

## Integrated Information System Design

2 units (selection)

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**Target** The aim of this lecture is to master the modern design technologies of very large scale integrated circuits.

**Outline** Very large scale integrated circuit (V-LSI) design and production method. Using CAD technology, VLSI logic design, testing and fabrication are explained. Design of high-speed algorithm and parallel distributed processing system. Neural network and genetic algorithm for integrated circuit design.

**Style** Lecture and exercise

**Requirement** It is necessary to get the unit of the mos integrated circuits in master course.

**Notice** In order to get the unit of this lecture, the graduate course students should have learned the-state-of-the-art of the modern hardware technology, especially C-MOS integrated circuits.

**Goal** This lecture is designed to provide engineers and scientists with an introduction to the field of VLSI neurocomputing.

**Schedule**

1. Embedded software architecture
2. Real-time schedule method
3. System description language
4. Application specific integrated circuits
5. Power consumption and speed of very large scale integrated circuits
6. Shared memory and communication method
7. Cache memory and main memory
8. System modeling and documentation
9. Partitioning and performance
10. Data flow graph and finite state machine
11. Behavior description language and Spec C
12. Control data-flow graph and function synthesis
13. Neural computing board diagram using EEPROM-style programmable synapses
14. Layout pattern example
15. Gate-sizing wiring and timing driven
16. Boundary scan and delay estimation

**Evaluation Criteria** Unit evaluation contains test and design of VLSI

**Textbook** Hardware Annealing in Analog VLSI Neurocomputing, Kluwer Academic Publishers

**Reference** Electronics Circuits, written by Norio Akamatsu

**Webpage** <http://titan.is.tokushima-u.ac.jp/~fukumi>

**Contents** <http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=216700>

**Student** Able to be taken by student of other department and faculty

**Contact**

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(Office Hour: 原則として、水曜日 15 時 ~ 18 時、ただし年度により異なる場合があるので講義の際に指定する。)

**Note** Lecturer will show the schedule of this lecture and design technologies.