

Subject	Applied Biological Chemistry (応用生物化学)	Day/Period	1st Quarter Fri./1st-2nd	Object	AMB/JYPE
Instructor (Post)	Professors and Associate Professors of Biochemistry Course	Categories	Specialized Subjects	Preferable Participants	3rd & 4th-year & JYPE students
Position	Faculty of Agriculture (Graduate School of Agricultural Science)	Credits	2		
		Semester	7&9		
Subject Numbering	ABC-AGC261E	Language Used in Course	English		
1. Class subject: Life science for agricultural and industrial applications					
2. Object and summary of class: This class object is to study fundamentals and recent progress in the research fields of molecular biology, cell biology, and physiology with plants, animals, and microbes as well as chemistry of biologically active natural products. More than ten Professors and Associate Professors will give lectures weekly to introduce their specific research fields.					
3. Keywords: Biochemistry, Molecular Biology, Chemistry					
4. Goal of study The goal of this class is to obtain the background knowledge concerning life science for agricultural and industrial applications as well as the basic principles of biochemistry and biotechnology.					
5. Contents and progress schedule of class					
1) Mineral nutrients of higher plants Students will learn about essential nutrients for higher plants and their physiological roles.					
2) Genome and epigenetics This lecture deals with characteristics and functions of genome and epigenetics in eukaryotic cells, including molecular mechanisms of gene regulation and effects of food ingredients on epigenetics.					
3) Enzymes in pathophysiology and toxicology This lecture will be presented to understand role of enzymes in health and disease, especially focusing on pathophysiology of Alzheimer's disease and therapeutic application of natural toxins.					
4) Applied microbiology and fermentation technology Microorganisms possess a wide variety of metabolism and thus are applied to bio-conversion in fermentation industry. This lecture will address both transport processes (substrate-uptake and product-efflux) catalyzed by solute transporters at cell membranes and intracellular metabolic pathways from the view points of bioenergetics in microorganisms. We will also lecture on the principles of protein production technology by bacteria.					
5) Synthesis and application of bioactive natural products This lecture will be presented to build basic understanding of synthetic organic chemistry in the field of natural products chemistry and its roles in agricultural production, medicinal chemistry, and so on.					
6) Molecular basis of nitrogen metabolism in rice In this lecture, molecular mechanisms underlying the primary ammonium assimilation and the related processes in rice will be introduced.					
7) Molecular eukaryotic microbiology Eukaryotic microorganisms such as yeasts and filamentous fungi have been playing a pivotal role in academic science as well as in industrial production of valuable substances. This lecture will give an overview of molecular analysis of the important characteristics of yeast and koji-mold, which each has been used in sake fermentation for over a thousand years in Japan.					
6. Preparation: Textbooks and references will be introduced by each instructor.					
7. Record end evaluation method : Attendance to the lectures 50%, reports 50%					
8. Textbook and references: Textbooks and references will be introduced by each instructor.					
9. Self study: Textbooks and references will be introduced by each professor.					
10. Practical business					
11. In addition Instructors: Profs. Masahiko HARATA, Tomohisa OGAWA, Keietsu ABE, Shigefumi KUWAHARA, Mitsue MIYAO, Takahiro SHINTANI; Associate Profs. Hiroyuki ISHIDA, Eugene FUTAI, Jun KANEKO, Masaru ENOMOTO, Toshihiko HAYAKAWA					