SM3612: AUGMENTED REALITY

Effective Term
Semester A 2022/23

Part I Course Overview

Course Title
Augmented Reality

Subject Code
SM - School of Creative Media
Course Number
3612

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
Augmented Reality (AR) embeds computer graphics into the environment of its users. This course, AR 1, is the first part of a 2-semester AR course. Both courses focus on design and content creation and to a lesser extent on technical aspects. In

AR 1, students will learn how to design and previsualize AR experiences by compositing photorealistic objects into video clips with Cinema4D that are rendered offline. In AR 2, students will then build on this conceptual knowledge to deploy fully interactive AR systems on head-worn displays that can be used outdoors.

Compared to Virtual Reality, a display paradigm where users can only see computer graphics and not the real world, there are several key differences that students will learn about in this course. In AR 1, these are specifically

- Learning how to capture environment light conditions and how to apply them when rendering virtual objects
- Learning how to design interactions for AR, which are radically different to VR interaction techniques. For example, standard VR techniques (e.g. teleportation) can't be done in AR. AR introduces additional challenges, e.g. for safety when walking outdoors in busy areas.
- Learning how to design for seamlessly connecting virtual objects to the environment.

In parallel to learning how to embed photorealistic objects into video clips, students will learn about design approaches for AR content. Mid-semester, students will propose a project to be executed till the end of the semester.

The major components of the course may include:

a. Briefly learn about the history of Augmented Reality
b. Learn how to use state-of-the-art software to compose photorealistic graphics into video footage
c. Learn how to develop an interactive application on an AR head-worn display
d. Develop a concept, rationale, and artist statement for your piece
e. Produce a short movie to showcase your piece

Course Intended Learning Outcomes (CILOs)

	CILOs	Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Demonstrate the capacity for self-directed learning to understand the design principles of AR.		x	x	
2	Demonstrate the use of special state-of-the-art AR software			x	x
3	Demonstrate critical thinking skills in analysing, designing, and developing AR content		x	x	
4	Design AR content that address cultural and societal issues		x	x	
5	Demonstrating differentiated argumentation skills by contributing to discussions in class		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.

Teaching and Learning Activities (TLAs)

	TLAs	Brief Description	CILO No.	Hours/week (if applicable)
1	Exercises in Lecture	Design AR Experiences	1, 2, 3, 4	
2	Previsualization Development	Learn state-of-the-art software to be able to create an illustrative movie of an envisioned AR experience	1, 2, 3, 4	
3	Application Development	Learn how to develop an AR application for a head-worn display. E.g for Micorosoft Hololens, based on popular AR development platform.	1, 2, 3, 4	
4	Presentation in Lecture	Students present their proposal and final project	3, 4	
5	Discussion in Lecture	Students practice argumentation	1, 2, 3	

Assessment Tasks / Activities (ATs)

	ATs	CILO No.	Weighting (%)	Remarks (e.g. Parameter for GenAI use)
1	Assignments	1, 2, 3, 4	30	
2	Project Proposal Presentation (includes 15 sec. rendered movie)	1, 2, 3, 4	20	
3	Final Project Presentation	1, 2, 3, 4	50	

Continuous Assessment (%)

100

Examination (%)

0

Assessment Rubrics (AR)

Assessment Task

Student project, including presentations (proposal & final), movie, and artist statement

Criterion

Ability to plan, execute and evaluate a project. Reflection of Innovation / Originality / Imagination / Lateral Thinking / Production Management / Team Spirit / Learning Attitude / Ethics / Presentation Skills

Excellent (A+, A, A-)

Project was highly original, involved significant logistical challenges and required frequent problem-solving and re-assessment of project methods and goals throughout the duration of the project; student demonstrated exceptional and frequent initiative and self-direction in identifying and overcoming problems as they arouse.

Good (B+, B, B-)

Project was original, challenging and require consistent problem-solving and re-assessment of project methods and goals throughout the duration of the project; student demonstrated consistent initiative and self-direction in identifying and overcoming problems as they arose.

Fair (C+, C, C-)

Project was challenging, require minor problem-solving and re-assessment of project methods and goals throughout the duration of the project; student demonstrated some initiative and self-direction in identifying and overcoming problems as they arose.

Marginal (D)

Project was simplistic and required little problem-solving; student demonstrate little initiative and self-direction in identifying and overcoming problems as they arose.

Failure (F)

Project was simplistic and required no problem-solving; student failed to demonstrate initiative and self-direction in identifying and overcoming problems as they arose.

Additional Information for AR

All A+/A/A- grade assignment should comply with the highest performance of Discovery-oriented learning.

Part III Other Information

Keyword Syllabus

Augmented Reality, Design, Cultural Issues, Societal Issues, Offline Camera Tracking, VFX, Special Visual Effect, Software Development, Programming

Reading List

Compulsory Readings

	Title
1	Azuma, Ronald. Location-Based Mixed and Augmented Reality Storytelling. Chapter 11 in the book Fundamentals of Wearable Computers and Augmented Reality, 2nd Edition, Woodrow Barfield, editor. CRC Press, Aug. 2015. pp. 259-276

Additional Readings

	Title
1	Nil