Course	Computational Vision Science
Course No.	02RB235
Credits	1.0Credits
Grade	1, 2Year
Timetable	SprAB Thu3
Instructor	Ko Sakai
Course Overview	The course is an introduction to the human vision, with specific interests on the computational mechanisms of the visual cortex. The course will cover elementary physiology and psychology, as well as computational algorithms.
Remarks	Identical to 01CH607.
Course Type	lectures
Course Remarks	The lecture will be given in Japanese language unless where English is required. Writings on blackboard and handouts will be given in English. Questions are welcome in either Japanese and English, and the answers will be given accordingly. The lecturer will talk with students whose native language is not Japanese and consider necessary measures. This class will not be given if the number of registrant is less than five.
Relationship to EMP Educational Objectives	Participants will learn the foundation of the computational aspects of cognition which will help understanding a variety of neural phenomena and designing applications in engineering.
Course Objectives	Participants will learn the essence of neural computations which underlie visual functions.
Course Schedule	Fundamentals of visual neuroscience, visual psychophysics, computational neuroscience. Cortical representation of visual information. Computational mechanisms of visual functions.
Graduating Methods and Criteria	Based on the quality of reports(80%) and discussion/participation(20%) in the class.
Homework	Homework will be assigned every one to two weeks.
Textbook	Important slides will be given in advance as an online handout.
References	1. T. Trappenberg, "Fundamentals of Computational Neuroscience", 2009, Oxford 2. A. Hyvrinen, et al., "Natural Image Statistics", Springer, 2009 3. S. E. Palmer "Vison Science" MIT press 4. Kandel, et al., "Principles of Neural Science" McGrawhill, 2014 5. L. M. Chalupa & J. S. Werner (Ed) "The Visual Neuroscience" MIT, 2004 6. R. Snowden, et al., "Basic Vision" Oxford,2006 7. D. Purves, et al., "Principles of Cognitive Neuroscience", Sinauer 8. J. M. Wolfe, et al, "Sensation and Perception", Sinauer 9. J. P. Frisby & J. V. Stone "Seeing: the computational approach to biological vision", MIT 10. . S. Werner & L. M. Chalupa "The new visual neuroscience", MIT, 2014 11. M. S. Gazzaniga "The Cognitive Neurosciences", MIT, 2009 12. 3D shape, Pizlo, MIT, 2008 All references are available in our library.

Office Hour	The office hour will be assigned at the first class. sakai at cs.tsukuba.ac.jp http://www.cvs.cs.tsukuba.ac.jp/~ko
Messages for Students	The lecturer will introduce a number of topics unfamiliar for students with background of information science. The lecture is designed to provide opportunities that expose students to the world of cognitive neuroscience. Students are encouraged to take good notes during lecture, and research the introduced topics by oneself following the homework problems.
Teaching Fellow / Teaching Assistant	
Keywords	vision, perception, brain, science, cognitive, neuroscience