City University of Hong Kong
Course Syllabus

offered by Department of Computer Science
with effect from Semester A 2017/18

Part I   Course Overview

Course Title: Multimodal Interface Design

Course Code: CS3483

Course Duration: One semester

Credit Units: 3 credits

Level: B3

Proposed Area:
(for GE courses only)
☐ Arts and Humanities
☐ Study of Societies, Social and Business Organisations
☐ Science and Technology

Medium of Instruction: English

Medium of Assessment: English

Prerequisites:
(Course Code and Title)
CS2310 Computer Programming or
CS2311 Computer Programming or
CS2313 Computer Programming or
CS2360 Java Programming or equivalent

Precursors:
(Course Code and Title)   Nil

Equivalent Courses:
(Course Code and Title)   Nil

Exclusive Courses:
(Course Code and Title)   Nil

Part II   Course Details

1.   Abstract
(A 150-word description about the course)

This course aims to develop an understanding and practical skills of how to design usable interfaces to computer-based environments that interact with, and support human multi-modal information processing.

2.   Course Intended Learning Outcomes (CILOs)
(CILOs state what the student is expected to be able to do at the end of the course according to a given standard of performance.)

No.	CILOs#	Weighting* (if applicable)	Discovery-enriched curriculum related learning outcomes (please tick where appropriate)		
			A1	*A2*	*A3*
1.	Discover human characteristics important in carrying out tasks using computer-based environments and be able to apply these characteristics to the design of a user-oriented multi-modal interface.		✓	✓	
2.	Perform a detailed analysis of the target user community of an interface.			✓	
3.	Create new forms of user-oriented interfaces by applying suitable design principles.				
4.	Adopt alternative modalities, in addition to keyboard and mouse input, in user-oriented interface design.			✓	
5.	Perform critical assessment of a multimodal interface design.		✓	✓	
*If weighting is assigned to CILOs, they should add up to 100%.		100%			

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 # Please specify the alignment of CILOs to the Gateway Education Programme Intended Learning outcomes (PILOs) in Section A of Annex.

A1:   Attitude
Develop an attitude of discovery/innovation/creativity, as demonstrated by students possessing a strong sense of curiosity, asking questions actively, challenging assumptions or engaging in inquiry together with teachers.
A2:   Ability
Develop the ability/skill needed to discover/innovate/create, as demonstrated by students possessing critical thinking skills to assess ideas, acquiring research skills, synthesizing knowledge across disciplines or applying academic knowledge to self-life problems.
A3:   *Accomplishments*
Demonstrate accomplishment of discovery/innovation/creativity through producing /constructing creative works/new artefacts, effective solutions to real-life problems or new processes.

3. Teaching and Learning Activities (TLAs)
(TLAs designed to facilitate students' achievement of the CILOs.)

Teaching pattern:
Suggested lecture/tutorial/laboratory mix: 2 hrs. lecture; 1 hr. tutorial.

TLA	Brief Description	CILO No. 1	2	3	4	5	Hours/week (if applicable)
Lecture	The lecture will focus on the introduction of the theories, principles and guidelines of multimodal interface design.	✓	✓	✓	✓	✓	2 hrs/wk
Tutorial	Students will work on a different case study each week during the tutorial sessions. In particular, they will have group discussions to perform critical assessment of the case study, and each group is required to submit a brief report of their conclusions in each tutorial session.					✓	1 hr/wk
Group project	Students will work as a group to create a new design for a user-oriented interface. The interface should allow interaction through a creative combination of different interaction modalities. The students will apply the theories, principles and guidelines they have learnt from the course for their design.	✓	✓	✓	✓		6 hrs/wk for 9 weeks
Assignment	Students will implement an interface design which makes use of alternative modalities of interaction, in addition to keyboard and mouse input. The implementation results are to be summarized in the form of a report.				✓		4 hrs/wk for 7 weeks

4. Assessment Tasks/Activities (ATs)
(ATs are designed to assess how well the students achieve the CILOs.)

Assessment Tasks/Activities	CILO No. 1	2	3	4	5	Weighting*	Remarks
Continuous Assessment^: 60%							
Group project	✓	✓	✓	✓		30%	
Assignment				✓		20%	
Tutorial performance					✓	10%	
Examination^: 40% (duration:2 hours)							
* The weightings should add up to 100%.						100%	

^ For a student to pass the course, at least 50% of the maximum mark for the continuous assessment and 30% of the maximum mark for the examination must be obtained.

5. Assessment Rubrics

(Grading of student achievements is based on student performance in assessment tasks/activities with the following rubrics.)

Assessment Task	Criterion	Excellent (A+, A, A-)	Good (B+, B, B-)	Fair (C+, C, C-)	Marginal (D)	Failure (F)
1. Group project	1.1 Capability to apply the theories, principles and guidelines they have learnt to design a multimodal interface.	High	Significant	Moderate	Basic	Not even reaching marginal levels
	1.2 Capacity for creatively integrating multiple modalities of interaction to enhance user experience.					
2. Assignment	2.1 Ability to implement an interface design which makes use of alternative modalities of interaction, in addition to keyboard and mouse input.	High	Significant	Moderate	Basic	Not even reaching marginal levels
	2.2 Capability to compare the usability of multimodal interface and conventional user interface, and summarize their findings in a report.					
3.Tutorial performance	3.1 Capacity for analysing case studies in multimodal interaction design, and effectively summarizing the findings.	High	Significant	Moderate	Basic	Not even reaching marginal levels
4. Examination	4.1 Ability to perform a detailed analysis of the target user community of an interface.	High	Significant	Moderate	Basic	Not even reaching marginal levels
	4.2 Capability to perform critical assessment of a multimodal interface design.					
	4.3 Capacity for designing a multimodal interface based on a requirement specification.					

Part III   Other Information (more details can be provided separately in the teaching plan)

1.   **Keyword Syllabus**
     (An indication of the key topics of the course.)

Human psychological and physical ergonomics. Tools. Human sensory: visual, aural and kinesthetic limitations. Human psychological expectations and limitations. Forms of interaction. Information interaction design. Human performance engineering. Usability testing. Ethics of testing. Measures. statistical and psychological tool kits. The design process. Design metaphors. Sketching. Object/action paradigm. Conceptual modeling. Use scenarios. Dialogue formalisms. Guidelines. Industry standards. nonverbal communication. Use of colour, sound and gestures. Documentation. Help systems. Tutorials. Integration with program design. Windowing systems. Multimedia environments. Elements of graphics.

Syllabus
1.   Background to human use of computer systems
     How people use computers. Concept of the computer as a tool. Concept of the end-user need. Ergonomics and human performance engineering. Information processing modalities: visual, aural and kinesthetic factors. Conceptual (mis)match. Forms of interaction. Role of metaphors in designs.   Information seeking in electronic environments.

2.   Evaluation of human-computer interaction
     What makes products easy for people to use; frameworks for testing human-computer interaction; ways of testing: when to test and how to test; ethics of testing that involves human subjects; measurement in testing: time, response, accuracy, learning, recall, errors; what makes an interface human-centred.

3.   Design
     Design process. Development of visual prototypes through sketching, drawing and interactive prototyping. Conceptual models. Object-action paradigm for design. Methodologies of design. Design metaphors. Information structuring design. Physical design: colour, visual displays, keyboards, pointing devices. Sound and voice. Screen layout. Paper forms design. Use scenarios, interaction scripts, dialogue and its specifications.

4.   Environment and development platforms
     Hardware input/output objects.   Integration of manuals, quick reference guides, courses, on-line help, tutorials and information guides as part of the user interface. User interface management systems (UIM). Managing the design process. Multiple communication media and existing software components for developing user-interface designs: fundamentals of windowing systems, web-based systems, cyberworlds, elements of graphics, virtual environments.

2.   **Reading List**
2.1   **Compulsory Readings**
     (Compulsory readings can include books, book chapters, or journal/magazine articles. There are also collections of e-books, e-journals available from the CityU Library.)

1.	Shneiderman B. and Plaisant C. (2009) *Designing the User Interface: Strategies for Effective Human-Computer Interaction*. Addison Wesley, 5th edition.

2.2   **Additional Readings**
     (Additional references for students to learn to expand their knowledge about the subject.)

1.	Norman D. (2013) *The Design of Everyday Things*. Basic Books
2.	Raskin J. (2000) *The Humane Interface*. Addison Wesley.
3.	Norman D. (1999) *The Invisible Computer*. Cambridge, MA: MIT Press.