

## ITL-818: Designing Immersive Learning Environments

**Credit Hours:**

3+0

**Prerequisites:**

None

### **Course Objectives:**

This course explores the design, development, and evaluation of immersive learning environments using technologies such as Virtual Reality (VR), Augmented Reality (AR), Mixed Reality (MR), and Metaverse-inspired platforms. Students will engage with design frameworks, interaction models, and pedagogical strategies to create engaging, accessible, and impactful immersive learning experiences. The course combines theory with practice through case studies, design exercises, and a capstone project. By the end of the course, the students will be able to:

- Understand theoretical foundations of immersion, presence, and embodiment in learning.
- Explore AR/VR/XR technologies and their applications in education and training.
- Apply design thinking and user-centered design to create immersive learning prototypes.
- Evaluate immersive environments in terms of usability, engagement, and learning outcomes.
- Conduct a research-informed project demonstrating the application of immersive technologies in learning.

### **Course Contents:**

- Introduction to Immersive Learning
  - Evolution of immersive technologies in education
  - Key concepts: immersion, presence, embodiment
- Theories of Learning & How immersion supports deeper learning
- Technologies for Immersive Learning
  - Hardware and software overview of VR, AR, XR platforms
- Designing Immersive Learning Environments
  - Interaction design in 3D spaces
  - Narrative, storytelling, and gamification in immersive learning
- Pedagogical Applications of VR

- STEM simulations, medical training, skill development
- Case studies
- Pedagogical Applications of AR
  - Mobile AR for situated and contextual learning
  - Augmented textbooks, markers, and geolocation learning
- Mixed Reality and Collaborative Immersion
  - MR learning environments
  - Multi-user VR/AR classrooms and social presence
- Usability & Accessibility in Immersive Learning
  - Cognitive load and motion sickness
  - Designing inclusive immersive environments
- Evaluation Methods for Immersive Environments
  - Usability testing, presence questionnaires, learning analytics
  - Experimental vs. experiential evaluation approaches
- Ethics and Challenges
  - Privacy, data security, health concerns
  - Ethical design of immersive learning
- Emerging Trends in Immersive Learning
  - AI-driven VR, adaptive XR environments
  - Metaverse in education

**Course Learning Outcomes:**

At the end of the course, the students will be able to:

1. Explain and critique the theoretical foundations of immersion, presence, and embodiment in the context of learning theories.
2. Analyze and evaluate immersive learning applications (VR/AR/MR) to identify pedagogical affordances, limitations, and accessibility concerns.
3. Apply and assess usability, accessibility, and evaluation frameworks to measure learning effectiveness, motivation, and engagement.
4. Design and prototype immersive learning environments by applying interaction design principles, storytelling, and user experience methods that demonstrate an innovative immersive learning solution addressing a real educational challenge.

**Reference Materials/ Books:**

1. *A systematic review of immersive virtual reality applications for higher education: Design elements, lessons learned, and research agenda.* Computers & Education, by Radianti, J., Majchrzak, T. A., Fromm, J., & Wohlgenannt, (2020)
2. *A review of the use of virtual reality head-mounted displays in education and training,* Jensen, L., & Konradsen, F. Education and Information Technologies, (2018).
3. *Experience on Demand: What Virtual Reality Is, How It Works, and What It Can Do,* by Jeremy Bailenson, (2018).
4. *Virtual, Augmented, and Mixed Realities in Education,* by Dejian Liu, Chris Dede, Ronghuai Huang, John Richards, Routledge, (2017)
5. Selected recent papers from Computers & Education, BJET, CHI, and VR/AR research conferences.