Module XX: Impact and Application IIA

1.1. Module Objectives

On completion of this module, the students wil be able to:

- describe the application of microbial knowledge (from cellular up to molecular) in medical, environment, and food industries
- create, formulate, and design the application realted to microbial industries
- interpret the knowledge given in order to solve the problems that related in medical, environment, and industrial
- develope and apply the industrial microbiology kowledge to solve human problems

1.2. Module Data

Person in charge	Dr. Dea Indriani Astuti
Credits	5
Courses	BM 4103 Food Microbiology
	BM 4102 Development of Microbial Product
Module examination	Written test

1.2.1. Sub-module I: Food Microbiology

Lecturer	Dr. Dea Indriani Astuti
Semester	7
Type of submodule / course	Compulsory
Credits	2
Workload - class lecture (hr/sem)	2 hours lectures, 2 hours structured activities, 2 hours individual study, 16 weeks per semester, and total 96 hours a semester
Workload details	Textbook reading assignment, group discussion, paper review, presentation
Classification within the curriculum:	General Studies / Compulsory Course/ Elective Course
Type of examination	Written test
Language	Bahasa Indonesia
Course Target / Outcome	A. Conceptual Knowledge and Competence: - Understand the process of microbial metabolism associated with food processing and food quality - Understand the potential of microbes for the development of food processing technology - Understand the impact of microbes in food damage - Understand the processes and techniques for controlling microorganisms in food B. Scientific Skills:

	- Have scientific thinking patterns and the ability to think creatively to solve problems related to food microbiology - Linking the results of the analysis of food microbiology case studies with the concept of microbiology - Communicate the results of analysts and studies in the form of scientific exposure C. Social Skills: - Able to work together and communicate in teams.
Teaching methods	Interactive Teaching
Contents (SAP)	
1	Microorganisms in food
2	The growth of microorganisms in food
3	The benefits of microorganisms in food
4	Persentation of fermented food
5	Persentation of fermented food
6	Persentation of fermented food
7	Mid-Term Test
8	Food spoilage caused by microorganism
9	"Food borne" diseases
10	Persentation of various diseases caused by microorgaisms in food
11	Persentation of foodborne diseases
12	Persentation of foodborne diseases
13	Microbial control in food
14	HACCP
15	Food industrial visiting
16	Final Test
Literature / Sources	• Jay, J.M. Modern Food Microbiology, 6th ed. 2000. APAC Publ. Singapore • Ray, B. 1996. Fundamental Food Microbiology. CRC Press LLC, USA. • Yousef, A.E. and C. Carlstrom. Food Microbiology: A Laboratory Manual. 2003. John Wiley and Sons, USA.
Other specialties	

1.2.2. Sub-module II: Development of microbial-based product

Lecturer	Dr. Gede Suantika/ Dr. Nyoman P. Aryantha/ Dr. Dea Indriani Astuti
Semester	7
Type of submodule / course	Compulsory

Credits	3
Workload - class lecture (hr/sem)	3 hours lectures, 3 hours structured activities, 3 hours individual study, 16 weeks per semester, and total 144 hours a semester
Workload details	Textbook reading assignment, group discussion, paper review, presentation
Classification within the curriculum:	General Studies / Compulsory Course/ Elective Course
Type of examination	Written
Language	Bahasa Indonesia
Course Target / Outcome	A. <u>Conceptual Knowledge and Competence:</u> - Understand the concept and application of microbiological processes that are used as a basis for developing microbiology-based products in the food, health, energy and environment sectors. - Select and optimize the microbiological processes that underlie product development - Understand the basic principles of developing microorganism-based products - Understand and identify parameters in the development and production process - Determine product standards - Consider good product design - Analyze market needs for microorganism-based products B. <u>Scientific Skill:</u> - Possess the ability of scientific thinking skill and understand the quantitative and qualitative data related to developing process of microorganism-based products - Create or develop microorganism-based product innovations - Record the innovation development ideas of microorganism-based product - Evaluate the quality and quantity of microorganism-based products that are produced C. <u>Social Skills:</u> - Explain the results of creating microorganism-based products properly - Understand the application of microorganism-based products for the benefit of society
Teaching methods	Interactive Teaching

Contents (SAP)	
1	The knowledge of microbial-based product
2	Basic Pricipals of microbiology in life-based product development
3	Microbial role in product development
4	Microbial role in product development
5	Microbiology process control in production
6	Microbiology process control in production
7	Mid-Term Test
8	Introduction of raw materials in production process
9	Development of food product
10	Development and production of fine chemicals
11	Development and production of energy
12	Development of environmental product
13	Product persentation
14	Product persentation
15	Product persentation
16	Final Test
Literature / Sources	• Shimasaki, C. D. (2009) The Bussines of Bioscience : What Goes Into Making a Biotechnology Product. Springer • Okafor, Nduka. 2017. Modern Industrial Microbiology and Biotechnology, Second Ed. Science Publishers.Rittman, B. E., Mc Carty, P.L. (2010) Enviromental Biotechnology Bisen, P.S., Debnath, M., Prasad, G.B.K.S. 2012. Microorganismss: Concepts and Applications. Wiley-Blackwell • Behera, B.K. and Varma A. 2017. Microbial Biomass Process Technologies and Management. Springer
Other specialties	