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, D2 (obligatory), D3-D5 (optional)

3. Course organizer
   Yasuo Kawaguchi
   E-mail: yasuo@nips.ac.jp
   TEL: 0564-59-5280, FAX: 0564-59-5284

4. Time
   [Oral]
   10:00～12:00 on Friday
   October 7, 14, 21, 28
   November 11, 18, 25
   December 2

5. Place
   Seminar room, 2nd Floor West, 2nd Building, NIPS (Yamate Area)
   The lectures will be delivered by the remote lecture system.

6. Prerequisites and Styles
   Basic knowledge on microanatomy and neurophysiology help, but is not essential. For the credit, register in the graduate student affairs section.

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 introduce basic structures of the neocortex and cover what is currently known about its neuronal organization, synaptic connectivity/plasticity, connections with the thalamus, and development, along with the structural/functional differences among the cortical areas, and neural circuit modeling. An emphasis is placed on how these structural elements contribute to our understanding of the cortical circuit.

8. Course objectives
   1. To understand the basic structures, neural connections and development of the cerebral cortex.
   2. To understand circuit organization differences among cortical areas.

9. Schedule
   (1) October 7th
Basic structures of forebrain  
Yasuo Kawaguchi (NIPS)

(2) October 14th  
Neuronal wiring and plasticity in cortical microcircuits  
Yoshiyuki Kubota (NIPS)

(3) October 21st  
Neural connections between cortex and thalamus  
Yasuo Kawaguchi (NIPS)

(4) October 28th  
Neural circuits in frontal cortex  
Mieko Morishima (NIPS)

(5) November 11th  
Structure and function of auditory cortex  
Hisayuki Ojima (Tokyo Medical and Dental University)

(6) November 18th  
Modeling studies of information processing in cortical circuits  
Takeshi Otsuka (NIPS)

(7) November 25th  
Neural circuits in visual cortex  
Yumiko Yoshimura (NIPS)

(8) December 2nd  
Development of cortical excitatory and inhibitory neurons  
Yumiko Hatanaka (NIPS)

10. Lecture materials and readings

11. 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.

12. Notes
Nothing in particular