

# Course Syllabus

<b>Course Title</b>	Simulation Design(GR26265-1)		
<b>Course Type</b>	Major(etc.)	<b>Credits (Credit Hours)</b>	3.0
<b>Department (College)</b>	Education	<b>Instructor</b>	Inki Kim
<b>Classification (Year in School)</b>	1~4	<b>Phone</b>	
<b>Classroom</b>	교육108	<b>E-mail</b>	
<b>Class Hours</b>	월5월6월7화5화6화7목5목6목7금5금6금7	<b>Office Hours</b>	
<b>Prerequisite(s)</b>	None		
<b>Course Description</b>	This course is dedicated to the design and development of scenario based simulations that are directly aligned with learning objectives. Students will craft branching scenarios with clearly defined learner roles, contexts, and decision points, and will conduct interaction design that incorporates feedback, adaptive difficulty, and error tolerance. Throughout the design process, they will apply universal design principles and build an immersive learning environment.		

## Course Objectives for Enhancing Competency - Teaching Methods - Grading

<b>Course Objectives</b>	This course aims to equip students with the knowledge and skills needed to design and implement intelligent applications for next-generation augmented reality (AR) devices such as Meta Ray-Ban smart glasses and Samsung Galaxy XR headsets. Students will learn how state-of-the-art AI/ML models operate within AR computing environments and how these models enable real-time perception of faces, gestures, movements, environments, objects, and social interactions. By the end of the course, students will understand how AR and AI/ML converge to deliver context-aware, user-specific intelligence that extends well beyond traditional desktop AI systems.							
<b>Teaching Methods</b>	<b>Lecture</b>	<b>Presentation</b>	<b>Discussion / Debate</b>	<b>Problem-based Learning</b>	<b>Team-based Learning</b>	<b>Flipped Learning</b>	<b>Experiment / Practice</b>	<b>Etc. (with details)</b>
	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
	<p>&lt;Detailed information on teaching methods&gt;</p> <p>Each class session will feature a lecture supported by PowerPoint slides, video demonstrations, and handwritten explanations. Lectures will be followed by student-led activities including discussions, design practices, testing, or hands-on programming conducted in class. Most in-class activities will be facilitated by the instructor and followed up with post-class reflections and submissions for grading. Students are strongly encouraged to bring their own laptops to fully participate in the interactive components of the course.</p>							
<b>Grading</b>	<b>Midterm</b>	<b>Final</b>	<b>Individual Tasks</b>	<b>Team Projects</b>	<b>Class Participation</b>	<b>Attendance</b>	<b>Etc. (with details)</b>	<b>Total (%)</b>
	20	20	25	25		10		100
	<p>&lt;Detailed information on grading&gt;</p> <p>※ Pursuant Section 28 of the Guidelines on Class Management, grading methods can be adjusted for the physically impaired.</p> <p>※ Under Section 29 of the University Regulations on Academic Affairs, a student automatically fails a course in case of failure to attend more than 3/4 classes. (More than four (4) times absence)</p>							
<b>Accommodations for Students with Disabilities</b>	<ul style="list-style-type: none"> <li>- Students with vision impairment: provision of course related materials, note-taking helper, permission to record lectures, etc.</li> <li>- Students with a hearing impairment: provision of course related materials, note-taking helper, permission to have e-learning lectures in sign language or shorthand, etc.</li> <li>- Students with physical disabilities or cerebral palsy: provision of course related materials, note-taking helper, permission to record lectures, etc.</li> <li>- Any other requests that are considered necessary.</li> </ul> <p>※ For students with disabilities, the evaluation method can be adjusted in accordance with Article 28 of the Class Management Guidelines.</p>							

## Textbooks & References

Category	Author	Title	Publisher	Year of Publication
Main Textbook	Alan B. Craig	Understanding Augmented Reality: Concepts and Applications	Morgan Kaufmann	2013
Supplementary Textbook	Dieter Schmalstieg and Tobias Hollerer	Augmented Reality: Principles and Practice	Addison-Wesley Professional	2016
Supplementary Materials	Jonathan Linowes, Krystian Babilinski	Augmented Reality for Developers: Build practical augmented reality applications with Unity, ARCore,	Packt Publishing	2017
Other Materials	<ul style="list-style-type: none"> <li>- Mastering OpenCV with Python (Alberto Fernandez Villan, Packt Publishing, 2019)</li> <li>- Deep Learning (Ian Goodfellow, Yoshua Bengio, Aaron Courville, MIT Publishing, 2016)</li> <li>- Fundamentals of Computer Graphics (Marschneer Shirley, CRC Press, 2022)</li> </ul>			

## Weekly Course Schedule

Week	Topics	Instruction Methods	Evaluation Methods	Class Materials & Assignments, Etc.
1	Experiencing AR	Hands-on experiences		<ul style="list-style-type: none"> <li>• Smart glasses/ AR headsets</li> </ul>
2	Design of AR/MR for Simple Application Project <ul style="list-style-type: none"> <li>• Overview of AR/MR technology and technological components</li> <li>• Introduction to the development platform ( Unity/XCODE)</li> <li>• Getting started with project development</li> </ul>	Instructor-guided design activities		<ul style="list-style-type: none"> <li>• Material: Power Point slides,</li> <li>• Team assignment: An AR /MR project creation</li> </ul>
3	Foundation of AR/MR Simulation: Concepts, Theories, and Methods <ul style="list-style-type: none"> <li>• Overview of XR simulation methods</li> <li>• Key concepts and theories of simulation</li> </ul>	A lecture, followed by discussion and individual activities		<ul style="list-style-type: none"> <li>• Material: Power Point slides</li> </ul>
4	Design of spatial computing and reasoning in AR/MR <ul style="list-style-type: none"> <li>• Overview of spatial reasoning process via AR/MR technology</li> <li>• Introduction to the python development libraries (OpenCV)</li> <li>• Introduction to the implementation of AI/ML libraries in XCODE</li> <li>• Hands on with codes</li> </ul>	Instructor-guided design/ programming activities		<ul style="list-style-type: none"> <li>• Material: Power Point slides,</li> <li>• Team assignment: An AR /MR project creation</li> </ul>
5	Foundation: Spatial Computing <ul style="list-style-type: none"> <li>• Overview of spatial computing methods ( registration, tracking, enrollment) via AR/MR technology</li> <li>• Concepts, mathematics, and algorithms</li> </ul>	A lecture, followed by discussion and individual activities		<ul style="list-style-type: none"> <li>• Material: Power Point slides</li> </ul>
6	Foundation: Basics of AI/ML <ul style="list-style-type: none"> <li>• Key AI/ML models, architecture, and algorithms explained</li> </ul>	A lecture, followed by discussion and individual activities		<ul style="list-style-type: none"> <li>• Material: Power Point slides</li> </ul>
7	Foundation: Spatial Reasoning with AI/ML <ul style="list-style-type: none"> <li>• Overview of AI-XR integration approaches</li> <li>• Basic AI/ML models, architecture, and algorithms explained</li> </ul>	A lecture, followed by discussion and individual activities		<ul style="list-style-type: none"> <li>• Material: Power Point slides</li> </ul>
8	Mid-term Exam (open book, open note)			<ul style="list-style-type: none"> <li>• Use laptop to submit the student's individual exam works on Part 1 and 2.</li> </ul>
9	Design of user interactions in AR/MR <ul style="list-style-type: none"> <li>• Overview of user interaction design methods and processes in AR/MR</li> <li>• Implementation in an XR platform</li> </ul>	Instructor-guided design/ programming activities		<ul style="list-style-type: none"> <li>• Material: Power Point slides,</li> <li>• Team assignment: An AR /MR project creation and testing</li> </ul>
10	Foundation: AR/MR User Interactions <ul style="list-style-type: none"> <li>• Overview of key methods (gesture, gaze, and voice tracking) via AR/MR technology</li> <li>• Concepts, mathematics, and algorithms</li> </ul>	A lecture, followed by discussion and individual activities		<ul style="list-style-type: none"> <li>• Material: Power Point slides</li> </ul>

11	<p>Foundation: Advanced User Interaction with AI/ML</p> <ul style="list-style-type: none"> <li>• Overview of AI-XR integration approaches</li> <li>• Review of related AI/ML models, architecture, and algorithms</li> </ul>	A lecture, followed by discussion and individual activities		<ul style="list-style-type: none"> <li>• Material: Power Point slides</li> </ul>
12	<p>Design proposal for final project</p> <ul style="list-style-type: none"> <li>• Discussion and team activities to define the final concept design for AR/MR application</li> </ul>	Instructor-guided design/programming activities		<ul style="list-style-type: none"> <li>• Material: Power Point slides,</li> <li>• Team assignment: An AR /MR project concept definition</li> </ul>
13	<p>Code development for final project [1/2]</p> <ul style="list-style-type: none"> <li>• Platform-agnostic development for spatial computing, reasoning, and user interaction</li> <li>• Development of pseudo computing algorithms</li> <li>• Define key performance indices for the project testing</li> </ul>	Instructor-guided design/programming activities		<ul style="list-style-type: none"> <li>• Material: Power Point slides,</li> <li>• Team assignment: An AR /MR project algorithm development and test</li> </ul>
14	<p>Code development for final project [2/2]</p> <ul style="list-style-type: none"> <li>• Platform-agnostic development for spatial computing, reasoning, and user interaction</li> <li>• Development of pseudo computing algorithms</li> <li>• Define key performance indices for the project testing</li> </ul>	Instructor-guided design/programming activities		<ul style="list-style-type: none"> <li>• Material: Power Point slides,</li> <li>• Team assignment: An AR /MR project algorithm development and test</li> </ul>
15	<ul style="list-style-type: none"> <li>• Final Exam (Presentation and report)</li> </ul>	Feedback and Q & A will be handled by the instructor in class		

\* The schedule above is subject to change.

### References

### Reflection on Course Evaluation from Previous Term

Course Evaluation by Students

CQI by Professor