<table>
<tr><td>講義ユニット名
Title　of Lecture</td><td colspan="2">Biochemistry 1</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>IMAIZUMI KAZUNORI</td><td>所属
Affiliation</td><td colspan="2">Biochemistry (内線　Ext. Number 5130)</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>IMAIZUMI KAZUNORI</td><td>所属
Affiliation</td><td colspan="2">Biochemistry (内線　Ext. Number 5130)</td></tr>
<tr><td></td><td>メール
E-mail</td><td colspan="2"></td></tr>
<tr><td>授業方法
Lesson Style</td><td colspan="4">Mainly lectures along with practical training</td></tr>
<tr><td>概要
Overview</td><td colspan="4">Comprehensively and systematically understand issues of bioenergy, carbohydrate metabolism, lipid metabolism and cell biology in preparation for acquiring biochemical knowledge that is necessary to become a doctor. Practical training sessions will be divided into two parts: Biochemistry 1 and Biochemistry 2.</td></tr>
<tr><td>講義ユニットの到達目標
Academic Goals</td><td colspan="4">Explain the types and properties of monosaccharides, disaccharides, glycerol, and fatty acids.
Explain the basic structure and function of carbohydrates.
Explain the basic structure and function of lipids.
Explain the structure, function, and metabolic control (rate-limiting step, allosteric effect) of enzymes.
Explain that ATP hydrolysis releases free energy.
Explain ATP production by glycolysis, the TCA cycle, electron transport chain, and oxidative phosphorylation.
Explain the process of DNA replication and the mechanism of DNA repair.
Explain the process of transcription and translation.
Explain the structure and function of the cell membrane.
Explain the ion composition, osmotic pressure, and resting (membrane) potential of intracellular and extracellular fluids.
Give an outline of the function of ion channels, pumps, receptors, and enzymes of membranes.
Explain the process of active and passive transport of substances across cell membranes.
Explain the process of secretion and absorption across cell membranes.
Explain the mechanism of cell adhesion.</td></tr>
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	Give an outline of proteins that form the cell structure and their functions. Explain the cell motility by actin filaments. Explain the intracellular transportation system. Explain the roles and functions of microtubules. Explain cell division. Give an outline of each phase of the cell cycle and its adjustment. Explain the process and significance of meiosis. Explain types and function of signal transduction. Explain mechanisms of signal transduction via receptors. Explain the process of intracellular signal transduction. Explain the variety of roles of Ca ions in living organisms. Explain the mechanism that initiates action potentials and their transmission. Explain the function and regulation of enzymes. Explain the glycolytic pathway and regulatory mechanisms. Explain the TCA cycle. Explain the electron transport chain and oxidative phosphorylation. Explain the gluconeogenesis pathway and regulatory mechanisms. Explain the glycogenesis and glycogenolysis pathways. Explain the significance of the pentose phosphate cycle. Explain lipid synthesis and lipolysis. Explain the structure and metabolism of lipoproteins. Explain the production and function of free radicals. Explain types and functions of vitamins. Explain the structures of genes and chromosomes. Explain the relationship between the genome and genes. Explain the synthesis, replication, and repair of DNA. Explain the regulation of gene expression by promoters, transcription factors, and other factors. Explain metabolic pathways of saccharides, proteins, and lipids and their interactions. Explain the structure and function of cell organelles.
講義日程 Class Schedule	See the attached schedule.
出席の取り扱い Class Attendance Policy	A student absent from any practical training session is not eligible for taking the examination on physiology and biochemistry. A student whose attendance is less than two-thirds of all the classes is also not eligible for taking the examination.

評価項目 Evaluation Item	Achievement of the academic goals (basic understanding and application of knowledge)
評価法 Evaluation Method	After completing the lecture, a written examination is conducted. Mainly based on scores of the examination, and factoring in class attendance. A part-time lecturer may give a small test after a class and may add class attendance to evaluation. In practical training, students will be assigned to write a report.
履修上のアドバイス Advice for Taking the Lecture	
推奨参考書 Recommended Reference Books	*Lehninger no Shinsei Kagaku Jo/Ge (Lehninger Principles of Biochemistry)*. Kawasaki T. trans-ed. Nakayama K. ed. Hirokawa Shoten; 2010 (¥8,800 for each) *Harper Seikagaku (Harper's Biochemistry)*. Kajiro Y. trans-ed. Ishimura Y, et al. trans. Maruzen Publishing; 2009. (¥10,290) *Illustrated Seikagaku (Lippincott's illustrated reviews: Biochemistry)*. Ishizaki Y, Maruyama K. trans-ed. Inoue N, Minami Y. trans. Maruzen Publishing; 2011. (¥8,000) Alberts B, et al. *Essential Saibo Seibutsugaku (Essential Cell Biology: An Introduction to the Molecular Biology of the Cell. 3rd ed.)*. Nakamura K, Matsubara K. trans-ed. Nankodo; 2011. (¥8,400) *Saibo no Bunshi Seibutsugaku (Molecular Biology of the Cell. 5th ed.)*. Nakamura K, et al. trans-ed. Newton Press; 2010 (¥22,300) Fujita M. ed. *Hyojun Bunshi Ikagaku*. Igaku Shoin (¥10,000) Ogata N, Nojima H. Idenshi Kogaku Keyword Book. Revised 2nd ed. Yodosha; 2000. Levine B. *Genes VII*. Oxford University Press; 2000. (¥8,750) Brown TA. *Genomes*. Medical Science International; 2000. (¥9,500) Karp GC. *Cell and Molecular Biology: Concepts and Experiments* (Karp Bunshi Saibo Seibutsugaku). Yamamoto M, Watanabe Y. trans-ed. Tokyo Kagaku Dojin *Seikagaku Jiten*. Imahori K, Yamakawa T. superv-ed. Tokyo Kagaku Dojin (¥9,800) *Bunshi Saibou Seibutsugaku Jiten*. Muramatsu M, et al. ed. Tokyo Kagaku Dojin