University of Macau
Faculty of Science and Technology
Department of Computer and Information Science
SFTW300 Software Psychology
Syllabus
1st Semester 2012/2013
Part A – Course Outline

Compulsory course in Computer Science

Course description:
(2-2) 3.0 credits. This junior compulsory major course introduces fundamentals of interaction design based on established learning from human-computer interactions (HCI) in relation to contextual design of interactive systems. HCI is an important area of computing knowledge, and the construction of useful and usable interfaces that ease the man-machine interaction has become required skills for all computer science students. Coverage includes: problem formulation, user requirements study, usability analysis, prototyping, and evaluation. Pedagogy includes a mixture of dialogic teaching, classroom discussions of real cases, and group-based projects.

Course type:
Theoretical with substantial laboratory/practice content

Prerequisites:
- none

Textbook(s) and other required material:
- Rogers, Y., Sharp, H., and Preece, J. (2011) *Interaction Design beyond human-computer interaction*. 3rd ed., John Wiley & Sons Ltd.

References:
- Dix, A., Finlay J., Abowd, G. D., Beale, R. (2004). *Human-Computer Interaction.* 3rd ed., Prentice Hall.
- Hartson, R., Pyla, P. S. (2012). The UX Book – Process and guidelines for ensuring quality user experience, Morgan Kaufmann.

Major prerequisites by topic:
- none

Course objectives:
- Learn the fundamentals of interface design (establish requirements, user requirement analysis, prototyping, and evaluation) [a, c, e]
- Understand human factors in the design and during the design process [a, c]
- Practice the process of interaction design [a, c, d, e, k]
- Aware of the contemporary issues and technologies for interaction design [j]

Topics covered:
- **Basic Concepts (8 hours)**: Introduce the goals and the concepts of interaction design. Compare good and bad designs by examples. Emphasize the importance of usability and the design for user experience. Explain the core design principles. Learn how to formulate conceptual models. Different interface metaphors will also be discussed.
- **Cognitive Models (4 hours)**: Study the human factors in design especially the cognitive aspects, including attention, perception, memory, learning, problem solving. Introduce the state-of-arts cognitive frameworks which are used to explain and predict user behavior, including mental models, gulfs of execution and evaluation, distributed cognition, and other external cognition.
- **Social and Emotional interaction (4 hours)**: Introduce different kinds of social mechanisms. Give an overview of technologies that facilitate communication and group participation. Discuss the relationship between emotions and user experience. Compare expressive interfaces and frustrating interfaces. Overview of the persuasive technologies that change the human behaviors and attitudes.

- **Interfaces (4 hours)**: Overview of the different kinds of interfaces, highlight the main design and research issues for each of the interfaces. Discuss the difference between graphical (GUIs) and natural user interfaces (NUIs). Learn by examples the suitability of an interface for a given application
- **Interaction Design Process (4 hours)**: Overview of the user-centered design and the process of interaction design. The four basic activities of the design process, i.e. requirement establishment, design alternatives, prototyping the design, and evaluation.
- **User Requirement Collection (8 hours)**: Identify requirements. Learn how to plan a data collection activity (goal setting, user identification, etc.). Discuss different techniques including interviews, questionnaires, direct and indirect observations, and ethnographic study. Automated data collection methods exploiting application data, access logs, activity loggers, etc. will be introduced.
- **Requirement Analysis (8 hours)**: Discuss the difference between qualitative and quantitative data. Learn to interpret and present data from interviews, questionnaires, and observation studies. Overview of the tools that help to perform analysis. Learn how to develop scenarios, use cases and to perform hierarchical task analysis (HTA) on task description.
- **Prototyping (4 hours)**: Explain prototyping and its goals. Discuss different types of prototyping activities such as storyboarding, sketching, wizard of Oz, and high-fidelity prototyping. Learn how to transform requirements into conceptual models and finally to generate the physical design. Discuss the use of scenarios in prototyping.
- **Evaluation (4 hours)**: Explain the concepts and terms used in evaluation. Introduce different evaluation methods including the DECIDE framework, usability testing, heuristic evaluation, and cognitive walkthroughs. Predictive models such as GOMS, KLM, Fitts' law will be addressed.
- **Project Demonstration (4 hours)**: Presentation of the course projects (by students).

Class/laboratory schedule:

Timetabled work in hours per week			**No of teaching weeks**	**Total hours**	**Total credits**	**No/Duration of exam papers**
Lecture	**Tutorial**	**Practice**				
2	2	Nil	14	56	3	2 / 4.5 hours

Student study effort required:

Class contact:	
Lecture	28 hours
Tutorial	28 hours
Other study effort	
Self-study	16 hours
Homework assignment	9 hours
Project	15 hours
Total student study effort	96 hours

Student assessment:

Final assessment will be determined on the basis of:

Homework	10%	Project	30%
Mid-term	20%	Final exam	40%

Course assessment:

The assessment of course objectives will be determined on the basis of:

- Homework, project and exams
- Course evaluation

Course outline:

Weeks	Topic	Course work
1-2	**Introduction** Good and poor interaction design, relationship between interaction design and HCI, goals and core principles of interaction design, conceptual models, interface metaphors, different interaction types	
3	**Cognitive Models** Human cognition processes, cognitive frameworks (internal and external)	Assignment#1
4	**Social and Emotional interaction** Social mechanisms in communication and collaboration, social behavior, emotions and user experience, expressive and frustrating interfaces, persuasive technologies	
5	**Interfaces** Different kinds of interfaces, graphical (GUIs) vs. natural (NUIs) user interfaces	Assignment#2
6	**Interaction Design Process** User-centered design, interaction design lifecycle	Mid-Term
7-8	**User Requirement Collection** Establishing requirements, data gathering by means of interviews, questionnaires, and observations, ethnographic research, automated data collection methods	Assignment #3
9-10	**Requirement Analysis** Qualitative and quantitative data analysis, data interpretation and forms of presentation, the theoretical frameworks, task description and task analysis techniques	Project#1
11	**Prototyping** What and why, low-fidelity prototypes, high-fidelity prototypes, conceptual design and physical design	Project#2
12-13	**Evaluation** Usability testing, the DECIDE framework, heuristic evaluation, cognitive walkthroughs, predictive models	Project#3
14	**Project Demonstration**	

Contribution of course to meet the professional component:
This course prepares students with fundamental knowledge and experiences to design interactive systems.

Relationship to CS program objectives and outcomes:
This course primarily contributes to the Computer Science program outcomes that develop student abilities to:
(a) an ability to apply knowledge of mathematics, science, and engineering.
(c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
(e) an ability to identify, formulate, and solve engineering problems.
(k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

The course secondarily contributes to the Computer Science program outcomes that develop student abilities to:
(d) an ability to function effectively on multi-disciplinary teams.
(j) a knowledge of contemporary issues.

Relationship to CS program criteria:

Criterion	DS	PF	AL	AR	OS	NC	PL	HC	GV	IS	IM	SP	SE	CN
Scale: 1 (highest) to 4 (lowest)								1				3	2	

Discrete Structures (DS), Programming Fundamentals (PF), Algorithms and Complexity (AL), Architecture and Organization (AR), Operating Systems (OS), Net-Centric Computing (NC), Programming Languages (PL), Human-Computer Interaction (HC), Graphics and Visual Computing (GV), Intelligent Systems (IS), Information Management (IM), Social and Professional Issues (SP), Software Engineering (SE), Computational Science (CN).

Course content distribution:

Percentage content for			
Mathematics	Science and engineering subjects	Complementary electives	**Total**
0%	100%	0%	100%

Coordinator:
Prof. Z. G. Gong

Persons who prepared this description:
Dr. Weng In Siu

Part B – General Course Information and Policies

1st Semester 2011/2012

Instructor:	Dr. Weng In Siu	Office:	N327B
Office hour:	Mon 4-6 pm & Thur 4-6pm	Phone:	8397 4378
Email:	shirleysiu@umac.mo		

Time/Venue: Wed 9:30-11:30am & Fri 5:30 - 7:30 pm / U101

Grading distribution:

Percentage Grade	Final Grade	Percentage Grade	Final Grade
100 - 93	A	92 - 88	A–
87 - 83	B+	82 - 78	B
77 - 73	B–	72 - 68	C+
67 - 63	C	62 - 58	C–
57 - 53	D+	52 - 50	D
below 50	F		

Comment:
The objectives of the lectures are to explain and to supplement the text material. Students are responsible for the assigned material whether or not it is covered in the lecture. Students who wish to succeed in this course should read the textbook prior to the lecture and should work all homework and project assignments. They are encouraged to look at other sources (other texts, etc.) to complement the lectures and text.

Homework policy:
Assignments are lightweight exercises to help students to revise and practice the lecture content.
- There will be approximately 3 homework assignments.
- Homework is due 10 days after assignment unless otherwise noted, late homework is not accepted.
- The course grade will be based on the average of the homework grades.

Course project:
Through this group project, students will design, and prototype an interactive computer system. Project requirements will be announced in the class. The project is expected to finish in 5 weeks. Grading is based on the quality and the efforts of the work, as well as the final presentation. The entire project is consisted of three phases: phase 1 for requirement collection and analysis, phase 2 for system design and prototyping, phase 3 for evaluation.

Exam:
There will be one 2-hour mid-term exam during the semester and a 2.5-hour final exam. Both the mid-term and final exams are closed book, closed notes examinations.

Note:
- Check UMMoodle (https://ummoodle.umac.mo/) for announcements, homeworks and lectures.
- No make-up exam is given except for CLEAR medical proof.
- Cheating is absolutely prohibited by the university.

Appendix:

Rubric for Program Outcomes

Rubric for (a)	5 (Excellent)	3 (Average)	1 (Poor)
Understand the theoretic background	Students understand theoretic background and the limitations of the respective applications.	Students have some confusion on some background or do not understand theoretic background completely.	Students do not understand the background or do not study at all.
Rubric for (c)	**5 (Excellent)**	**3 (Average)**	**1 (Poor)**
Design capability and design constraints	Student understands very clearly what needs to be designed and the realistic design constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.	Student understands what needs to be designed and the design constraints, but may not fully understand the limitations of the design constraints.	Student does not understand what needs to be designed and the design constraints.
Process to meet desired needs	Student understands very clearly the process of the design.	Student understands what the needs of the process design, but may not fully understand the limitations of the design constraints.	Student does not understand the process.
Rubric for (d)	**5 (Excellent)**	**3 (Average)**	**1 (Poor)**
Ability to work in teams	Performance on teams is excellent with clear evidence of equal distribution of tasks and effort as well as frequent meetings of the team members.	Performance on teams is acceptable with one or more members carrying a larger amount of the effort as well as infrequent meetings of the members or one or more members being absent from several meetings.	Performance on teams is poor to unacceptable with one or two members clearly carrying the majority of the effort as well as inadequate team meeting or one or more members missing the majority of the meetings.
Rubric for (e)	**5 (Excellent)**	**3 (Average)**	**1 (Poor)**
Modeling, problem formulation and problem solving	Students choose and properly apply the correct techniques.	Students model correctly but cannot select proper technique or model incorrectly but solve correctly accordingly.	Students at loss as to how to solve a problem.
Rubric for (j)	**5 (Excellent)**	**3 (Average)**	**1 (Poor)**
Relevance to the present time	Student displays an understanding of the theoretical or practical impact and an ability to correlate a subject, perception, communication, association and reasoning from a global and societal perspective.	Student is able to display an understanding of current topics and issues with some knowledge regarding their impact in a bigger global and societal sense.	Student has difficulty demonstrating an awareness or familiarity with current topics and issues relevant to most current global and societal affairs.

Rubric for (k)	5 (Excellent)	3 (Average)	1 (Poor)
Use modern principles, skills, and tools in engineering practice	Student applies the principles, skills and tools to correctly model and analyze engineering problems, and understands the limitations.	Student applies the principles, skills and tools to analyze and implement engineering problems.	Student does not apply principles and tools correctly and/or does not correctly interpret the results.