Module/Course Description

Metabolism (BIK1208)

A. Module Identity		
1.	Name	Metabolism
2.	Code	(BIK1208)
3.	Credit	2 (2-0)
4.	Semester	2
5.	Pre-requisite	-
6.	Coordinator	Prof. Dr. drh. Hasim, DEA
7.	Lecturers	1. Prof. Dr. drh. Hasim, DEA 2. drh. Sulistiyani, MSc. PhD. 3. Dr. Waras Nurcholis, SSi, MSi 4. Dr. Dimas Andrianto, SSi, MSi 5. Dr. Inda Setyawati, STP, MSi 6. Ukhradiya M. Safira P, SSi, MSi
8.	Language	Indonesian
9.	Program(s) in which the course is offered	1. Bachelor of Biochemistry 2. Bachelor of Chemistry 3. Bachelor Program in IPB as Supporting Course (minor course)
10.	Type of teaching	• Traditional classroom: 90 % (Problem/Case-Based Learning) • e-Learning system:10%

B. Workload of course components (total contact hours and credits per semester)

Credit		Contact Hours				Self-study	Other (Group Discussion)	Total
SKS *)	ECTS	Lecture	Exercise	Laboratory	Practice			
2	2.8	28	-	-	-	42	20	90

**) Semester credit unit according to the Indonesian higher educational system*
1 credit unit lecture = 2 hours/week for lecture and 2 hours/ week for self-study within 14 weeks/ semester
1 credit unit class exercise or laboratory or field practice = 3 hours/week within 12-14 weeks/semester
***) 1 hour for lecture= 50 minutes; 1 hour for class exercise or laboratory or field practice = 60 minutes*

C. Module Objective (Learning Outcomes)
Student are able to explain general concepts and principles of bioenergetics in metabolism and the metabolic processes of carbohydrates, lipids, proteins and nucleotides.

D. Detailed Course Learning Outcomes (LO) in Relation to Learning Domains, Teaching Strategies, and Assignment Methods			
No.	**LO in Learning Domains**	**Teaching Strategies**	**Assessment Methods**
a.	**Knowledge**		
1.	Students are able to explain the concepts and principles of bioenergetics and their relationship to metabolic processes in general	lecture, discussion/question-and-answer	Mid-Term Examination
2.	Students are able to explain metabolism of carbohydrate, the process of electron transport in the mitochondria (oxidative phosphorylation)	lecture, discussion/question-and-answer	Mid-Term Examination
3.	Students are able to explain the details of the stages in the process: ● Fatty acid biosynthesis, fatty acid extension and differences between plants and animals ● β-oxidation of palmitic acid and its energy balance ● Ketogenesis ● Synthesis of cholesterol & steroid hormones from cholesterol	Problem/Case-Based Learning (PBL/CBL), group discussion	Final-Term Examination
4.	Students are able to explain the details of the stages in the process: ● Protein turnover pathways, proteolytic enzymes, oxidative and non-oxidative deamination of amino acids, decarboxylation of amino acids, and GS/GOGAT. ● General metabolism of phenylalanine, valine and methionine ● Advanced metabolism of	Problem/Case-Based Learning (PBL/CBL), group discussion	Final-Term Examination

	glucogenic, ketogenic and gluco-ketogenic amino acids ● Urea cycle		
5.	Students are able to explain and describe the biosynthetic pathways of purine and pyrimidine nucleotides (de novo and salvage pathways)	Problem/Case-Based Learning (PBL/CBL), group discussion	Final-Term Examination
b.	**Competences**		
1.	Students are able to explain general basic biochemistry related to mobile processes (biology), chemistry and physics	lecture, discussion/question-and-answer	Mid-Term Examination, Final Examination
2.	Students are able to work in groups, express opinions verbally and in writing	Practice, group and individual work, Discussion	Paper assignment

E. Course Content

List of Topic	Number of Weeks	Contact Hours*
Introduction to Bioenergetics and Metabolism	1	2
Carbohydrate metabolism	6	12
Lipid Metabolism	3	6
Protein Metabolism	3	6
Nucleotide Metabolism	1	2

*not include self-study and discussion outside class

F. Course Assessment

No.	Assessment Type *)	Schedule (Week Due)	Proportion of the Final Mark
1.	Mid-term examination	week 8	25%
2.	Final examination	week 16	25%
3.	Paper Making (PBL/CBL Report) and Presentation	week 4,7,10, and 14	50%

*) Example: mid-term examination, final examination, quiz, homework, project, etc.

G. Media Employed

1. Power Point Presentation
2. Laptop, LCD, microphone, whiteboard, marker, pointer.

H. Learning Resources
1. Nelson DL & Lox MM. 2017. *Lehninger Principles of Biochemistry*. 7th Ed. New York USA: W. H. Freeman and Company. 2. Mc Kee T & Mc Kee JR. 2003. *Biochemistry: The Molecular Basis of Life*. 3rd Ed. New York USA: The McGraw Hill Company, Inc. 3. Related articles (based on Problem/Case given)