SM2291: THEORIES AND PHENOMENA OF HUMAN-COMPUTER INTERACTION

New Syllabus Proposal

Effective Term
Semester B 2024/25

Part I Course Overview

Course Title
Theories and Phenomena of Human-Computer Interaction

Subject Code
SM - School of Creative Media
Course Number
2291

Academic Unit
School of Creative Media (SM)

College/School
School of Creative Media (SM)

Course Duration
One Semester

Credit Units
3

Level
B1, B2, B3, B4 - Bachelor's Degree

Medium of Instruction
English

Medium of Assessment
English

Prerequisites
Nil

Precursors
Nil

Equivalent Courses
Nil

Exclusive Courses
Nil

Part II Course Details

Abstract

This course, titled "Theories and Phenomena of HCI," is designed to provide students with a robust understanding of human-computer interaction, a dynamic and increasingly vital field that bridges the gap between human users and technology. The course will delve into the theoretical frameworks that underpin HCI, exploring the cognitive, psychological, and social aspects that influence how users interact with and behave within computer-mediated environments.

A key focus of the course will be on teaching students the ability to quantitatively analyze user data, employing statistical methods and computational models to derive insights into user behavior and experience. This skill set is essential for designing effective and intuitive interfaces that enhance user satisfaction and productivity.

Moreover, the course will cover the latest theories in HCI research, including cutting-edge work in computational rationality, offers significant potential for understanding and predicting user behavior, as well as for developing adaptive systems that can learn from and respond to user interactions.

Through a combination of lectures, discussions, and hands-on activities, students will acquire a solid foundation in HCI theories and will learn to apply these theories to real-world problems. The course will also expose students to current research and emerging trends in the field, preparing them for careers in user experience design, human factors engineering, and related areas.

By the end of the course, students will be able to critically evaluate existing HCI theories, conduct quantitative analyses of user data, and understand the implications of theories in HCI. They will be well-prepared to contribute to the advancement of human-computer interaction and to the development of technologies that are both user-centered and technologically sophisticated.

Course Intended Learning Outcomes (CILOs)

	CILOs	Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Students will develop a strong sense of curiosity about the complex interplay between humans and computers, and maintain an open-minded attitude towards new theories and methods in HCI.		x		
2	Students will apply quantitative methods for analyzing user data, including statistical techniques and computational modeling.			x	
3	Students will describe, reflect on and critique a wide range of HCI theories, including cognitive, psychological, and social aspects of human interaction with technology.			x	
4	Students will design and modify interactive systems or interfaces, showcasing their understanding of applying theories in practical applications.				x

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 real-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.

Learning and Teaching Activities (LTAs)

	LTAs	Brief Description	CILO No.	Hours/week (if applicable)
1	Interactive Lectures and Discussions	Engage students in an interactive learning environment where they explore HCI theories and participate in discussions that encourage curiosity and open-mindedness.	1	2-3 hours of lectures and discussions
2	Quantitative Analysis Workshops	Conduct workshops focused on teaching students how to apply quantitative methods for analyzing user data, including practical exercises with statistical software.	2	2 hours of workshops, plus additional time for practical exercises
3	Theory Critique Sessions	Organize small group sessions where students critically evaluate and discuss a range of HCI theories, fostering a deeper understanding and analytical skills.	3	1-2 hours of group sessions
4	Design Studio Projects	Guide students through a series of design studio projects where they apply HCI theories to create and modify interactive systems or interfaces.	4	Varies depending on project phase;
5	Prototyping and User Testing Labs	Provide hands-on experience in prototyping and user testing, allowing students to apply their knowledge in creating interactive systems and interfaces.	2, 4	3 -5 hours of work, including prototyping and user testing activities

Assessment Tasks / Activities (ATs)

	ATs	CILO No.	Weighting (%)	Remarks (e.g. Parameter for GenAI use)
1	In-class activities	1	15	
2	Experimental Design and Analysis	2	25	
3	Theory-based Interface critiquing	1, 3	10	

4	Design and modeling	4	25	
5	In-class exam	1, 3	25	

Continuous Assessment (%)

100

Examination (%)

0

Assessment Rubrics (AR)

Assessment Task

In-class Activities

Criterion

Participation, Critical Thinking, Attitude

Excellent (A+, A, A-)

Actively engages in discussions, contributes insightful comments, and demonstrates deep understanding. Consistently displays critical thinking, challenges ideas constructively, and integrates new concepts. Maintains a positive and open-minded attitude towards new theories and ideas.

Good (B+, B, B-)

Participates regularly, contributes to discussions, shows good understanding. Shows critical thinking, occasionally questions ideas, and begins to integrate concepts. Generally maintains a positive attitude, open to some new ideas.

Fair (C+, C, C-)

Occasionally participates, provides some comments, demonstrates adequate understanding. Somewhat demonstrates critical thinking, rarely questions ideas, and minimally integrates concepts. Shows some resistance to new ideas, attitude can be somewhat negative.

Marginal (D)

Rarely participates, offers limited comments, lacks clear understanding. Rarely displays critical thinking, does not question ideas, and does not integrate concepts. Consistently negative attitude, resistant to new theories and ideas.

Failure (F)

Does not participate, provides no input. No critical thinking demonstrated. Persistently negative and disruptive attitude.

Assessment Task

Experiment design and analysis

Criterion

Hypothesis formulation

Excellent (A+, A, A-)

Clearly defines a testable hypothesis rooted in HCI theories with strong logical basis

Good (B+, B, B-)

Defines a testable hypothesis with some logical basis related to HCI theories

Fair (C+, C, C-)

Formulates a hypothesis that is somewhat related to HCI theories but lacks clarity or strength

Marginal (D)

Hypothesis is poorly defined, weakly related to HCI theories, or not clearly testable

Failure (F)
No hypothesis is formulated or it is irrelevant to HCI

Assessment Task
Experimental Design and Analysis Assignment

Criterion
Methodology

Excellent (A+, A, A-)
Designs a rigorous and ethical experimental methodology, including appropriate controls and valid measures

Good (B+, B, B-)
Methodology is well-structured with mostly appropriate controls and measures

Fair (C+, C, C-)
Methodology has some flaws; controls and measures are present but not fully valid or appropriate

Marginal (D)
Methodology is poorly designed with significant issues in controls and measures

Failure (F)
No methodology is presented or it is entirely inappropriate

Assessment Task
Experimental Design and Analysis Assignment

Criterion
Analysis

Excellent (A+, A, A-)
Performs sophisticated data analysis appropriate to the experiment's design, using advanced statistical methods

Good (B+, B, B-)
Analyzes data correctly using appropriate statistical methods, with minor errors or omissions

Fair (C+, C, C-)
Data analysis is present but uses methods that are not fully suitable or contains significant errors

Marginal (D)
Attempts data analysis with major errors, inappropriate methods, or lacks statistical understanding

Failure (F)
No analysis is performed or it is entirely incorrect

Assessment Task
Experimental Design and Analysis Assignment

Criterion

Presentation and Communication

Excellent (A+, A, A-)

Presents findings clearly and professionally, with excellent use of visual aids and articulate communication

Good (B+, B, B-)

Presents findings in a clear and organized manner, using appropriate visual aids

Fair (C+, C, C-)

Presentation is somewhat clear but lacks organization or effective use of visual aids

Marginal (D)

Presentation is disorganized, unclear, or does not effectively communicate findings

Failure (F)

No presentation is made or it is incoherent

Assessment Task

Theory-Based Interface Critique Assignment

Criterion

The depth of understanding, application of theory, analytical skills, and the quality of the critique and recommendations provided.

Excellent (A+, A, A-)

The critique demonstrates a profound understanding of HCI theories and applies them adeptly to analyze and evaluate the interface. The student provides a comprehensive analysis that not only identifies strengths and weaknesses but also offers constructive suggestions for improvement that are well-grounded in theory. The critique is articulated with clarity, depth, and insight, showing exceptional critical thinking and the ability to synthesize information from various HCI domains.

Good (B+, B, B-)

The critique shows a solid grasp of HCI theories and applies them to analyze the interface, though perhaps with less depth or breadth compared to the highest level. The analysis identifies key strengths and weaknesses and provides suggestions for improvement, but these may lack the same level of theoretical grounding or practical applicability. The critique is clear and well-organized, with good critical thinking, though it may have minor gaps or oversights.

Fair (C+, C, C-)

The critique provides an adequate application of HCI theories to the analysis of the interface, but with noticeable limitations. The evaluation identifies some strengths and weaknesses but may do so in a superficial manner, and suggestions for improvement may be generic or not fully supported by theory. The critique is generally understandable but lacks the depth and rigor expected at higher levels.

Marginal (D)

The critique attempts to apply HCI theories to the interface critique but does so with significant misunderstanding or misapplication. The analysis may identify a few correct observations but is largely superficial or incorrect, and suggestions for improvement lack theoretical support or practical value. The critique shows limited critical thinking and a weak synthesis of theoretical knowledge.

Failure (F)

The critique fails to adequately apply HCI theories to the interface critique, showing a lack of understanding of both the theories and their application to interface design. The analysis is incorrect or irrelevant, and any suggestions for improvement are not supported by theory or practical considerations. The critique lacks clarity, critical thinking, and demonstrates an inadequate grasp of the subject matter.

Assessment Task

Design and Modeling Assignment

Criterion

the application of HCI principles, creativity, user-centered design, theoretical grounding, and the overall quality of the documentation and design.

Excellent (A+, A, A-)

The design and modeling assignment demonstrates a sophisticated understanding of HCI principles and applies them innovatively to create an interface design that is both conceptually sound and practically effective. The student's work shows exceptional creativity, thoughtfulness, and attention to detail, resulting in a model that is well-structured, user-centered, and aligned with current design best practices. The assignment is thoroughly documented, with clear explanations of the design decisions and their theoretical underpinnings.

Good (B+, B, B-)

The design and modeling assignment effectively applies HCI principles to the creation of an interface design. The model is generally well-structured and user-centered, with most design decisions justified by relevant theories. The assignment is well-documented, but may have some minor flaws or lack slight depth in certain areas. The work shows good creativity and understanding, though it may not be as innovative or polished as the highest level.

Fair (C+, C, C-)

The design and modeling assignment provides an adequate application of HCI principles with a functional interface design. The model meets basic design requirements, but may lack some depth or innovation. The assignment is documented, but explanations for design decisions may be somewhat superficial or not fully grounded in theory. There is room for improvement in terms of creativity, user-centered design, and theoretical application.

Marginal (D)

The design and modeling assignment attempts to apply HCI principles but falls short in creating an effective interface design. The model has noticeable flaws and may not fully consider user needs or theoretical principles. Documentation is present but lacks clarity or detail, making it difficult to understand the design rationale. The work shows limited creativity and understanding of HCI principles.

Failure (F)

The design and modeling assignment fails to adequately apply HCI principles, resulting in a design that is significantly flawed or irrelevant. The model does not meet basic design requirements and lacks a clear user-centered approach. Documentation is inadequate or nonexistent, and there is no evident understanding of the theoretical basis for design decisions. The assignment lacks creativity and does not demonstrate a grasp of HCI principles.

Assessment Task

In-class Exam

Criterion

Students should demonstrate the ability to apply knowledge and skills to understand the concepts and theory of Human-Computer Interaction (HCI) across multiple platforms including lectures, online resources, and assignments.

Excellent (A+, A, A-)

Excellent grasp of materials, ability to explain key concepts, assumptions, and debates, demonstrating sound knowledge of the field
Deep understanding of key HCI methodologies and case studies
Deep understanding of important speeches and writings connected with HCI theory
Deep understanding of the impact of HCI on various aspects of daily life and technology interaction

Deep understanding of contemporary HCI research trends and their technological applications

Good (B+, B, B-)

Firm grasp of materials, ability to explain key concepts, assumptions, and debates, demonstrating sound knowledge of the field
Comprehensive understanding of key HCI methodologies and case studies
Comprehensive understanding of important speeches and writings connected with HCI theory
Comprehensive understanding of the impact of HCI on various aspects of daily life and technology interaction
Comprehensive understanding of contemporary HCI research trends and their technological applications

Fair (C+, C, C-)

Adequate grasp of materials, ability to explain key concepts, assumptions, and debates, demonstrating sound knowledge of the field
Adequate understanding of key HCI methodologies and case studies
Adequate understanding of important speeches and writings connected with HCI theory
Adequate understanding of the impact of HCI on various aspects of daily life and technology interaction
Adeate understanding of contemporary HCI research trends and their technological applications

Marginal (D)

Weak grasp of materials, ability to explain key concepts, assumptions, and debates, demonstrating sound knowledge of the field
Weak understanding of key HCI methodologies and case studies
Weak understanding of important speeches and writings connected with HCI theory
Weak understanding of the impact of HCI on various aspects of daily life and technology interaction
Weak understanding of contemporary HCI research trends and their technological applications

Failure (F)

Poor grasp of materials, ability to explain key concepts, assumptions, and debates, demonstrating sound knowledge of the field
Poor understanding of key HCI methodologies and case studies
Poor understanding of important speeches and writings connected with HCI theory
Poor understanding of the impact of HCI on various aspects of daily life and technology interaction
Poor understanding of contemporary HCI research trends and their technological applications

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Part III Other Information

Keyword Syllabus

a. Course introduction and structure
b. Experimental design
c. Experimental analysis
d. UX design process (Guest lecture)
e. Human cognition
f. GOMS, KLM, CogTools, and applications
g. Motor behavior models
h. Current trends in HCI research
i. Irrationality: introduction to human biases

Reading List

Compulsory Readings

	Title
1	Human-Computer Interaction - An Empirical Research Perspective - Scott MacKenzie (Chapter 3-5)
2	Oulasvirta, A., & Hornbæk, K. (2016, May). HCI research as problem-solving. In Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems (pp. 4956-4967).
3	Oulasvirta, A., Jokinen, J. P., & Howes, A. (2022, April). Computational rationality as a theory of interaction. In Proceedings of the 2022 CHI Conference on Human Factors in Computing Systems (pp. 1-14).
4	Murray-Smith, R., Oulasvirta, A., Howes, A., Müller, J., Ikkala, A., Bachinski, M., ... & Klar, M. (2022). What simulation can do for HCI research. Interactions, 29(6), 48-53.

Additional Readings

	Title
1	Carroll, J. M. (Ed.). (2003). HCI models, theories, and frameworks: Toward a multidisciplinary science. Elsevier.