**Syllabus**

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

Functional neural circuits

Lecture

1 credit

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

All Departments

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

**3.** Lectures

Yumiko Yoshimura

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NIPS (Myodaiji Area)

**4.** Time

[Oral]

10:00~12:00 on Fridays

April 24

May 8, 15, 22, 29

June 5, 12, 19

**5.** Place

1F Lecture room in Myodaiji building of NIPS

The lectures will be delivered by the remote lecture system.

**6.** Prerequisties and Styles

Basic knowledge on the central nervous system will help to understand the lecture but is not essential.

**7.** Contents

Information processing in the central nervous system (CNS) is based on neural circuits consisting of various types of neurons. In this lecture, we will introduce the properties of basic circuits commonly found in various brain regions and specialized circuits found in particular regions, and

also discuss how these properties contribute to the emergence of function in the circuits, and how the circuits are refined in an activity-dependent manner during development.

## 8. Course objectives

1. To understand the anatomical architecture and functional properties of the CNS
2. To understand the relationship between neural circuit properties and brain function
3. To understand activity-dependent refinement and development of neural circuits

## 9. Schedule

(1) April 24
Overview of neural circuits
Yumiko Yoshimura (NIPS)

(2) May 8
Inhibitory synaptic transmissions
Yasuo Kawaguchi (NIPS)

(3) May 15
Spinal Locomotor Circuits in Aquatic Vertebrates
Shin-ichi Higashijima (NIPS)

(4) May 22
Visual pathway
Takuma Mori (NIPS)

(5) May 29
Synaptic plasticity and functional development
Yumiko Yoshimura (NIPS)

(6) June 5
Motor cortex
Rie Kimura (NIPS)

(7) June 12
Cerebellum
Yugo Fukazawa (Fukui University)

(8) June 19
Amygdala and hippocampus
Toshio Miyashita (NIPS)

## 10. Lecture materials and readings

“The Synaptic Organization of the Brain” edited by Gordon Shepherd, Oxford

## 11. Grades

Students are requested to file the short essay related to the Course Objectives. Either passed or failed is determined by the quality of the report. Students must attend the classes at least half of total classes to take a credit.

## 12. Notes

Nothing in particular