SOKENDAI

Course title	System Neuroscience 2
Term	後期 2nd Half
Credit(s)	1
The main day	The main period
Program/Department	48 Physiological Sciences
Lecturers	Masaki Isoda
成績評価区分 Grading Scale	A,B,C,Dの4段階評価 Four-grade evaluation
レベル Level	Level 3
力量 Competence	専門力 Academic expertise、独創性 Creativity

Instructor

Full name
* ISODA MASAKI

Outline	Understanding higher brain functions as a biological system requires not only a reductive analysis of individual neural elements but also a systems-level perspective that integrates hierarchical interactions ranging from local circuits to global networks. This lecture course will explain the latest research methodologies and findings essential for the system-level understanding of various functions-such as visual perception, voluntary movement, multisensory integration, decision-making, and social cognition-and a computational understanding of higher brain functions.
Learning objectives	Students will be able to: (1) Explain the neural mechanisms underlying visual perception. (2) Explain the neural mechanisms involved in voluntary movement. (3) Explain the neural mechanisms of multisensory integration and decision-making. (4) Explain the neural mechanisms of social cognition. (5) Explain the methodologies for applying mathematical models and information theory to neural activity data.
Grading policy	Attendance in more than half of the lectures is mandatory. Students are required to choose one lecture they attended and submit a report summarizing its content, either in English (approx. 500-1,000 words) or in Japanese (approx. 1,000-2,000 characters). Students who submit their reports by the deadline will be graded on an absolute scale (A, B, C, or D) based on their level of understanding. Grade A corresponds to a score of 80-100, B to 70-79, C to 60-69, and D to 59 or below. Grades A, B, and C are considered passing. <Report submission deadline> January 31, 2027 <How to submit> ・Students in the Physiological Sciences program: Please refer to the following URL: https://sites.google.com/nips.ac.jp/sokendaiadm/ ・Other Students: Submit your report via email to the Graduate Student Affairs Section, National Institute for Physiological Sciences (NIPS) at sokendai-adm@nips.ac.jp
Lecture Plan	1) October 16, 2026 (10:00 AM - 11:30 AM) Research on visual perception in systems neuroscience (I) Junxiang Luo (Division of Sensory and Cognitive Brain Mapping) 2) October 23, 2026 (10:00 AM - 11:30 AM) Research on visual perception in systems neuroscience (II) Hiroki Oishi (Division of Sensory and Cognitive Brain Mapping) 3) October 30, 2026 (10:00 AM - 11:30 AM) Research on voluntary movement in systems neuroscience (I) Satomi Chiken (Section of Multilayer Physiology) 4) November 6, 2026 (10:00 AM - 11:30 AM) Research on voluntary movement in systems neuroscience (II) Naokazu Goda (Section of Brain Function Information) 5) November 27, 2026 (10:00 AM - 11:30 AM) Research on multi-sensory integration and decision-making in systems neuroscience Ryo Sasaki (Division of Multisensory Integration Systems) 6) December 4, 2026 (10:00 AM - 11:30 AM) Research on social cognition in systems neuroscience (I) Takaaki Kaneko (Division of Behavioral Development) 7) December 11, 2026 (10:00 AM - 11:30 AM) Research on social cognition in systems neuroscience (II) Taihei Ninomiya (Division of Behavioral Development) 8) December 18, 2026 (10:00 AM - 11:30 AM) Research on computational modeling in systems neuroscience Keiichi Kitajo (Division of Neural Dynamics)
Location	Online (Zoom)
Language	English
Textbooks and references	Lecture 1 Kingdom, F. A. A. & Prins, N. (2016). Psychophysics: A Practical Introduction (2nd ed.) Lecture 4 Kandel ER, Koester JD, Mack SH, and Siegelbam SA, "Principles of Neural Science (6th Edition). Part V: Movement, Chapters 34-35" McGraw Hill, ISBN 978-1-259-64223-4 Lecture 5 Sasaki R et al. (2024) Science 383(6678):55-61 Sasaki R et al. (2020) Nature Neuroscience 23(8): 1004-1015 Lecture 7 di Pellegrino, G., Fadiga, L., Fogassi, L., Gallese, V., and Rizzolatti, G. (1992). Understanding motor events: a neurophysiological study. Exp Brain Res 91, 176-180. doi: 10.1007/BF00230027
Notes for students of other programs	Please contact the Graduate Student Affairs Section at NIPS in advance: sokendai-adm@nips.ac.jp
Contact for Course Inquiries	Masaki Isoda (isodam@nips.ac.jp)