Course Outline
Institut Pertanian Bogor - ACICIS' Agriculture Semester Program

Unit name	Basic Food Biochemistry (ITP240)
Department/ Faculty	Food Science and Technology Faculty of Agriculture Technology
Course credit (SKS)	3 (3-0)
Offered in	Odd semester (September-January), second year subject
Pre-requisite	-
Course Coordinator	Maggy T. Suhartono and Puspo Giriwono
Language	Indonesian English ☑ Both

Course description
This course introduces the basic principles of biochemistry and molecular biology in relation with food science and technology, post harvest physiology and food biotechnology.

Learning outcomes
By the end of this course, students are expected to have learned fundamental understandings of biochemistry and molecular biology, which are important to comprehend food characteristics, food enzymology, food bioenergetics as well as food biotechnology. Students will learn particularly:

- identification of cell compartments and macromolecules in foods as well as their roles in biochemical process,
- biochemical process in ATP generating and role of foods,
- basic genetics in relation with food biotechnology.

According to designed core competencies related to biochemistry and human nutrition, students will learn in detail the basic concept of human nutrition and the relationship between the consumption of foods and nutritional status and health; and learn briefly changes of biological function of food components due to food processing and storage.

Indicative assessment

- Group assignments (20%)
- Mid-exam (40%)
- Final exam (40%)

Contact Hours
3 hours lecture and discussion per week for 14 weeks; no laboratory work

Readings

- Nelson, D.L. dan Cox,M.M. 2004. Lehninger Principles of Biochemistry 4th edition. W.H. Freeman, New York.
- Horton,H.R., Moran,L.A., Ochs,R.S., Rawn,J.D., dan Scrimgeour,K.G. 2002. Principles of Biochemistry 3rd ed., Pearson Education International–Prentice Hall. New Jersey.

Materials (subject to change)

Week	Topic	Sub-Topics
1	Course Introduction	• Course rules • What is cognitive levels? • Specific learning outcomes and cognitive levels for each topic
	Cell	• Prokaryotic cells • Eukaryotic cells • Cell compartment and their characteristics
2	Water and Biomolecule	• Polarity and hydrogen bond • Non covalent interactions in biomolecule • Functional groups in biomolecule • Building blocks of biomolecule
3	Amino Acid and Proteins	• Structure and classification of amino acid • Primary, secondary, tertiary and quartenary structure • Protein in action; meat protein and hemoglobin
4, 5	Enzymology and Food Enzymes	• Definition and classification of enzyme • Catalytic mechanism; chymotrypsin • Enzyme activity and kinetics • Michaelis-menten equation • Enzymes in food • Enzymes in food processing
6, 7	DNA, Protein Synthesis and Food Biotechnology	• Nucleic acid and its building block • Replication, transcription and translation • Gene technology • Genetically modified food
8	Thermodynamic in Biochemical Reaction	• Basic terminologies • Redox, free energy and relevant thermodynamic laws • Case study and example
9	Metabolism of Macro-Molecules	• Digestion of macromolecules • Catabolism and anabolism
	Glycolysis	• Steps and pathways of glycolysis • Energy balance • Downstream process • Pyruvate dehydrogenase complex
10	TCA Cycle	• Precursor of tca cycle, fatty acid and protein degradation • Step and pathway • Energy balance
11	Electron Transport Chain	• Compounds in oxidative phosphorylation • Electron transport chain complex • Proton gradient and chemical osmotic theory • Atp generating system
12, 13	Post Harvest and Post Mortem Physiology	• Important reactions in post harvest physiology • Biochemical changes during post harvest • Biochemical changes during post mortem • Implication on quality of food
14	Biochemistry in Food System	• Food system • Case: role of biochemistry in food safety issue • Challenges in tropical region