

## Virtual Reality

2 units (selection)

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**Target** Introduction to the fundamental concepts of virtual reality.

**Outline** Virtual Reality is a combination of human interface, graphics, sensor technology, high performance computing, and networking. It allows the user to interact with an artificial environment created by computers. Using these technologies, one has the feeling of total immersion in a new environment. Here, these technologies and several VR simulations are described.

**Requirement** It is desired to finish a course of digital signal processing, image processing, and pattern recognition .

**Goal**

1. To understand fundamentals of virtual reality.
2. To understand various techniques for realizing virtual environments.

**Schedule**

1. Introduction
2. Mathematical Fundamentals (Image Processing)
3. Mathematical Fundamentals (Pattern Recognition)
4. Computer Graphics
5. Three-dimensional Coordinate System
6. Geometrical Modeling
7. Hidden Line and Surface Removal Methods
8. Advanced Rendering Topics
9. Real Time Computer Graphics
10. Image Processing of Motion Pictures
11. Image Sensing Technology
12. Virtual Reality Systems
13. Augmented Reality Systems
14. Advanced Applications of Virtual Reality 1
15. Advanced Applications of Virtual Reality 2
16. Final Examination

**Evaluation Criteria** Project Report 60%, Final Examination 40%

**Textbook** Reference books are introduced to each topic.

**Contents** <http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=216813>

**Note** Preparation (2hrs) and Review (2hrs) are required to take this lecture (2hrs).