<table>
<tr><td>講義ユニット名
Title　of Lecture</td><td colspan="2">Physiology 2</td><td>所属科目名
Title of Course</td><td>Physiology and Biochemistry</td></tr>
<tr><td rowspan="2">講義ユニット責任者
Responsible Instructor</td><td>HASHIMOTO KOUICHI</td><td>所属
Affiliation</td><td colspan="2">Neurophysiology (内線　Ext. Number 5125)</td></tr>
<tr><td></td><td>メール
E-mail</td><td colspan="2"></td></tr>
<tr><td rowspan="2">講義ユニットコーディネーター
Lecture Coordinator</td><td>HASHIMOTO KOUICHI</td><td>所属
Affiliation</td><td colspan="2">(Neurophysiology (内線　Ext. Number 5125)</td></tr>
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E-mail</td><td colspan="2"></td></tr>
<tr><td>授業方法
Lesson Style</td><td colspan="4">Lectures and practical training</td></tr>
<tr><td>概要
Overview</td><td colspan="4">Understand basics of electrical activity of the neurons and functions of the brain.</td></tr>
<tr><td>講義ユニットの到達目標
Academic Goals</td><td colspan="4">Raise examples how learning can change behaviors.
Give an outline of cognitive activities of animals in relation to the function of the central nervous system.
Explain the structure and function of the cell membrane.
Explain the ion composition and osmotic pressure of intracellular and extracellular fluids, and resting membrane potential.
Give an outline of functions of ion channels, pumps, receptors and enzymes in the plasma membrane.
Explain active and passive transport of substances across cell membranes.
Explain the structure and function of skeletal muscle, myocardium, and smooth muscle.
Explain types and function of signal transduction.
Explain signal transduction cascades via receptors.
Explain the intracellular signal transduction cascades.
Explain various functional roles of Ca^{2+} ions in living organisms.
Explain generation and conduction of action potentials.
Explain morphology (including the nerve-muscle junction), signal transduction (excitatory and inhibitory) and plasticity of the synapse.
Explain the types and mechanisms for sensory perception.
Explain reflex.</td></tr>
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	Explain major neurotransmitters (acetylcholine, dopamine, noradrenaline and glutamic acid) and their functions. Explain spinal reflexes (stretch reflex and flexor reflex) and the reciprocal innervation of muscle. List the names, localization, nerve tracts and functions of nuclei in the brain. Explain the functional localization of the cerebral cortex. Give an outline of the mechanism of memory and learning in relation to the structure of the limbic system. Explain roles of the pyramidal tract for voluntary movements. Give an outline of the structure and function of the cerebellum. Give an outline of synaptic connections and the function of the basal ganglia (striatum, globus pallidus, substantia nigra). Explain perceptions and ascending pathways of pain, temperature, tactile and proprioception. Explain sensing mechanisms and neural pathways for vision, hearing, equilibrium, smell and taste. Explain the sympathetic and the parasympathetic nervous systems. Give an outline of excitation-contraction coupling. Explain the mechanisms and neural pathways for visual perception. Explain the mechanisms and neural pathways for hearing and equilibrium sensing. Explain axonal transport and axon degeneration and regeneration. Explain the circadian rhythm. Explain the functions of the brainstem.
講義日程 Class Schedule	See the attached schedule.
出席の取り扱い Class Attendance Policy	A student absent from a practical training session is not eligible to take the examination on Physiology 2.
評価項目 Evaluation Item	Achievement level of goals
評価法 Evaluation Method	After completing the lecture, a written examination is conducted. Students may be given a small test after a class. In practical training, students should follow the instructors and are required to write a report for each item.
履修上のアドバイス	

Advice for Taking the Lecture	
推奨参考書 Recommended Reference Books	Purves, et al., *Neuroscience*. Sinauer Associates Inc. Bear, et al., *Neuroscience: Exploring the Brain*. Lippincott Williams & Wilkins Kandel, et al., *Principles of Neural Science*. McGraw-Hill Ozawa, et al., *Hyojun Seirigaku*. Igaku Shoin