computer Interaction

Summer Session, 2021

Course Staff

- For any course management related issues e-mail *cse.comp3511@unsw.edu.au*
- Dr Sasha Vassar, Lecturer-in-Charge & Admin
    - a.vassar@unsw.edu.au
- Your tutor will also be able to answer questions in your tutorial/laboratory
- 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 Moodle or e-mail the specific staff.

Course Details

- 6 units of credit (UoC)
- Pre-requisites
    - 48 units of credit from any program (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 are:
  Monday 2-4pm;
  Tuesday 2-4pm;
  Wednesday 10-12pm.
- Lectures are online with a Teams live stream – a link will be provided for you to join the live stream. Lectures are common for undergraduates and postgraduates.
- Each student should be enrolled in a designated 2x2 hour tutorial/laboratory time slots
- Tutorial/laboratory will start in Week 1 and go through until Week 5 (inclusive).
- Tutorial/laboratory and assignment checkpoints will take place every week, and are also located online – you will be sent a Zoom link for the tutorial by the tutor once you are enrolled in your classes.
- Postgraduates and undergraduates will have different assignment contexts.

Course Summary

- Lecture topics are summarised in the Course Schedule below.
- The course includes topics relating to Requirements, Design, Prototyping and Evaluation within the User Centred Design process.
- You will also be given the skills to conduct a basic Usability Evaluation.
- Other topics covered within the course allow you to understand your users and their needs. This includes an overview of basic Cognitive capacities, Designing for Accessibility, Internationalisation, levels of Expertise, and Collaboration.
- You will also be looking at the differences between Scientific Data Gathering and User Studies, with a consideration for Human Ethics.
- Other topics include Visual Design principles, and looking at different Input/Output devices and their potential impact on Design.

Course Aims

- to develop your skills in the area of user-centred design
- to provide 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 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

10 Core Learning Outcomes

- Be able to prepare a project plan that is based on user-centred design principles and then carry out activities to design, evaluate and refine user interaction based on iteration.
- To develop the skills necessary to create a user interface evaluation report (written and oral) that critiques a user interface.
- Understand the strengths and limitations of human cognition and memory and apply these to the design of more usable interfaces that do not cognitively overload users.
- To develop design skills, primarily using paper for rapid solutions, and consolidate individual designs in small groups to understand the importance of design decisions and the selection process.
- Prepare and carry out usability walkthroughs to evaluate paper based designs for their usability, and then create structured reports that quantify the issues discovered from evaluation activities.
- To ensure that your design work includes user needs analysis and is not just a reflection of what you believe your users need.
- Construct questionnaires/surveys to obtain pre- and post-test information from users, and to understand the importance of ethics and privacy in order be able to carry out appropriate user-centred design activities.
- Understand the relationship between the scientific method and the user-centred design approach and be aware of the scientific and research approaches used in user interface design research.
- Understand how user centred design processes should be inclusive of all users, including international audiences, those with special needs, such as disabilities, as well different levels of user experience, and use this knowledge to design interfaces appropriate to a particular group of users.
- To develop an awareness of user-centred design tools, methods, and techniques and maintain a real-world perspective in order to be able to apply this knowledge in industry.

Broader Learning outcomes

- Through the use of 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
- 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
- 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
- Be able to define and describe (with examples) 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, including an understanding of novices' capabilities and needs
- Use the knowledge of experts and novices to be able to design interfaces appropriate to a particular group of users
- Understand the difference between quantitative and qualitative research methodologies
- 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
- 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
- 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 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 speaking), and 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

Assumed Knowledge

The assumed knowledge for this course is that you know how to write a report and/or essay for your assignments. Because students come from a variety of backgrounds, with different knowledge bases, the assumed knowledge is not extensive. The course does, however, involve extensive reading.

Teaching 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. This design process starts with 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.

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, and 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

There are three lectures a week, each of them two hours in duration. All of the lectures are common lectures that will have lecture material, design diary exercises and some small group activities. **You will need to bring your design diary, as it is an assessable component of the course.**

Each week you will be required to participate in your timetabled tutorial/laboratory class. There are two tutorials/laboratories a week, each of them two hours in duration. These will be held online – you will receive a link in your Teams space for the tutorial. 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. Tutorial attendance is a compulsory component of this course.

Regular progress on assignment 2 group work is required and will be checked with weekly or biweekly 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 Moodle 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. You are all expected to be present at your tutorials for all graded milestones or you will be penalised.

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 marked at the end of the course. This trimester, you will be encouraged to maintain a digital design diary using OneNote on Teams. 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 putting 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. This is especially true for the summer session, where the content-rich material is delivered in five weeks of intense classes.

- 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 must 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

Assignment 2 context will differ between postgraduates and undergraduates 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 (COMP3511/COMP9511) will complete 2 assignments.

- Assignment 1 – Individual Website Design Critique
- Assignment 2 – Group User Interface Design

Assignment 1 focuses on heuristic evaluation, design principles and usability principles. For Postgraduates and Undergraduates, you will apply your understanding of these concepts when evaluating a given website.

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 several design iterations, with on-going evaluation. You will discover through 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.

In week 4, 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 final group presentation of the design will be presented in tutorial class in week 5.

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. Assignment more than 5 days late will not be marked as they will automatically fail.
- 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, but we note that this is a confidential process and should NOT involve group members sharing their marks. It is to be noted that group assignment marks will not be released until ALL group members have completed a peer review.
- Borderline final marks, after sitting the final exam, may be further assessed with an oral examination.

Assessment
(IND)=individual (G)=group

Task	COMP3511	COMP9511	Week Due
Assignment 1 User Interface Analysis	15%	15%	Week 2 (IND)
Assignment 2 Consolidated Group Design and Evaluation	40%	40%	Checkpoint Weeks 2 & 3 (G) Usability Evaluation and Group Assessment Week 4 (G) Individual Accessibility Analysis Week 5 (IND) Final Group Presentations Week 5 (G)
Design Diary	10%	10%	Week 1-5 (IND)
Participation (in tutorials)	5%	5%	Week 1-5 (IND)
Final Exam*	30%	30%	(IND)

***You must attend at least 80% of all tutorials to pass the course, unless documented special consideration is in place.**
***Note:** you must achieve at least a pass on the examination to pass the subject. A harmonic mean may be applied to the final mark to ensure the mark reflects consistent performance across all areas of assessment. 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, web site, 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:

https://student.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)

- Preece, Rogers & Sharp (2019), 5th ed. Interaction Design: Beyond Human Computer Interaction, John Wiley
- Additional readings are posted on the library MyCourse site, by searching for COMP3511. A link will be available from the class web site.

References

- Buxton (2007), *Sketching User Experiences: Getting the Design Right and the Right Design*, Morgan Kaufmann.
- Cooper, A. (2004), The Inmates are Running the Asylum, Sams Publishing
- Cooper et al (2007), *About Face 3.0: The Essentials of Interaction Design*, John Wiley (COMP4511 Text)
- Goodwin (2009), *Designing for the Digital Age*, John Wiley
- Lazar, Feng & Hochheiser, (2010), *Research Methods in Human-Computer Interaction*, John Wiley
- Nielsen (1993), *Usability Engineering*, Morgan Kaufmann.
- Norman, D.A. (1998), *The Design of Everyday Things* (Paperback), MIT Press, London
- Rubin (1994 or 2008) *Handbook of Usability Testing*, John Wiley Publishing.
- 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 sessions.
- 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: https://www.library.unsw.edu.au/study/services-for-students

Course Schedule

This is the intended course schedule. Subject to changes. Moodle will contain the up to date schedule.

Wk	*Date*	*Lecture Topics*	*Tutorial/Laboratory*	*Assignment Deliverables*
1	4/1	Course Introduction & Logistics Heuristics and Usability Goals	Tutorial 1: • Introductions • Usability critique, heuristic evaluation activity • Redesign doorbell Tutorial 2: • Stakeholders activity • Personas/Scenarios • Accessibility	
	5/1	Usability Goals (Part 2) Visual Thinking and Design Diaries		
	6/1	From Ideas to Scenarios Universal Access		
2	11/1	Assignment 2 Overview Ethics Interviews	Tutorial 1: Assignment 2 Work and Checkpoint Tutorial 2: • Survey and Interviews • Requirements and Brainstorming • Paper Prototype	Assignment 1 Individual Due (11th January at midnight) Assignment 2 – Product Description Statement (in-class work and checkpoint)
	12/1	Requirements through to Prototyping Paper Prototyping Electronic Prototyping		
	13/1	Visual Design		
3	18/1	Evaluation	Tutorial 1: • Visual Design • Assignment 2 Work and Checkpoint Tutorial 2: • Assignment 2 Checkpoint	Assignment 2 Group Check Point (in Tutorial 1): Consent Documents Questionnaires Assignment 2 Group Check Point (in Tutorial 2) Revised Product Description Statement Context Scenarios Requirements Questionnaire Summary
	19/1	Memory Cognitive Load Theory		
	20/1	Cognitive Load Theory and Heuristics		
4	25/1	Experts and Novices Problem Solving	Tutorial 1: • Assignment 2 in-class check for usability testing	Assignment 2 Group Check Point (in Tutorial 1) Usability Testing
	26/1	*NO LECTURE – PUBLIC HOLIDAY*		

	27/1	Internationalisation Scientific Methodology	<u>Tutorial 2:</u> • Memory • CLT • Problem Solving	
5	1/2	Input/Output Technology (Guest Lecture – Ali) Quantification (Guest Lecture – Ali)	<u>Tutorial 1:</u> • Assignment 2 Work <u>Tutorial 2:</u> • Presentations	Assignment 2 Individual Accessibiity Analysis Due (6th February at midnight) Assignment 2 Group Presentations and Posters (Tutorial 2)
	2/2	Data Visualisation (Guest Lecture – Wafa) Collaboration/Social Computing (recording available online)		
	3/2	Finale/Review		

Course Evaluation and Development

We will use both lab-based feedback and/or electronic survey tools to gather feedback about the course. This is used to assess the quality of the course in order to make on going improvements. We do take this feedback seriously and approach the design of this course using user centred design philosophies. Students are also encouraged to provide informal feedback during the session, and to let the lecturer in charge know of any problems, as soon as they arise. Suggestions will be listened to very openly, positively, constructively and thankfully, and every reasonable effort will be made to address them. Recent MyExperience evaluations showed that students were highly satisfied with most aspects of the course. In particular, students really enjoyed tutorials/labs and found they learned a lot. Students valued the up to date lecture content and slides, which we will strive to maintain.

Due to positive student feedback, we will be continueing to administer the quizzes (to be completed in tutorials) that focus on lecture content. The main aim of the quizzes is to ensure students keep up to date with listening to/attending the lectures. They also serve as a form of feedback to students as to whether their learning is on track. Some students requested that we share the MC quizzes with them. We note that they are not a revision tool but rather a testing tool and so will not be released to students. Unfortunately, if they are used as both it compromises the integrity of the test conditions.

Students valued the specific assignment milestones, and the reminders which are provided in many formats including the assignment specifications, lecture summary notes, and in tutorials. The onus is still on individual students to track these on a weekly basis, otherwise it is easy to fall behind and miss deadlines. We note that HCI is an ill-defined domain, so assignment specifications will never be as clear-cut or concise as most other CSE subjects, and so we provide this extra support, which students value.

Other Matters

- Students are expected to attend all classes.
- Students are expected to read their UNSW emails regularly. They are also expected to use their UNSW email addresses for all UNSW related communications.
- Please be aware of **CSE's new Student Conduct statement** available at:
  http://webapps.cse.unsw.edu.au/cse/student-conduct.html
  (the content of which is listed below)

Student Conduct

The **Student Code of Conduct** (Information, Policy) sets out what the University expects from students as members of the UNSW community. As well as the learning, teaching and research environment, the University aims to provide an environment that enables students to achieve their full potential and to provide an experience consistent with the University's values and guiding principles. A condition of enrolment is that students *inform themselves* of the University's rules and policies affecting them, and conduct themselves accordingly.

In particular, students have the responsibility to observe standards of equity and respect in dealing with every member of the University community. This applies to all activities on UNSW premises and all external activities related to study and research. This includes behaviour in person as well as behaviour on social media, for example Facebook groups set up for the purpose of discussing UNSW courses or course work. Behaviour that is considered in breach of the Student Code Policy as discriminatory, sexually inappropriate, bullying, harassing, invading another's privacy or causing any person to fear for their personal safety is serious misconduct and can lead to severe penalties, including suspension or exclusion from UNSW.
If you have any concerns, you may raise them with your lecturer, or approach the School Ethics Officer, Grievance Officer, or one of the student representatives.

Plagiarism is defined as using the words or ideas of others and presenting them as your own. UNSW and CSE treat plagiarism as academic misconduct, which means that it carries penalties as severe as being excluded from further study at UNSW. UNSW has an ongoing commitment to fostering a culture of learning informed by academic integrity. All UNSW staff and students have a responsibility to adhere to this principle of academic integrity. Plagiarism undermines academic integrity and is not tolerated at UNSW. There are several on-line sources to help you understand what plagiarism is and how it is dealt with at UNSW:

- Plagiarism and Academic Integrity
- UNSW Plagiarism Procedure

Make sure that you read and understand these. Ignorance is not accepted as an excuse for plagiarism. In particular, you are also responsible that your assignment files are not accessible by anyone but you by setting the correct permissions in your CSE directory and code repository, if using. Note also that plagiarism includes paying or asking another person to do a piece of work for you and then submitting it as your own work.
If you haven't done so yet, please take the time to read the full text of
UNSW's policy regarding academic honesty and plagiarism
The pages below describe the policies and procedures in more detail:
Student Code Policy
Student Misconduct Procedure
Plagiarism Policy Statement
Plagiarism Procedure

You should also read the following page which describes your rights and responsibilities in the CSE context:
Essential Advice for CSE Students - This site contains important information regarding use of laboratories, originality of assignment submissions and special consideration.

- Please review the official school policies that are all available online at the school web site: https://www.engineering.unsw.edu.au/computer-science-engineering/help-resources/for-students/unsw-computing-policies.

- 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 are available via the following PDF and website:
      http://safety.unsw.edu.au/sites/default/files/documents/WHS_Policy.pdf

      https://www.engineering.unsw.edu.au/computer-science-engineering/help-resources/health-safety
    - Computer Ergonomics for Students:
      https://www.engineering.unsw.edu.au/computer-science-engineering/help-resources/students/ergonomics

- Students who have a disability are encouraged to discuss their study needs with the course convenor 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:
  https://student.unsw.edu.au/disability
  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.