



COURSE CONTENT

AUGMENTED REALITY (AR) & VIRTUAL REALITY (VR) APPLICATIONS IN CIVIL ENGINEERING								
III Semester-SE								
Course Code	Category	Hours/Week			Credits	Maximum Marks		
		L	T	P		C	CIA	SEE
	SDC							
Contact Classes: Nil		Tutorial Classes : Nil		Practical Classes: Nil		Total Classes:		
Prerequisites: NIL.								

Course Overview:

This laboratory course introduces students to the application of Augmented Reality (AR) and Virtual Reality (VR) in civil engineering for visualization, simulation, design validation, and construction planning.

Students will learn to:

- Visualize structures in immersive environments
- Integrate BIM models into AR/VR platforms
- Simulate construction processes
- Analyze structural and site conditions interactively

Course Objectives:

1. Understand fundamentals of AR/VR technologies
2. Apply AR/VR in structural visualization and design
3. Develop basic AR/VR models for civil engineering applications
4. Enhance spatial understanding of infrastructure systems
5. Improve presentation and communication of engineering designs

Course Outcomes:

After completion of the course, students will be able to:

1. Explain AR/VR concepts and tools used in civil engineering
2. Create and visualize 3D models in AR/VR environments
3. Integrate BIM models into immersive platforms
4. Simulate construction sequences using VR
5. Evaluate design and safety using AR/VR visualization



List of Experiments:

Experiment 1: Introduction to AR/VR Tools

- Study of AR/VR hardware and software
- Familiarization with platforms like:
 - Unity
 - Unreal Engine
- Basic navigation in VR environment

Experiment 2: 3D Modeling for Civil Structures

- Create simple models (beam, column, truss)
- Use tools like:
 - AutoCAD
 - SketchUp

Experiment 3: Importing Models into AR/VR Environment

- Export models from CAD/BIM software
- Import into Unity/Unreal
- Apply materials and textures

Experiment 4: AR-Based Visualization

- Develop simple AR app for:
 - Building model overlay
 - Site visualization
- Use mobile-based AR tools

Experiment 5: VR Walkthrough of Building Model

- Create immersive walkthrough of:
 - Residential building
 - Industrial structure
- Navigation and interaction in VR

Experiment 6: BIM Integration in VR

- Import BIM models from:
 - Revit
- Explore structure in VR environment



Experiment 7: Construction Sequence Simulation

- Simulate step-by-step construction process
- Visualize:
 - Foundation → Superstructure → Finishing

Experiment 8: Structural Visualization

- Visualize:
 - Load paths
 - Stress distribution (conceptual)
- Improve understanding of structural behavior

Experiment 9: Site Planning using AR

- Overlay building model on real site
- Analyze:
 - Orientation
 - Space utilization

Experiment 10: Safety Training using VR

- Simulate construction site hazards
- Identify:
 - Unsafe conditions
 - Risk zones

Experiment 11: Bridge/Infrastructure Visualization

- Create AR/VR model of:
 - Bridge / Highway / Tunnel
- Analyze design and layout

Experiment 12: Mini Project

- Develop a complete AR/VR application for:
 - Building / Bridge / Industrial structure
- Includes:
 - Modeling
 - Integration
 - Presentation



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(AN AUTONOMOUS INSTITUTION)

(Approved by AICTE, New Delhi & Affiliated to JNTUH, Hyderabad)

Accredited by NAAC with 'A' Grade & Recognized Under Section 2(f) & 12(B) of the UGC act, 1956

REFERENCES:

ELECTRONIC RESOURCES:

MATERIALSONLINE:

1. Virtual labs
2. Contents beyond syllabus