

## **Syllabus**

### **1. Course Title, style, and credit**

'Cerebral circuitry'

Lecture

One credit

### **2. Appropriate grade level and Eligible Departments**

All Departments;

For Department of Physiological Sciences, D1, 2 (obligatory), D3–5 (optional)

### **3. Lectures**

Yasuo Kawaguchi

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### **4. Time**

[Oral]

10:00~12:00 on Friday

September 9, 30

October 7, 14, 21, 28

November 4, 25

### **5. Place**

Seminar room B, 9th Floor, 3rd Building (Yamate Area)

The lectures will be delivered by the remote lecture system.

### **6. Prerequisites and Styles**

Basic knowledge on microanatomy and neurophysiology will be helpful, but is not essential.

### **7. Contents**

Subregions of the central nervous system have evolved unique and elaborate local circuits. Above all, the cerebral cortex is highly complicated in its structure, and its operation principle remains to be unraveled. This course will cover what is currently known about the neuronal organization and connectivity of the neocortex and hippocampus, with an emphasis on how

these structural elements contribute to our understanding of the cortical circuit and its functional input–output relationship with the thalamus, basal ganglia, and cerebellum.

#### 8. **Course objectives**

1. To understand the basic structures and functions of the cerebral cortex.
2. To understand the functional linkage of the neocortex with thalamus, basal ganglia, and cerebellum.

#### 9. **Schedule**

(1) September 9th

Cortical neuron types

Yasuo Kawaguchi (NIPS)

(2) September 30th

Neural connections between cortex and thalamus

Yasuo Kawaguchi (NIPS)

(3) October 7th

Neural connections in visual cortex

Yumiko Yoshimura (NIPS)

(4) October 14th

Structure and function of auditory cortex

Hisayuki Ojima (Tokyo Medical and Dental University)

(5) October 21st

Cortico–basal ganglia linkage

Atsushi Nambu (NIPS)

(6) October 28th

Neural connections in the hippocampus

Yugo Fukazawa (NIPS)

(7) November 4th

Cortical inhibitory circuits

Yoshiyuki Kubota (NIPS)

(8) November 25th

Cerebro-cerebellar linkage

Toru Tsujimoto (NIPS)

### **1 0. Lecture materials and readings**

“The Synaptic Organization of the Brain” edited by Gordon Shepherd, Oxford (2003).

### **1 1. Grades**

Students will write a short essay related to the Course Objectives. Essays will be scored based on the quality of the report (100 full points). To receive credit for the course, students must attend at least half of the scheduled lectures and get more than 60 points.

### **1 2. Notes**