



Course program and reading list

Semester 2 Year 2023

School: Sammy Ofer School of Communications M.A.

Seminar: VR Research and Prototyping

Lecturer:

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Prof. Doron Friedman doronf@runi.ac.il

Course No.:	Course Type :	Weekly Hours :	Credit:
27304	Seminar	6	6

Course Requirements :	Group Code :	Language:
Final Paper	232273040	English

Course Description

Course details:

The students will experience VR and AR first hand, and read academic papers related to:

1. User experience in VR and AR, including the concept, definition and measurement of (different types of) presence and related concepts (engagement, involvement, plausibility, and perceived realism), embodiment and body ownership illusions and their psychological consequences, and multisensory integration (tangible, auditory, visual AR/VR experiences).
2. Design principles of VR and AR experiences, with emphasis on interaction.

The students will work in pairs. The teams are expected to build simple unity projects in VR, and then carry out an evaluation study of the resulting experience. The team will select a specific question and address it by an evaluation study, using quantitative and/or qualitative research methods. The students will analyze the data gathered and present

the results both orally and in writing.

Course structure:

First semester:

WEEK	Topic	Content	Dates	Notes
1-2	Introduction class	Introduction to the science and technology of VR, key concepts and applications.		Classroom lectures
3-4	Brainstorming and team building:	Coming up with simple but exciting VR experiences to implement and evaluate.		Personal group meetings in the classroom and VR Lab
5	Technical workshop	Basic VR implementation using the assets available in the shared folder		Class and VR Lab
6	Requirements workshop	each team comes up with functional specifications and requirements, including assets needed		Class and VR Lab
7-10	Project implementation with iterative refinement	Development of a prototype of the VR experience and preparation of the evaluation study.		Self-passed development with mentors guidance and personal meetings
11-12	Evaluation sessions	Conducting pilot studies to evaluate the user experience and impact of the VR/AR prototype.		Each team will run a short evaluation study
13	Final Presentations	In-class presentation of the student projects and evaluation results of the pilot study.		The presentation will be graded

Second semester: the advisors will be available for personal group meetings Wednesdays from 10 till 11:30. Each group is required to run a full evaluation study throughout the summer semester and write a report that will be submitted two weeks after the summer semester ends



Course Goals

Course topics:

While there is much progress with virtual reality (VR) and related technologies, designing interactive VR scenarios is still an open question, with rules, conventions, and best practices being discovered and invented every day. We will discuss questions such as: how do you tell a story in VR? What are the unique affordances of VR and how do you design experiences around them? What are the best interaction paradigms, and which paradigms are best for which scenarios and purpose? Answering such questions requires understanding the concepts of immersive technology, rooted in psychology and neuroscience, as well as translating these scientific concepts and findings into principles of experience design and evaluation. Additionally, learning VR experience and interaction design requires hands on trial and error. We will focus on VR experiences, since these are currently easier to develop, but the students will also be exposed to wearable augmented reality (AR) devices.

Course goals:

The seminar aims to introduce the students to the cutting-edge research and practice in the fields of VR, with emphasis on experience and interaction design. The students will gain an understanding of the unique concepts of these immersive technologies based on psychological and neuroscientific research findings. This will enable the students to design and implement basic but successful VR experiences. A particular emphasis is placed on providing the students with the knowledge and skills to evaluate VR/AR user experiences and their impact using qualitative and quantitative research methods. Most of the design, development, and evaluation will occur during class.



Grading

Course requirements and grade components:

Course requirements:

- Class attendance and participation
 - Reading assignments
 - Presentation of the seminar project and evaluation study findings (Sem B **60%** of the course grade)
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- The composition of the grades for sem B are as follows:
 - Presentation/storytelling – 15%
 - Requirement elicitation/academic background – 10%
 - Design – 10%
 - Implementation effort and quality – 30%
 - Demo quality (live/video) – 30%
 - Creativity – 5%
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- Special bonus for any type of extra work beyond typically required – up to 5 points
 - Submission of a short poster paper in the CHI extended abstract format (2-6 pages, two weeks after the end of the summer semester, **40%** of the course grade)

Grade composition:

- VR design, concept, and implementation – demo (60%)
- Research or evaluation study – report paper (40%)



Reading List

Reading list:

Mandatory reading:

- Slater, M., & Sanchez-Vives, M. V. (2016). Enhancing our lives with immersive virtual reality. *Frontiers in Robotics and AI*, 3, article 74.

Further reading:

- Gaggioli, A. (2015). Transformative experience design. In A. Gaggioli et al. (Eds.), *Human computer confluence. Transforming human experience through symbiotic technologies*(pp. 97-122). De Gruyter Open.
- Billinghamurst, M., Clark, A., & Lee, G. (2015). A survey of augmented reality. *Foundations and Trends in Human-Computer Interaction*, 8(2-3), 73-272.
- Koh, A. L. (2017, November). I feel you. Alyssa K. Loh on virtual reality and empathy. *Artforum*, 56(3). <https://www.artforum.com/print/201709/alyssa-k-loh-on-virtual->

[reality-and-empathy-71781](#)

- Bowman, D., & McMahan, R. P. (2007). Virtual reality: How much immersion is enough? *Computer*, 7(40), 36–43.
- New Media & Society special issue on Virtual Reality for Pro-Social Attitude Change (expected publication date: fall 2019)
- Hasler, B. S., Spanlang, B., & Slater, M. (2017). Virtual race transformation reverses racial in-group bias. *PloS one*, 12(4), e0174965.
- De la Peña, N., Weil, P., Llobera, J., Giannopoulos, E., Pomés, A., Spanlang, B., ... & Slater, M. (2010). Immersive journalism: immersive virtual reality for the first-person experience of news. *Presence: Teleoperators and virtual environments*, 19(4), 291–301.
- Friedman, D., Pizarro, R., Or-Berkers, K., Neyret, S., Pan, X., & Slater, M. (2014). A method for generating an illusion of backwards time travel using immersive virtual reality—an exploratory study. *Frontiers in psychology*, 5, 943.

Recommended books:

- Blascovich, J., & Bailenson, J. (2011). *Infinite reality: Avatars, eternal life, new worlds, and the dawn of the virtual revolution*. William Morrow & Co.
- Jerald, J. (2016). *The VR book: Human-centered design for virtual reality*. ACM Books.
- Lanier, J. (2017). *Dawn of the new everything: Encounters with reality and virtual reality* (1st ed.). New York: Henry Holt.
- Ohta, Y., & Tamura, H. (2014). *Mixed reality: Merging real and virtual worlds*.