

HUMAN COMPUTER INTERACTION

1. Thông tin về học phần (General Information)

Tên học phần (Course name): Human Computer Interaction

Mã học phần (Course code): INT1460

Số tín chỉ (Number of credits): 3

Loại học phần (Course type): Elective

Học phần tiên quyết (Prerequisites):

Học phần trước (Previous courses):

Học phần song hành (Parallel courses):

Các yêu cầu đối với học phần (Course requirements):

- Lecture room: Projector, black board
- Laboratory:

Giờ tín chỉ đối với các hoạt động (Teaching and Learning hours):

- Lý thuyết (Lectures): 36h
- Bài tập (Exercises): 4h
- Bài tập lớn (Projects): 4h
- Thực hành (Labs): 0h
- Tự học (Individual reading): 1h

Địa chỉ Khoa/Bộ môn phụ trách học phần (Address of the Faculty/Department in charge of the course):

- Address: Faculty of Information Technology 1 - Posts and Telecommunications Institute of Technology, Km10, Nguyen Trai Street, Ha Dong District, Hanoi.
- Phone number: (024) 33510432

2. Mục tiêu học phần (Objectives)

Về kiến thức (Knowledge):

The course provides an introduction to human computer interaction (HCI), which focusses on the understanding of HCI concepts, design, and frameworks. In addition, the course also provides an understanding of new developments and trends of HCI such as the interactions based on Voice-guided, virtual reality, and wearables. The students will:

- Gain a historical perspective of HCI and its objectives.
- Become familiar with fundamental backgrounds of HCI toward the development of interactive systems.

Kỹ năng (Skills):

Upon successful completion of this source, the students will be able to:

- Understand the HCI scope, goals, and design process
- Can use tools for designing a simple HCI system.
- Can apply the knowledge of HCI to design and implement simple interactive systems.

Thái độ, Chuyên cần (Attitude):

Students are required to attend the classes and complete exercises and assignments.

3. Tóm tắt nội dung học phần (Description)

This course starts with the introduction to the basic HCI knowledge: concepts, scope, goals; Next, the course will provide the background of HCI design, including HCI principles, human factors and design, to students. In addition, common HCI frameworks are introduced to students for understanding the underlying of HCI systems such as human gestures, language and vision understanding, and multimodality. Finally, students will also explore some recent trends of HCI.

4. Nội dung chi tiết học phần (Outlines)

Chapter 1: Introduction to Human Computer Interaction

1.1. Basic concepts

- 1.1.1. What is Human Computer Interaction (HCI)

- 1.1.2. User interface

- 1.1.3. HCI benefits

1.2. HCI scope

- 1.2.1. Use & context

- 1.2.2. Human factors

- 1.2.3. Computers

- 1.2.4. Interaction

- 1.2.5. Development Process

1.3. HCI goals

- 1.3.1. Safety

- 1.3.2. Utility

- 1.3.3. Effectiveness

- 1.3.4. Usability

- 1.3.5. Appeal

Chapter 2: Human Factors and HCI Design

2.1. Principles of HCI

- 2.1.1. Know the user

- 2.1.2. Understand the task

- 2.1.3. Reduce memory load

- 2.1.4. Strive for consistency

- 2.1.5. Remind user and refresh their memory

- 2.1.6. Prevent error and reverse actions

- 2.1.7. Naturalness

2.2. Human factors

- 2.2.1. Task modeling and human problem-solving model

- 2.2.2. Human reaction and prediction of cognitive performance

- 2.2.3. Visual

- 2.2.4. Aural

- 2.2.5. Tactile and haptic

- 2.2.6. Single and multimodal interaction

2.3. HCI Design

- 2.3.1. Design process

- 2.3.2. Requirement analysis

- 2.3.3. User analysis

- 2.3.4. Scenario and task modeling

- 2.3.5. Interface design

- 2.3.5. Input and Output at low-level

- 2.3.5. Input and output processing

2.4. A project example

Chapter 3: Interactive Frameworks

- 3.1. Gestures
 - 3.1.1. Wearable based gesture recognition
 - 3.1.2. Sensor-free gesture recognition
- 3.2. Language understanding
 - 3.3.1. Text vs. voice commands
 - 3.3.2. Audio speech recognition
 - 3.3.3. Naïve vs. stochastic semantics
- 3.4. Image recognition and understanding
 - 3.4.1. Face and facial expression detection
 - 3.4.2. User attention recognition
 - 3.4.3. People and object detection and tracking
 - 3.4.4. Human action and context recognition
- 3.5. Multimodal interaction
 - 3.5.1. Multimodal input
 - 3.5.2. Multimodal Output
 - 3.5.3. Vision, audio and tactician
 - 3.5.4. Multimodal fusion
- 3.6. A project assignment

Chapter 4: Advanced Topics on HCI

- 4.1. Voice guided interface
 - 4.1.1. Voice triggers
 - 4.1.2. Dependencies and devices
 - 4.1.3. Exercise
- 4.2. Virtual/Augmented Reality
 - 4.2.1. Head-worn and mounted display
 - 4.2.2. Hand-held display
 - 4.2.3. Project display
 - 4.2.4. Spatial augmented reality
 - 4.2.5. Input devices
 - 4.2.6. Exercise
- 4.3. Wearables
 - 4.3.1. Visible wearable technology
 - 4.3.2. Non-obtrusive wearable technology
 - 4.3.3. The Internet-of-Things (IoT) based wearables
 - 4.3.4. Exercise

5. Học liệu (Textbooks)

5.1. Học liệu bắt buộc (Required Textbooks)

- [1]. Gerard Jounghyun Kim. *Human Computer Interaction: fundamentals and practice*. CRC Press, 2014.

5.2. Học liệu tham khảo (Optional Textbooks)

- [2]. Jeff Johnson. *Designing with the Mind in Mind: simple guide to understanding user interface design rules*. MK press. 2010.

6. Phương pháp, hình thức kiểm tra – đánh giá kết quả học tập học phần (Grading Policy)

Grading method	Percentage	Group/Individual
- Attendance	10%	Individual
- Exercises	10%	Individual

- Mid-term projects/exam	20%	Group or individual
- Final examination	60%	Individual

**Trưởng Bộ môn
(Head of Department)**

**Giảng viên biên soạn
(Lecturer)**

Ngô Xuân Bách

Phạm Văn Cường