

## Advanced Theory of Electric Power Control Systems

2 units (selection)

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**Target)** The purpose of this lecture is to understand the characteristic of various power generation systems and electric power systems and to master new technologies on distributed power sources and electric power systems.

**Outline)** The principle of power generation in various kinds of power generation machines, the characteristic of electric power systems and the analysis technique are introduced. Moreover, the electric power control technology for a distributed power source using an inverter, and control techniques in electric power systems connecting power generation facilities whose output change will occur, such as solar systems, are introduced.

**Style)** Portfolio

**Keyword)** *electric power control, solar system, inverter*

**Requirement)** N/A

**Goal)**

1. To master analysis technique of power generation systems
2. To master analysis techniques of electric power systems
3. To understand control mechanism of distributed power generation systems
4. To master analysis techniques of distributed power generation systems

**Schedule)**

1. Energy transformation technique
2. Basic circuit equations for electric power systems
3. Analysis method 1 in electric power systems
4. Analysis method 2 in electric power systems
5. Analysis method 3 in electric power systems
6. Voltage and reactive power in electric power systems
7. Modeling of synchronous machines
8. Characteristics of synchronous machines
9. Modeling of distributed power generation systems
10. Stability of electric power systems
11. Control of electric power systems
12. Control of distributed power generation systems
13. Requirements for stability in distributed power generation systems
14. Advances analysis method 1 in electric power systems
15. Advances analysis method 1 in electric power systems

**16. Examination**

**Evaluation Criteria)** Evaluate with portfolio and examinations

**Textbook)** printed materials

**Contents)** <http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=216791>