

**City University of Hong Kong
Course Syllabus**

**offered by School of Creative Media
with effect from Semester B 2022/23**

Part I Course Overview

Course Title:	Art and Technology
Course Code:	SM5308
Course Duration:	One semester
Credit Units:	3
Level:	P5
Medium of Instruction:	English
Medium of Assessment:	English
Prerequisites: <i>(Course Code and Title)</i>	Nil
Precursors: <i>(Course Code and Title)</i>	Nil
Equivalent Courses: <i>(Course Code and Title)</i>	Nil
Exclusive Courses: <i>(Course Code and Title)</i>	Nil

Part II Course Details

1. Abstract

This course examines the concepts of telepresence and digital avatars both from a technical and theoretical standpoint in the framework of remote Virtual Teaching and Learning. It questions our habitual use of video conferencing softwares (Zoom, Facetime, Whatsapp and the like) which seems to define our everyday communications in the post-pandemic world. These tools result from a natural evolution of the telephone, merged with a rather classical view of how teaching is done in a classroom; there are one size-fit-all solutions. Speculative design methodologies will be used to uncover the opportunities for novel and original ways to connect emotionally and cognitively at a distance, departing from these traditional platforms but also from the other one-size-fit-all solutions such as the "Metaverse" where people could meet virtually to perpetrate, once again, the old paradigm of the teacher and students in a classroom.

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.	Understand the basic theoretical frameworks around telepresence technologies.		✓		
2.	Acquire knowledge for how to build an avatar system using Unity game engine.			✓	
3.	Gain a thorough understanding of Blender 3D modelling software.			✓	✓
4.^	Explore how online avatars created using software can be integrated with offline hardware like microcontrollers.			✓	✓
		100%			

^ Negotiated Learning Outcome (NLO) explicitly articulating the elements of Discovery oriented learning.

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.)

TLA	Brief Description	CILO No.				Hours/week (if applicable)
		1	2	3	4	
Task 1. Class discussion and debate	Participation in group discussions regarding key concepts on telepresence systems (technologies and communication models), and engage in speculative design practices for developing new modalities for virtual teach and learning	✓				
Task 2. Online presentation of telepresence avatar	Create a personalized avatar using Unity game engine and Blender 3D which is streamed onto zoom.		✓	✓		
Task 3. Class presentation of prototype for a physical interactive avatar (small robot, microcontroller, etc).	Present your Unity avatar system integrated with real world hardware (IoT, simple actuated arm, etc, using a microcontroller and the provided AI-capable streaming webcam)				✓	

4. Assessment Tasks/Activities (ATs)

(ATs are designed to assess how well the students achieve the CILOs.)

Assessment Tasks/Activities	CILO No.				Weighting	Remarks
	1	2	3	4		
Continuous Assessment: 100%						
Class Participation and Discussion	✓				30%	
Online Presentation of Unity Avatar System		✓	✓		40%	
In person presentation of avatar software and hardware integration			✓	✓	30%	
Examination: 0% (duration: , if applicable)					100%	

5. Assessment Rubrics

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

Applicable to students admitted in Semester A 2022/23 and thereafter

Assessment Task	Criterion	Excellent (A+, A, A-)	Good (B+, B)	Marginal (B-, C+, C)	Failure (F)
1. Class Participation and Discussion	This assessment will grade on content and fluency of presentation. Students should show their co-operation to conduct a well-organized presentation with their own argument and evidence from readings and notes. The threshold of 'discovery' lied in a student's self-initiatives to conduct additional research and to personalize theories for her/his personal daily experience.	<ul style="list-style-type: none"> - Proactive and spontaneous intervention (online: video feed always on!), relevant remarks, good and intelligent listening, constructive attitude towards the work of peers. - demonstration of excellent grasp of the lecture material when discussing, including critical analysis with insightful comments capable of revealing new avenues for research and experimentation. - spontaneous research and presentation of new sources of information relevant to the course (this subject evolves quickly). - Propose original ideas and can discuss and defend them. - distinct pronunciation, fluent expression, and appropriate diction 	<ul style="list-style-type: none"> - Responsive attitude, moderate spontaneous intervention, and intelligent listening. Some degree of flexibility and integration of peers remarks. - Adequate grasp of the material is evident - Good verbal communication: comprehensible pronunciation, fluent expression and diction - Student provides some interesting insights with a certain degree of originality. - Capable of articulating and defending original proposals or those of others. 	<ul style="list-style-type: none"> - Student does not intervene spontaneously; proposal does not evolve with the discussion. - Dialogue demonstrates basic knowledge of the subject matter, comments are somehow relevant and in line with the subject being discussed. - Fair presentation skills: acceptable pronunciation, expression and diction 	<ul style="list-style-type: none"> - Irresponsive student that does not follow the lecture and/or attend the lecture randomly, showing no engagement with peers in discussions at all times; - student completely fails to relate with the subject matter and main concepts introduced in the lecture. - Poor presentation skills: marginal pronunciation, expression and diction
2. Online Presentation of Unity Avatar System	This assessment should demonstrate the student's thorough knowledge of how to use the Unity Game engine and Blender 3D to create a personalized 3D	<ul style="list-style-type: none"> - Excellent presentation and preparation, leading to a sufficiently smooth, working demonstration; - Original and aesthetically 	<ul style="list-style-type: none"> - Adequate mastery of the tools, and demonstration that works sufficiently well; - Work is somehow original and it is clear that a fair amount of 	<ul style="list-style-type: none"> - A partially functional or incomplete demonstration but complemented with a presentation explaining the shortcomings and problems; 	<ul style="list-style-type: none"> - No working demonstration and no justification - Incapacity to elaborate on the concept (if any)

	<p>avatar and environment. The system should include an ability to control the avatar, whether through animation or facial expression blendshapes. Finally, the student should demonstrate streaming their Unity avatar to Zoom used in a telepresence presentation.</p>	<p>interesting avatar</p> <ul style="list-style-type: none"> - It is clear from the work that the student has mastered tools and concepts - Student can elaborate about the idea behind the implementation, explain intentions and motivation for the choices in relation to the lecture content; 	<p>work has been put into it;</p> <ul style="list-style-type: none"> - Student can answer questions about the idea behind the work and explain the why and the how in a sufficiently intelligent and relevant way; 	<ul style="list-style-type: none"> - The work is not original and strictly responds to the points requested in the assignment; - Student demonstrate a superficial grasp of the underlying concepts and it is therefore difficult to extrapolate to more interesting concepts; 	
<p>3. In person presentation of avatar software and hardware integration</p>	<p>This assessment should demonstrate the student's integration of their online avatar system with an offline hardware component, whether through the physical control of the avatar using microcontrollers or AioT webcam, DIY head mounted display or Augmented Reality.</p>	<ul style="list-style-type: none"> - Excellent presentation and preparation leading to a demonstration that <i>works</i> and is impressive integrating most of the concepts and technologies introduced in the lecture (AioT webcam, DIY HMD, robotics, etc) or something else as long as the student defends the concept. The demonstration does not need to be perfect, bugs are acceptable if acknowledged and discussed); - The work is original as whole, that is: departs from mainstream telepresence system architectures, is inspirational in terms of interaction mechanism and avatar representation - Besides creative thinking, the work shows a high level of crafting skills. - The student demonstrates through the work autonomy and the capacity to solve 	<ul style="list-style-type: none"> - Working demonstration integrating at least one of the elements discussed in class; - The work is original and departs from a simple combination of examples; - It is clear from the work that the student tried and spend a reasonable amount of time on the craft and concept; - The student can elaborate and defend the concept in a clever and organized way when inquired - Very good multimedia documentation 	<ul style="list-style-type: none"> - Partially functional or incomplete demonstration but complemented with a presentation explaining the concept, and the problems faced; - The work is not original and strictly responds to the points requested in the assignment; - Student demonstrate a superficial grasp of the underlying concepts and it is therefore difficult to extrapolate to more interesting concepts; - Acceptable documentation of the work 	<ul style="list-style-type: none"> - No working demonstration and no justification - Incapacity to elaborate on the concept (if any) - Poor documentation

		<p>technical problems and come with interesting solutions;</p> <ul style="list-style-type: none"> - The student spontaneously elaborate and defend the concept in a clever and organized way - The student is capable to discuss shortcoming and put the work in context (e.g. compare with existing telepresence systems), discusses what he has learned and present new avenues for research. - Excellent documentation (webpage, Notion, essay and/or video) 			
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Applicable to students admitted before Semester A 2022/23

Assessment Task	Criterion	Excellent (A+, A, A-)	Good (B+, B, B-)	Fair (C+, C, C-)	Marginal (D)	Failure (F)
1. Class Participation and Discussion	This assessment will grade on content and fluency of presentation. Students should show their co-operation to conduct a well-organized presentation with their own argument and evidence from readings and notes. The threshold of 'discovery' lied in a student's self-initiatives to conduct	<ul style="list-style-type: none"> - Proactive and spontaneous intervention (online: video feed always on!), relevant remarks, good and intelligent listening, constructive attitude towards the work of peers including spontaneous help. - demonstration of excellent grasp of the lecture material when 	<ul style="list-style-type: none"> - Responsive attitude, and some degree of spontaneous intervention. Intelligent listening and conceptual flexibility. - Adequate grasp of the material is evident - Good verbal communication: comprehensible 	<ul style="list-style-type: none"> - Student does not intervene spontaneously very often, but when summoned to do so, she/he is capable of personal elaboration and capable to integrate comments and ideas to a certain extend in her/his work. - Dialogue demonstrates basic knowledge 	<ul style="list-style-type: none"> - Student never intervenes spontaneously. The proposal is poor and does not evolve with help and discussions. - Dialogue demonstrates a marginal grasp of the subject, reflections are marginal or irrelevant. - Marginal presentation skills: difficult pronunciation and expression. Student 	<ul style="list-style-type: none"> - Irresponsive student that does not follow the lecture and/or attend the lecture randomly, showing complete lack of engagement with peers in discussions at all times. - student completely fails to relate with the subject matter and main concepts introduced in the lecture. - Very poor presentation skills, incomprehensible

	additional research and to personalize theories for her/his personal daily experience.	<p>discussing, including critical analysis with insightful comments capable of revealing new avenues for research and experimentation.</p> <ul style="list-style-type: none"> - spontaneous research and presentation of new sources of information relevant to the course (this subject evolves quickly). - Propose original ideas and can discuss and defend them. - distinct pronunciation, fluent expression, and appropriate diction 	<p>pronunciation, fluent expression and diction</p> <ul style="list-style-type: none"> - Student provides some interesting insights with a certain degree of originality. - Capable of articulating and defending original proposals or those of others. 	<p>of the subject matter, comments are somehow relevant and in line with the subject being discussed.</p> <ul style="list-style-type: none"> - Fair presentation skills: acceptable articulation if ideas, expression, and diction. 	<p>struggles to pass ideas and respond adequately to questions.</p>	<p>pronunciation, disorganized thinking, lack of comprehension of basic questions.</p>
2. Online Presentation of Unity Avatar System	This assessment should demonstrate the student's thorough knowledge of how to use the Unity Game engine and Blender 3D to create a personalized 3D avatar and environment. The system should include an ability to control the avatar, whether through animation or facial expression blendshapes. Finally,	<ul style="list-style-type: none"> - Excellent presentation and preparation, leading to a sufficiently smooth, working demonstration; - Original and aesthetically interesting avatar - It is clear from the work that the student has mastered tools and concepts 	<ul style="list-style-type: none"> - Adequate mastery of the tools, and demonstration that works sufficiently well; - Work is somehow original and it is clear that a fair amount of work has been put into it; - Student is capable of answering questions about the 	<ul style="list-style-type: none"> - Partially functional or incomplete demonstration but complemented with a presentation explaining the concept and analysing the difficulties encountered and proposing ways these could be solved - The work is not especially original but responds to the assignment. 	<ul style="list-style-type: none"> - A partially functional or incomplete demonstration but complemented with a presentation explaining the shortcomings and problems. - The work is not original and strictly responds to the points requested in the assignment. - Student demonstrates a superficial grasp of the underlying concepts and it 	<ul style="list-style-type: none"> - No working demonstration and no justification - Incapacity to elaborate on the concept (if any)

	the student should demonstrate streaming their Unity avatar to Zoom used in a telepresence presentation.	- Student can elaborate about the idea behind the implementation, explain intentions and motivation for the choices in relation to the lecture content;	idea behind the work and explain the why and the how in a sufficiently intelligent and relevant way;	- Student demonstrates some grasp of the underlying concepts and the work hints at interesting derivations, but these are not developed further. - Adequate documentation of the work	is therefore difficult to extrapolate to more interesting concepts;	
3. In person presentation of avatar software and hardware integration	This assessment should demonstrate the student's integration of their online avatar system with an offline hardware component, whether through the physical control of the avatar using microcontrollers or AioT webcam, DIY head mounted display or Augmented Reality.	- Excellent presentation and preparation leading to a demonstration that <i>works</i> and is impressive integrating most of the concepts and technologies introduced in the lecture (AIoT webcam, DIY HMD, robotics, etc) or something else as long as the student defends the concept. The demonstration does not need to be perfect, bugs are acceptable if acknowledged and discussed); - The work is original as whole, that is: departs from mainstream telepresence system architectures, is inspirational in terms of interaction	- Working demonstration integrating at least one of the elements discussed in class; - The work is original and departs from a simple combination of examples; - It is clear from the work that the student tried and spend a reasonable amount of time on the craft and concept; - The student can elaborate and defend the concept in a clever and organized way when inquired - Very good multimedia documentation	- Partially functional or incomplete demonstration but complemented with a presentation explaining the concept and analysing the difficulties encountered and some suggestions of how to solve these. - The work is not especially original but responds to the assignment. - Student demonstrates a fair grasp of the underlying concepts and the work hints at interesting derivations, but these are not developed further. - Adequate documentation of the work	- Partially functional or incomplete demonstration but complemented with a presentation explaining the concept, and the problems faced. - The work is not original and strictly responds to the points requested in the assignment. - Student demonstrate a superficial grasp of the underlying concepts and it is therefore difficult to extrapolate to more interesting concepts; - Marginal documentation of the work demonstrating a lack of interest to perform adequately.	- No working demonstration and no justification - Incapacity to elaborate on the concept (if any) - No documentation

		<p>mechanism and avatar representation</p> <ul style="list-style-type: none"> - Besides creative thinking, the work shows a high level of crafting skills. - The student demonstrates through the work autonomy and the capacity to solve technical problems and come with interesting solutions; - The student spontaneously elaborate and defend the concept in a clever and organized way - The student is capable to discuss shortcoming and put the work in context (e.g. compare with existing telepresence systems), discusses what he has learned and present new avenues for research. - Excellent documentation (webpage, Notion, essay and/or video) 				
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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.)

Telepresence, avatars, virtual teaching and learning, Unity, Blender 3D, augmented reality, virtual reality, AIoT, Internet of Things, Art, Science and Technology; Art and Technology history; Philosophy regarding man, civilization, art and machine; Evolution in art and technology; Artificial Intelligence; Sensors and new representation media; Natural language understanding; Automated and autonomous animation; Activity and Interactivity; Avatar and virtual presence; Virtual environments; Motion engine; Motion Synthesis; Artificial life; Story telling using media technology; Mobile and Web lifestyle; Media

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.	Slater, M., & Sanchez-Vives, M. V. (2005). From presence to consciousness through virtual reality. <i>Nature Reviews. Neuroscience</i> , 6(4), 332–339. https://doi.org/10.1038/nrn1651
2.	Minsky, M. (1980) Telepresence. <i>OMNI Magazine</i> , 44-52. https://philpapers.org/rec/MINT
3.	Clark, A., & Chalmers, D. (1998). The Extended Mind. <i>Analysis (Oxford)</i> , 58(1), 7–19. https://doi.org/10.1093/analys/58.1.7

2.2 Additional Readings

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