Subject	Applied Biological Chemistry (応用生物化学)	Day/Period	1st Quarter Fri./3rd-4th	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 and photosynthesis in higher plants (4/11)**
1-1) Definition, classification, functions, and recycling of nutrients
1-2) Photosynthesis: carbon uptake by photoautotrophs
2) **Genome and epigenetics (4/18)**
2-1) The aging processes associated with genomic and epigenomic alterations
2-2) Hierarchical organization of the cell nucleus and application of synchrotron light
3) **Enzymes in pathophysiology and toxicology(4/25)**
3-1) Enzymes and proteins in natural toxins
3-2) Proteases in Alzheimer's disease
4) **Applied microbiology and fermentation technology (5/9)**
4-1) Principles of protein production technology by bacteria
4-2) Antibiotics and antimicrobial substances
5) Synthesis and application of bioactive natural products (5/16)
5-1) Fundamental of organic chemistry and introduction of natural products
5-2) Application of useful natural products to agrochemicals, fragrances, and medicines
6) **Molecular basis of nitrogen metabolism in plants (5/23)**
6-1) Nitrogen uptake and assimilation in plants
6-2) Transcriptional and post-transcriptional regulations of nitrogen metabolism in plants
7) **Molecular eukaryotic microbiology (5/30)**
7-1) Introduction of fermentation
7-2) Microbial production of enzymes, antibiotics, and recombinant proteins

6. Preparation: Textbooks and references will be introduced by each instructor.

7. Record and 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. Masaru ENOMOTO, Masahiko HARATA, Toshihiko HAYAKAWA, Hiroyuki ISHIDA, Jun KANEKO, Tomohisa OGAWA, Takahiro SHINTANI; Associate Profs. Eugene FUTAI, Chihiro HORIGOME, Shinya WADA