

## Elective Course Description (2. Spring Semester)

Subject (English)	Applied Biological Chemistry		Semester	Spring	Day/Slot	
科目名 (日本語)	応用生物化学					
Course Code		Course Numbering	ABC-AGC261E		Period	Apr. – Aug.
Instructor (Post)	TBC				Campus	
					Building	
Faculty	Faculty of Agriculture		Credits	2	Class Room	
Class subject	Life sciences for agricultural and industrial applications					
Object and summary of class						
<p>This class object is to study fundamentals and recent progress in the research field of molecular biology, cell biology, and physiology in plants, animals, and microbes, and chemistry of biologically active natural products. More than ten lectures will be given weekly to introduce their specific research fields.</p>						
Keywords	Biochemistry, Molecular Biology, Chemistry					
Goal of study						
<p>The goal of this class is to obtain the background knowledge concerning life sciences for agricultural and industrial applications as well as the basic principles of biochemistry and biotechnology.</p>						
Contents and progress schedule of class						
<ol style="list-style-type: none"> <li>1. Photosynthesis and mineral nutrients of higher plants Students will learn about the photosynthetic oxygen evolution and mineral nutrition in higher plants.</li> <li>2. Molecular Genetics and Brain Science Methodological advance in molecular biology and molecular genetics fields has contributed to recent brain science with a huge impact. I will try to demonstrate this fascinated field to the attendee of the class.</li> <li>3. Enzymology Topics in enzymes with emphasis on association with health, environment and food will be discussed.</li> <li>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.</li> <li>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.</li> <li>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.</li> <li>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.</li> </ol>						
Preparation	Nothing special					
Record and evaluation method	Class participation 50%, reports 50%					
Textbook and references	Handouts and/or some references will be given in the lectures.					
Self study	Students can study further about the topics using the references introduced in the lectures.					
In addition	-					