City University of Hong Kong Course Syllabus

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

Part I Course Overv	iew
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: (Course Code and Title)	Nil
Precursors: (Course Code and Title)	Nil
Equivalent Courses :	Nil
(Course Code and Title) Exclusive Courses: (Course Code and Title)	Nil

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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	Discov	ery-eni	
		applicable)	learnin		
		applicació)	(please	_	
			approp	riate)	
			A1	A2	A3
1.	Understand the basic theoretical frameworks around		✓		
	telepresence technologies.				
2.	Acquire knowledge for how to build an avatar system using			1	
	Unity game engine.				
3.	Gain a thorough understanding of Blender 3D modelling			1	✓
	software.				
4.^	Explore how online avatars created using software can be			1	1
	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	A Brief Description		No.		Hours/week	(if	
		1	2	3	4	applicable)	
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.		1	1			
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		1	1		40%	
Avatar System						
In person presentation of avatar			1	1	30%	
software and hardware integration						
Examination: 0% (duration: , if applicable)						
					1000/	

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	Criterion	Excellent	Good	Marginal	Failure
Task		(A+, A, A-)	(B+, B)	(B-, C+, C)	(F)
1. Class Participation and Discussion	This assessment will grade on content and fluency of presentation. Students should show their cooperation 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.	- 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	- 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.	- 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	- 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	- Excellent presentation and preparation, leading to a sufficiently smooth, working demonstration; - Original and aesthetically	 Adequate mastery of the tools, and demonstration that works sufficiently well; Work is somehow original and it is clear that a fair amount of 	- A partially functional or incomplete demonstration but complemented with a presentation explaining the shortcomings and problems;	- No working demonstration and no justification - Incapacity to elaborate on the concept (if any)

	avatar and environment. The	interesting avatar	work has been put into it;		
	system should include an			- The work is not original	
	ability to control the avatar,	- It is clear from the work that	- Student can answer questions	and strictly responds to the	
	whether through animation	the student has mastered tools	about the idea behind the work	points requested in the	
	or facial expression	and concepts	and explain the why and the how	assignment;	
	blendshapes. Finally, the		in a sufficiently intelligent and		
	student should demonstrate	- Student can elaborate about	relevant way;	- Student demonstrate a	
	streaming their Unity avatar	the idea behind the		superficial grasp of the	
	to Zoom used in a	implementation, explain		underlying concepts and it	
	telepresence presentation.	intentions and motivation for		is therefore difficult to	
		the choices in relation to the		extrapolate to more	
		lecture content;		interesting concepts;	
3. In person	This assessment should	- Excellent presentation and	- Working demonstration	- Partially functional or	- No working
presentation of	demonstrate the student's	preparation leading to a	integrating at least one of the	incomplete demonstration	demonstration and no
avatar software	integration of their online	demonstration that works and	elements discussed in class;	but complemented with a	justification
and hardware	avatar system with an offline	is impressive integrating most		presentation explaining	
integration	hardware component,	of the concepts and	- The work is original and	the concept, and the	- Incapacity to elaborate
	whether through the physical	technologies introduced in the	departs from a simple	problems faced;	on the concept (if any)
	control of the avatar using	lecture (AIoT webcam, DIY	combination of examples;		
	microcontrollers or AioT	HMD, robotics, etc) or		- The work is not original	- Poor documentation
	webcam, DIY head mounted	something else as long as the	- It is clear from the work that	and strictly responds to the	
	display or Augmented	student defends the concept.	the student tried and spend a	points requested in the	
	Reality.	The demonstration does not	reasonable amount of time on	assignment;	
		need to be perfect, bugs are	the craft and concept;		
		acceptable if acknowledged		- Student demonstrate a	
		and discussed);	- The student can elaborate and	superficial grasp of the	
			defend the concept in a clever	underlying concepts and it	
		- The work is original as	and organized way when	is therefore difficult to	
		whole, that is: departs from	inquired	extrapolate to more	
		mainstream telepresence		interesting concepts;	
		system architectures, is	- Very good multimedia		
		inspirational in terms of	documentation	- Acceptable	
		interaction mechanism and		documentation of the	
		avatar representation		work	
		- 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)

Applicable to students admitted before Semester A 2022/23

Assessment Task	Criterion	Excellent	Good	Fair	Marginal	Failure
		(A+, A, A-)	(B+, B, B-)	(C+, C, C-)	(D)	(F)
1. Class	This assessment will	- Proactive and	- Responsive attitude,	- Student does not	- Student never intervenes	- Irresponsive student that
Participation and	grade on content and	spontaneous	and some degree of	intervene	spontaneously. The	does not follow the
Discussion	fluency of	intervention (online:	spontaneous	spontaneously very	proposal is poor and does	lecture and/or attend the
	presentation. Students	video feed always	intervention.	often, but when	not evolve with help and	lecture randomly,
	should show their co-	on!), relevant	Intelligent listening	summoned to do so,	discussions.	showing complete lack of
	operation to conduct a	remarks, good and	and conceptual	she/he is capable of		engagement with peers in
	well-organized	intelligent listening,	flexibility.	personal elaboration	- Dialogue demonstrates a	discussions at all times.
	presentation with their	constructive attitude		and capable to integrate	marginal grasp of the	
	own argument and	towards the work of	- Adequate	comments and ideas to	subject, reflections are	- student completely fails
	evidence from readings	peers including	grasp of the	a certain extend in	marginal or irrelevant.	to relate with the subject
	and notes. The	spontaneous help.	material is evident	her/his work.		matter and main concepts
	threshold of				 Marginal presentation 	introduced in the lecture.
	'discovery' lied in a	- demonstration of	- Good verbal	- Dialogue	skills: difficult	
	student's self-	excellent grasp of the	communication:	demonstrates	pronunciation and	 Very poor presentation
	initiatives to conduct	lecture material when	comprehensible	basic knowledge	expression. Student	skills, incomprehensible

	additional research and	discussing, including	pronunciation,	of the subject	struggles to pass ideas	pronunciation,
	to personalize theories for her/his personal	critical analysis with insightful	fluent expression and	matter, comments are somehow relevant and	and respond adequately to questions.	disorganized thinking, lack of comprehension of
	daily experience.	comments capable of	diction	in line with the subject	questions.	basic questions.
'	daily experience.	revealing new	diction	being discussed.		basic questions.
		avenues for research	- Student provides	being discussed.		
		and experimentation.	some interesting	- Fair presentation		
		and experimentation.	insights with a certain	skills: acceptable		
		- spontaneous	degree of originality.	articulation if ideas,		
		research and		expression, and diction.		
		presentation of new	- Capable of			
		sources of	articulating and			
		information relevant	defending original			
		to the course (this	proposals or those of			
		subject evolves	others.			
		quickly).				
		D 1				
		- Propose original				
		ideas and can discuss				
		and defend them.				
		- distinct				
		pronunciation, fluent				
		expression, and				
		appropriate diction				
		Tr T				
	This assessment should	- Excellent	- Adequate mastery	- Partially functional or	- A partially functional or	- No working
3	demonstrate the	presentation and	of the tools, and	incomplete	incomplete demonstration	demonstration and no
	student's thorough	preparation, leading	demonstration that	demonstration but	but complemented with a	justification
	knowledge of how to	to a sufficiently	works sufficiently	complemented with a	presentation explaining	To
	use the Unity Game	smooth, working	well;	presentation explaining	the shortcomings and	- Incapacity to elaborate
	engine and Blender 3D to create a	demonstration;	- Work is somehow	the concept and analysing the	problems.	on the concept (if any)
	personalized 3D avatar	- Original and	original and it is clear	difficulties encountered	- The work is not original	
	and environment. The	aesthetically	that a fair amount of	and proposing ways	and strictly responds to	
	system should include	interesting avatar	work has been put	these could be solved	the points requested in the	
	an ability to control the	microsing avaid	into it;	diese could be solved	assignment.	
	avatar, whether	- It is clear from the		- The work is not	ussigimion.	
	through animation or	work that the student	- Student is capable	especially original but	- Student demonstrates a	
	facial expression	has mastered tools	of answering	responds to the	superficial grasp of the	
	blendshapes. Finally,	and concepts	questions about the	assignment.	underlying concepts and it	

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

	mechanism and avatar		
	representation		
	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 technical		
	problems and come		
	with interesting		
	solutions;		
	771		
	- 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.		
	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. Nature Reviews. Neuroscience, 6(4), 332–339. https://doi.org/10.1038/nrn1651
2.	Minsky, M. (1980) Telepresence. OMNI Magazine, 44-52. https://philpapers.org/rec/MINT
3.	Clark, A., & Chalmers, D. (1998). The Extended Mind. Analysis (Oxford), 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.)