Virtual Reality 虛擬現實

This course introduces the fundamental and advanced research topics in virtual reality (VR), including VR tools & metaphors, multi-sensory interactions, geometric and behavior modelling, touch-enabled interfaces, real-time immersive navigation, human factor in VR, augmented reality systems, internet-based VR applications. The web-based virtual reality interfaces plus 3D graphics engines build up the developing tools for testing the innovative ideas/solutions for the advanced VR research and real-time applications.

本科旨在介紹虛擬現實(VR)研究中的基礎及進階課題，包括VR工具及模擬，多感知交互，幾何與行為建模，可觸摸式介面，實時空間漫遊，沉浸感的人工因素，增強現實系統，基於互聯網的VR應用等。基於網上的虛擬現實交互介面連同3D圖形引擎，為進階的VR研究及實時應用中的創新提供了有力的開發工具。

Grade Descriptor:

A

EXCELLENT – exceptionally good performance and far exceeding expectation in all or most of the course learning outcomes; demonstration of superior understanding of the subject matter, the ability to analyze problems and apply extensive knowledge, and skillful use of concepts and materials to derive proper solutions.

有關等級說明的資料，請參閱英文版本。

B

GOOD – good performance in all course learning outcomes and exceeding expectation in some of them; demonstration of good understanding of the subject matter and the ability to use proper concepts and materials to solve most of the problems encountered.

有關等級說明的資料，請參閱英文版本。

C

FAIR – adequate performance and meeting expectation in all course learning outcomes; demonstration of adequate understanding of the subject matter and the ability to solve simple problems.
MARGINAL - performance barely meets the expectation in the essential course learning outcomes; demonstration of partial understanding of the subject matter and the ability to solve simple problems.

FAILURE - performance does not meet the expectation in the essential course learning outcomes; demonstration of serious deficiencies and the need to retake the course.

### Equivalent Offering:
- Units: 3 (Min) / 3 (Max) / 3 (Acad Progress)
- Grading Basis: Graded
- Repeat for Credit: N
- Multiple Enroll: N
- Course Attributes: MSc Computer Science, MPhil-PhD Computer Sci & Erg

### Topics:

### COURSE OUTCOMES

#### Learning Outcomes:

At the end of the course of studies, students will have acquired the ability to:

1. Learn fundamental methodology in VR projects/systems.
2. Build VR environments and web-based virtual effects.
3. Realize the virtual immersion and interactions in VR.
4. Apply VR techniques to the application via 3D graphics tools.
Course Syllabus:
This course introduces the fundamental and advanced research topics in virtual reality (VR), including VR tools & metaphors, multi-sensory interactions, geometric and behavior modelling, touch-enabled interfaces, real-time immersive navigation, human factor in VR, augmented reality systems, internet-based VR applications. The web-based virtual reality interfaces plus 3D graphics engines build up the developing tools for testing the innovative ideas/solutions for the advanced VR research and real-time applications.

Assessment Type:
- Essay test or exam: 40%
- Others: 50%
- Presentation: 10%

Feedback for Evaluation:
1. Quiz and examinations
2. Course evaluation and questionnaire
3. Reflection of teachers
4. Question-and-answer sessions during class
5. Student consultation during office hours or online

Required Readings:
To be provided by course teacher.

Recommended Readings:
5. Selected research papers in VR journals and conferences (e.g MIT PRESENCE, ACM VRST).
ARToolKit homepage: http://www.hitl.washington.edu/artoolkit/

OFFERINGS
1. CSCI5460
   Acad Organization=CSEGV; Acad Career=RPG

COMPONENTS
- LEC : Size=30; Final Exam=Y; Contact=3
- TUT : Size=30; Final Exam=N; Contact=1

ENROLMENT REQUIREMENTS
1. CSCI5460
   Enrollment Requirement Group:
For students in MSc Computer Science; or
For students in MPhil-PhD Computer Science & Engineering; or
For students in UG Computer Science; or
For students in UG Computer Engineering;
Prerequisite: CSCI3260 or its equivalent;
Exclusion: CMSC5716