

Micro Degree Program Proposal ACUCA

# **Metaverse and Multisensory Servicescape: Creating Virtual Environment to Leverage Customer Experiences**

## **Course Description**

Servicescape refers to a physical environment where customers and service providers interact. It encompasses all the tangible elements of the service environment, including layout, design, ambiance, decoration, signage, colors, lighting, temperature, and sounds. However, with the rapid emergence of technology, the service encounter has moved from physical to phygital (physical and digital), where customers are engaged and shaped perceptions, emotions, and behaviors by utilizing multisensory virtual environments. This course delves into multisensory virtual reality, providing participants with the knowledge and skills to design and develop virtual environments that resonate with users on a profound level.

## **Course Objectives**

### **1. Understanding the Use of Multisensory Stimuli and Its Consequences on Individual Experiences**

Participants will learn about different sensory experiences by providing users with human sense (visual, auditory, taste, smell, and touch) stimuli on their experiences. They will also learn about the idea of immersive virtual experiences, relying on the EPI (Environment, Presence, and Interactivity) cube, and how individuals navigate their virtual worlds and sensory inputs to improve user engagement and satisfaction.

### **2. Applying the Service Design Approach to Create Multisensory Service Experiences**

Service design principles provide a framework for crafting multisensory service experiences in virtual environments. This approach involves user research to understand their needs and desires, followed by service blueprinting to map out the touchpoints and interactions. Journey mapping then visualizes the user's entire experience, incorporating opportunities for multisensory engagement through sight, sound, smell, taste (if applicable), and touch.

Prototyping and user testing allow for iterative refinement before finalizing the immersive service experience.

### 3. Developing a Virtual Environment with Unity and Blender

By taking this course, students are expected to be able to conceptualize the creation of a virtual environment and integrate with some storyboarding techniques to visualize it and its key features. Further, by using Blender, students will learn how to create 3D models, textures, and animations for the virtual environment. At the end of this course, all the 3D assets will be integrated into the Unity project, ensuring proper scaling, rotation, and alignment of objects within the scene.

## Learning Outcomes

Students will understand how to develop 3D objects and integrate them into a single virtual environment with Unity. Overall, students who enroll in this course will gain some key competencies:

Code	Description
LO1	Students will be able to create 3D assets/objects using Blender
LO2	Students will be able to enhance the virtual environment with some key features, including storyboard and user interaction
LO3	Students are able to understand the Multisensory Service Design and its implication on individuals' experiences
LO4	Students will be competent in applying the design thinking method to design multisensory immersive virtual environments on service delivery
LO5	Students will be able to understand the implication of different sensory stimuli on individuals experience in the virtual environment
LO6	Students will have critical and creative thinking skills in analyzing and synthesizing individuals behavior in the virtual world

## Course Details

**Language of Instruction:** English

**Instructors:**

**1. Associate Prof. Halim Budi Santoso, Ph.D.**

Information System Department, Universitas Kristen Duta Wacana, Indonesia

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ORCID: 0000-0001-8272-3066

Research Interest: Technology-enabled services, Multisensory Experience, Ecosystem Orchestration and Digital Transformation, Immersive Technology in Services

**2. Assistant Prof. Matahari Bhakti Nendya, M.T**

Informatics Department, Universitas Kristen Duta Wacana, Indonesia

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ORCID: 0000-0002-4708-9087

Research Interest: Augmented Reality, Virtual Reality, Game Technology

**Required Software:**

- a. **Unity with LTS (Free Licence)**. Download source: <https://unity.com/releases/lts>
- b. **Blender 3.6 (Free Licence)**. Download source: <https://builder.blender.org/download/daily/>

**Learning Strategies:**

1. Individual Study
  - a. Reading Materials
  - b. Individual Assignment
2. Classroom Activities
  - a. Lecturer / Transfer Knowledge
  - b. Idea Creation with Design Thinking Practice
  - c. Idea Brainstorming
  - d. Hands-On Laboratory Practices
  - e. Individual Presentation
  - f. Idea Pitching
  - g. Group Presentation
  - h. Small Group Discussion

## Grading Scheme

Components	Weight	Number of Assignment	Description
Individual Assessment	40%	4	<ul style="list-style-type: none"> <li>• 2 Individual Assignment</li> <li>• 1 Student Design Presentation *</li> <li>• 1 Mid Term Exams</li> </ul> Notes: * Students will be split into 7 sensory groups: Visual, Auditory, Haptic, Taste, Smell, Thermal, and Kinesthetic
Final Project	50%	4	<ul style="list-style-type: none"> <li>• Milestone 1: Idea Generation (10%)</li> <li>• Milestone 2: Service Design (10%)</li> <li>• Milestone 3: Prototyping (10%)</li> <li>• Milestone 4: Final Presentation (20%)</li> </ul>
Participation in class	10%		

## Class Policy

1. Open Camera Policy: Both students and instructors should open camera during synchronous class
2. Punctual arrival, regular attendance, full preparation, and active engagement. Students should actively join the class discussion. Students will get a participation score if they ask a question, provide suggestions, or comment.
3. Addressing lecturers, students, and others appropriately and with respect, whether in person, in writing, or electronic communications
4. The class will be conducted in English. Students should use English during class to communicate with their classmates and instructors
5. Plagiarism and cheating are serious offenses and may be punished by failure on the assignment, in the course, and/or exclusion from the ACUCA platform.
6. Generative AI tools (such as ChatGPT, Gemini, etc.) are allowed for a brainstorming idea and idea generation. Students are not allowed to copy-paste responses from Generative AI tools directly without editing.
7. Instructors will expect that all work you turn in as your own is truly your original work.

## References

### Books

Code	References
B1	Velasco, C., & Obrist, M. (2020). <i>Multisensory experiences: Where the senses meet technology</i> . Oxford University Press.
B2	Davis, A., Baptiste, T., Craig, R., & Stunkel, R. (2022). <i>Unity 3D Game Development: Designed For Passionate Game Developers? Engineered To Build Professional Games</i> .
B3	Krishna, A. (Ed.). (2011). <i>Sensory marketing: Research on the sensuality of products</i> . Routledge.
B4	Kumar, V. (2012). <i>101 Design methods: A structured approach for driving innovation in your organization</i> . John Wiley & Sons.
B5	Stickdorn, M., & Schneider, J. (2012). <i>This is service design thinking: Basics, tools, cases</i> . John Wiley & Sons.
B6	Grey, S. (2021). <i>Mind-Melding Unity and Blender for 3D Game Development: Unleash the Power of Unity and Blender to Create Amazing Games</i> . Packt Publishing.
B7	Hamdani, A., & Barreto, C. (2013). <i>3D Environment Design with Blender: Enhance your modeling, texturing, and lighting skills to create realistic 3D scenes</i> . Pack Publishing.
B8	Blain, J. M. (2023). <i>The Complete Guide to Blender Graphics: Computer Modeling and Animation: Volume One</i> . Amerika Serikat: CRC Press.
B9	Nadales, D. C. (2023). <i>Build Your Own Metaverse with Unity: A Practical Guide to Developing Your Own Cross-Platform Metaverse with Unity3D and Firebase</i> . (n.p.): Packt Publishing, Limited.

### Journal and Conference Proceeding Publications

Code	References
J1	Spence, C., & Gallace, A. (2011). Multisensory design: Reaching out to touch the consumer. <i>Psychology &amp; Marketing</i> , 28(3), 267-308.
J2	Flavián, C., Ibáñez-Sánchez, S., & Orús, C. (2019). The impact of virtual, augmented and mixed reality technologies on the customer experience. <i>Journal of business research</i> , 100, 547-560.
J3	Flavián, C., Ibáñez-Sánchez, S., & Orús, C. (2021). The influence of scent on virtual reality experiences: The role of aroma-content congruence. <i>Journal of Business Research</i> , 123, 289-301.
J4	Santoso, H.B., Quarshie, B., Ukpabi, D., Wang, J.C. (2024). Body and Mind in Virtual Dark Tourism Experiences and Artwork Creations: Embodied Cognition Reaction Perspectives. In: Berezina, K., Nixon, L., Tuomi, A. (eds) <i>Information and Communication Technologies in Tourism 2024</i> . ENTER 2024. Springer Proceedings in Business and Economics. Springer, Cham. <a href="https://doi.org/10.1007/978-3-031-58839-6_12">https://doi.org/10.1007/978-3-031-58839-6_12</a>
J5	Baroroh, D. K., Santoso, H. B., & Anggrahini, D. (2023). Metaverse tourism: Elements and consequences on tourism experience journey. <i>Journal of Smart Tourism</i> , 3(1), 23-34.

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Code	References
J6	Tamtama, G. I. W., Santoso, H. B., Wang, J. C., & Windasari, N. A. (2022, December). Aw... The Museum is so “Dark”: The effect of thermal stimuli for virtual reality experience and emotion. In <i>2022 Seventh International Conference on Informatics and Computing (ICIC)</i> (pp. 1-7). IEEE.
J7	Santoso, H. B., Wang, J. C., & Windasari, N. A. (2022). Impact of multisensory extended reality on tourism experience journey. <i>Journal of Hospitality and Tourism Technology</i> , 13(3), 356-385.
J8	Nendya, M. B., Mahastama, A. W., & Setiadi, B. (2023, July). Augmented Reality Indoor Navigation Using NavMesh. In <i>2023 1st IEEE International Conference on Smart Technology (ICE-SMARTec)</i> (pp. 134-139). IEEE.
J9	Senapatha, I. K. D., Mahastama, A. W., Nendya, M. B., & Susanto, A. A. (2023, September). Usability Evaluation of Augmented Reality as Immersive Product Guidelines. In <i>2023 International Conference on Electrical and Information Technology (IEIT)</i> (pp. 248-251). IEEE.
J10	Nendya, M. B., Susanto, B., Tamtama, G. I. W., & Wijaya, T. J. (2023). Desain Level Berbasis Storyboard Pada Perancangan Game Edukasi Augmented Reality Tap The Trash. <i>Fountain of Informatics Journal</i> , 8(1), 1-6.
J11	Nendya, M. B., & Redono, D. (2022). Pocong Rush: Endless Runner Game Based On Finite State Machine. <i>JOINCS (Journal of Informatics, Network, and Computer Science)</i> , 5(1), 14-20.
J12	Mulcahy, R. F., & Riedel, A. (2022). “Going on a sensory adventure, a touchy subject?”: investigating haptic technology and consumer adventure orientation. <i>Journal of Service Theory and Practice</i> , 32(1), 5-29.
J13	Jha, S., Balaji, M. S., Peck, J., Oakley, J., & Deitz, G. D. (2020). The effects of environmental haptic cues on consumer perceptions of retailer warmth and competence. <i>Journal of Retailing</i> , 96(4), 590-605.
J14	Poushneh, A. (2021). Impact of auditory sense on trust and brand affect through auditory social interaction and control. <i>Journal of Retailing and Consumer Services</i> , 58, 102281.
J15	Garzonis, S., Jones, S., Jay, T., & O'Neill, E. (2009, April). Auditory icon and earcon mobile service notifications: intuitiveness, learnability, memorability and preference. In <i>Proceedings of the SIGCHI conference on human factors in computing systems</i> (pp. 1513-1522).
J16	Rimkute, J., Moraes, C., & Ferreira, C. (2016). The effects of scent on consumer behaviour. <i>International journal of consumer studies</i> , 40(1), 24-34.
J17	Girard, A., Lichters, M., Sarstedt, M., & Biswas, D. (2019). Short-and long-term effects of nonconsciously processed ambient scents in a servicescape: Findings from two field experiments. <i>Journal of Service Research</i> , 22(4), 440-455.
J18	Garaus, M., Weismayer, C., & Steiner, E. (2023). Is texture the new taste? The effect of sensory food descriptors on restaurant menus on visit intentions. <i>British Food Journal</i> , 125(10), 3817-3831.
J19	Batat, W. (2024). Phygital customer experience in the metaverse: A study of consumer sensory perception of sight, touch, sound, scent, and taste. <i>Journal of Retailing and Consumer Services</i> , 78, 103786.
J20	Lefebvre, S., Hasford, J., & Boman, L. (2022). Less light, better bite: How ambient lighting influences taste perceptions. <i>Journal of Retailing and Consumer Services</i> , 65, 102732.

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Code	References
J21	Santoso, H. B., Prabawati, A. G., Wang, J. C., Windasari, N. A., Tamtama, G. I. W., & Ernawati, L. (2023, December). Content is Fire and Virtual Reality is Gasoline: Understanding Users Attention, Comprehension, and Attitude in Destination Promotion. In <i>2023 Eighth International Conference on Informatics and Computing (ICIC)</i> (pp. 1-7). IEEE.
J22	Dwivedi, Y. K., Hughes, L., Baabdullah, A. M., Ribeiro-Navarrete, S., Giannakis, M., Al-Debei, M. M., ... & Wamba, S. F. (2022). Metaverse beyond the hype: Multidisciplinary perspectives on emerging challenges, opportunities, and agenda for research, practice and policy. <i>International Journal of Information Management</i> , 66, 102542.
J23	Dwivedi, Y. K., Kshetri, N., Hughes, L., Rana, N. P., Baabdullah, A. M., Kar, A. K., ... & Yan, M. (2023). Exploring the darkverse: A multi-perspective analysis of the negative societal impacts of the metaverse. <i>Information Systems Frontiers</i> , 25(5), 2071-2114.
J24	Koohang, A., Nord, J. H., Ooi, K. B., Tan, G. W. H., Al-Emran, M., Aw, E. C. X., ... & Wong, L. W. (2023). Shaping the metaverse into reality: a holistic multidisciplinary understanding of opportunities, challenges, and avenues for future investigation. <i>Journal of Computer Information Systems</i> , 63(3), 735-765.

## Metaverse and Multisensory Servicescape Course Outline

### Course Sessions :

Session	Competencies	Topics	Activities	Assessment	References
1 <sup>st</sup> Session July 22, 2024	LO3, LO5	Introduction to Metaverse and Multisensory Experience	<ul style="list-style-type: none"> <li>• Transfer Knowledge</li> <li>• Small Group Discussion</li> </ul>		B1 J2, J7, J20, J22, J23, J24
2 <sup>nd</sup> Session July 23, 2024	LO5, LO6	Digital Sensory Experiences: Visual	<ul style="list-style-type: none"> <li>• Idea Brainstorming</li> <li>• Transfer Knowledge</li> <li>• Small Group Discussion</li> </ul>	Milestone 1 Group Project: Idea Generation	B1, B3 J4, J19, J21
3 <sup>rd</sup> Session July 24, 2024	LO1	3D Assets Creation with Blender – Part 1	Hands-On Laboratory Experiences		B7, B8 J8, J9
4 <sup>th</sup> Session July 25, 2024	LO1	3D Assets Creation with Blender – Part 2	Hands-On Laboratory Practices	Individual Assignment 1 – 3D Assets Model	B2, B7, b8 J8, J9
5 <sup>th</sup> Session July 26, 2024	LO3, LO4, LO5, LO6	Design Thinking: Enhancing Customer Experiences through Service Design	<ul style="list-style-type: none"> <li>• Idea Creation with Design Thinking Practice</li> <li>• Idea Pitching</li> <li>• Group Presentation</li> </ul>	Milestone 2 Group Project: Service Design	B4, B5 J5, J19, J22, J23, J24
6 <sup>th</sup> Session July 29, 2024	LO3, LO5	Digital Sensory Experiences: Touch/Haptic	<ul style="list-style-type: none"> <li>• Transfer Knowledge</li> <li>• Individual Presentation</li> </ul>	Student Design Presentation – Individual	J1, J12, J13, J19



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7 <sup>th</sup> Session July 30, 2024	LO1, LO2	Introduction to Unity Part 1: Terrain Creation	Hands-On Laboratory Practices		B2, B6 J10
8 <sup>th</sup> Session July 31, 2024	LO3, LO5	Digital Sensory Experiences: Auditory	<ul style="list-style-type: none"> <li>• Transfer Knowledge</li> <li>• Individual Presentation</li> </ul>	Student Design Presentation - Individual	J4, J14, J15, J19
9 <sup>th</sup> Session Aug 1, 2024	LO1, LO2	Introduction to Unity Part 2: Scripting Interaction with Game Objects	Hands-On Laboratory Practices	Individual Assignment 2 – Creating your virtual environment and interaction	B2, B6 J10, J11
10 <sup>th</sup> Session Aug 2, 2024	LO1, LO2, LO3	Introduction to Unity Part 3: Multimedia Integration in the Virtual Environment	Hands-On Laboratory Practices	Individual Assignment 3 – Integrating 3D Assets with Virtual Environment	B2, B6, B9 J8, J10, J11
11 <sup>th</sup> Session Aug 5, 2024	LO3, LO5	Digital Sensory Experiences: Smell and Taste	<ul style="list-style-type: none"> <li>• Transfer Knowledge</li> <li>• Individual Presentation</li> </ul>	Student Design Presentation - Individual	B1, B3 J3, J19, J16, J17, J18
12 <sup>th</sup> Session Aug 6, 2024	LO1, LO2	Introduction to Unity Part 4: UI and UX Design and Implementation	Hands-On Laboratory Practices	Milestone 3: Prototyping	B2, B6 J8, J10, J11
13 <sup>th</sup> Session Aug 7, 2024	LO3, LO5, LO6	Digital Sensory Experiences: Kinesthetic, Thermal, and Wind	<ul style="list-style-type: none"> <li>• Transfer Knowledge</li> <li>• Individual Presentation</li> </ul>	Student Design Presentation - Individual	J6, J21

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<p>14<sup>th</sup> Session Aug 8, 2024</p>	<p>LO2</p>	<p>Introduction to Unity Part 5: Building Specific Platform Development</p>	<ul style="list-style-type: none"> <li>• Hands-On Laboratory Practices</li> <li>• Small Group Discussion</li> </ul>		<p>B2, B6, B9 J8, J10, J11</p>
<p>15<sup>th</sup> Session Aug 9, 2024</p>		<p>Final Project Presentation</p>		<p>Milestone 4: Final Presentation</p>	