

**SEMESTER COURSE OUTLINE
& LESSON PLANS
FIRST SEMESTER
2023/2024**



Agricultural Microbiology Major
Department of Agricultural Microbiology

Postharvest Microbiology

PNM20193117

Team Teaching:

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**UNIVERSITAS GADJAH MADA
FACULTY OF AGRICULTURE
2023**

		Universitas Gadjah Mada Faculty of Agriculture Department of Agricultural Microbiology First Semester of 2023/2024				Document Code:
RENCANA PROGRAM DAN KEGIATAN PEMBELAJARAN SEMESTER (RPKPS) SEMESTER COURSE OUTLINE & LESSON PLANS						
Kode Mata Kuliah Course Code	Nama Mata Kuliah Course Name	Bobot (sks) Credits		Semester Semester	Status Mata Kuliah Course Status	Mata Kuliah Prasyarat Prerequisite courses
PNM20193117	Mikrobiologi Pasca panen Postharvest Microbiology	T: 2	P: 1	I	Pilihan Elective	Biologi Mikroorganisme, Mikrobiologi Agroindustri Biology of Microorganisms, Agroindustrial Microbiology
Deskripsi Singkat Mata Kuliah Course Overview	Mata Kuliah ini merupakan mata kuliah yang ditujukan bagi mahasiswa dari program studi Mikrobiologi Pertanian, Fakultas Pertanian. Mata kuliah ini membahas mengenai berbagai kegiatan pasca-panen dan metode pengolahan berbagai produk pertanian yang melibatkan mikrobiologi. Pada mata kuliah ini juga terdapat praktikum dimana mahasiswa akan melakukan berbagai kegiatan pengolahan dan pengelolaan bahan baku pertanian dengan memanfaatkan mikroorganisme. This course is a course for students from the Agricultural Microbiology study program, Faculty of Agriculture. This course discusses various post-harvest activities and methods of processing various agricultural products involving microbiology. In this lecture there is also lab work where students will conduct various activities of processing and management of agricultural raw materials by utilizing microorganisms.					
Capaian Pembelajaran Lulusan (CPL) Program Learning Outcome (PLO)	CPL1 PLO1	Mampu menerangkan konsep teoritis mengenai teknologi produksi tanaman dengan memperhatikan aspek ekonomi dan sosial-humaniora untuk mencapai pertanian yang berkualitas, berkelanjutan, dan menguntungkan (profitable). (P1) Able to explain theoretical concepts regarding plant production technology by giving attention to economic and social-humanitarian aspects to achieve quality, sustainable and profitable agriculture. (K1)				
	CPL2 PLO2	Mampu mengidentifikasi, merancang, melaksanakan, serta dapat memecahkan masalah yang timbul dalam pelaksanaan usaha pertanian. (KK1) Able to identify, design, implement, and solve problems that arise in the implementation of agricultural businesses. (S1)				
	CPL3	Mampu memilih, memanfaatkan, dan mengelola potensi mikroba dan mikrobioma untuk membangun sistem industri dan pertanian. (KK3)				

	PLO3	<i>Able to select, utilize and manage the potential of microbes and microbiomes to build industrial and agricultural systems. (S3)</i>		
Capaian Pembelajaran Mata Kuliah (CPMK) <i>Course Learning Outcomes (CLO)</i>	Setelah menyelesaikan pembelajaran mata kuliah ini, mahasiswa diharapkan mampu: <i>After completing this course, students are expected to able:</i>			
	CPMK1	Mahasiswa mampu menguraikan peranan mikroorganisme dalam industri pangan [CPL 1]		
	CLO1	<i>Students are able to explain the roles and utilization of microorganisms in the food industry. [PLO 1] K1</i>		
	CPMK2	Mahasiswa memiliki keterampilan untuk melakukan pengolahan dan memproduksi hasil pertanian dengan memanfaatkan mikrobia [CPL 2]		
	CLO2	<i>Skillful in processing and producing agricultural products by utilizing microbial [PLO 2] S1</i>		
	CPMK 3	Mahasiswa mampu melakukan pengendalian dan analisis mikrobia dalam olahan pangan [CPL 3]		
	CLO3	<i>Students are capable of controlling and analyzing microbes in food processing. [PLO 3] S3</i>		
Kaitan CPMK dengan Materi dan Bentuk Pembelajaran, serta Alokasi Waktu <i>Correlation among CLO, the material, learning method, and estimated time</i>		Materi Pembelajaran <i>Course Materials</i>	Bentuk Pembelajaran (Luring/Daring) <i>Course Method (Offline/Online)</i>	Alokasi Waktu <i>Estimated Time</i>
	CPMK1	1. Pendahuluan	Kuliah Interaktif	2 x 50 menit kuliah sinkron
	CLO1	<i>1. Introduction</i>	<i>Interactive lectures</i>	<i>2 x 50 minutes of synchronous lectures</i>
	CPMK1	2. Mikrobia didalam Pangan dan Sumber Asalnya	Kuliah Interaktif	2 x 50 menit kuliah sinkron
	CLO1	<i>2. Microbes in food and their sources of origin</i>	<i>Interactive lectures</i>	<i>2 x 50 minutes of synchronous lectures</i>
	CPMK3	3. Pertumbuhan Mikrobia dan Faktor-faktor yang Mempengaruhi Pertumbuhannya pada Pangan	Kuliah Interaktif dan tugas individu	2 x 50 menit kuliah sinkron
	CLO3	<i>3. Microbial growth and factors that affect their growth in food</i>	<i>Interactive lectures and individual assignment</i>	Pengumpulan tugas individu tentang faktor yang mempengaruhi pertumbuhan mikrobia

				<i>2 x 50 minutes of synchronous lectures</i> <i>Submittal of individual assignment</i>
	CPMK3 CLO3	4. <i>Penyakit yang Disebabkan oleh Mikrobia Terikut Pangan</i> 4. <i>Diseases caused by foodborne microbes</i>	Kuliah Interaktif dan diskusi kasus <i>Interactive lectures and case-based learning (discussion)</i>	2 x 40 menit kuliah sinkron 20 menit studi kasus <i>2 x 40 minutes of synchronous lectures</i> <i>20 minutes of case study</i>
	CPMK3 CLO3	5. Kerusakan Pangan yang Disebabkan Mikrobia 5. <i>Food damage caused by microbes</i>	Kuliah Interaktif dan kuis <i>Interactive lectures and quizzes</i>	2 x 50 menit kuliah sinkron <i>2 x 50 minutes of synchronous lectures</i>
	CPMK3 CLO3	6. Pengendalian Mikrobia dalam Pangan I 6. <i>Microbial control in food I</i>	Kuliah Interaktif <i>Interactive lectures</i>	2 x 50 menit kuliah sinkron <i>2 x 50 minutes of synchronous lectures</i>
	CPMK3 CLO3	7. Pengendalian Mikrobia dalam Pangan II 7. <i>Microbial control in food II</i>	Kuliah Interaktif dan Tugas Individu <i>Interactive lectures and individual assignment</i>	2 x 50 menit kuliah sinkron Pengumpulan tugas individu mengenai metode pengendalian mikrobia dalam pangan

				2 x 50 minutes of synchronous lectures Collecting individual assignment about methods of controlling microbes in foods
UTS/Hasil Tugas Project/Hasil Analisis Kasus Mid Exam/Project Assignment Result/Case Analysis Result				
CPMK2 CLO2	8. Pemanfaatan Mikrobia dalam Pangan I 8. Utilization of microbes in food I	Kuliah Interaktif dan Tugas kelompok Praktik analisis mikrobiologi, fermentasi dan pengolahan makanan berbasis mikrobia dilakukan dalam praktikum Interactive lectures and group assignment The practice of microbiological analysis, fermentation and microbial-based food processing conducted in the lab work	2 x 40 menit kuliah sinkron 20 menit presentasi kelompok mengenai panganan fermentasi 2 x 50 menit praktik laboratorium 2 x 40 minutes of synchronous lectures 20 minutes of group presentation about fermented foods 2 x 50 minutes of laboratory practice	
CPMK2 CLO2	9. Pemanfaatan Mikrobia dalam Pangan II	Kuliah Interaktif dan Tugas kelompok	2 x 40 menit kuliah sinkron	

		9. <i>Utilization of microbes in food II</i>	Praktik analisis mikrobiologi, fermentasi dan pengolahan makanan berbasis mikrobia dilakukan dalam praktikum <i>Interactive lectures and group assignment</i> <i>The practice of microbiological analysis, fermentation and microbial-based food processing conducted in the lab work</i>	20 menit presentasi kelompok mengenai panganan fermentasi 2 x 50 menit praktik laboratorium <i>2 x 40 minutes of synchronous lectures</i> <i>20 minutes of group presentation about fermented foods</i> <i>2 x 50 minutes of laboratory practice</i>
	CPMK2 CLO2	10. Pemanfaatan Mikrobia dalam Pangan III <i>10. Utilization of microbes in food I</i>	Kuliah Interaktif dan Tugas kelompok Praktik analisis mikrobiologi, fermentasi dan pengolahan makanan berbasis mikrobia dilakukan dalam praktikum <i>Interactive lectures and group assignment</i> <i>The practice of microbiological analysis, fermentation and microbial-based food processing conducted in the lab work</i>	2 x 40 menit kuliah sinkron 20 menit presentasi kelompok mengenai panganan fermentasi 2 x 50 menit praktik laboratorium <i>2 x 40 minutes of synchronous lectures</i> <i>20 minutes of group presentation</i>

				<i>about fermented foods</i> <i>2 x 50 minutes of laboratory practice</i>
	CPMK3 CLO3	11. Kualitas Mikrobiologis Pangan <i>11. Microbiological Quality of Food</i>	Kuliah Interaktif Praktik analisis mikrobiologi, fermentasi dan pengolahan makanan berbasis mikrobia dilakukan dalam praktikum <i>Interactive lectures and group assignment</i> <i>The practice of microbiological analysis, fermentation and microbial-based food processing conducted in the lab work</i>	2 x 50 menit kuliah sinkron 2 x 50 menit praktik laboratorium <i>2 x 50 minutes of synchronous lectures</i> <i>2 x 50 minutes of laboratory practice</i>
	CPMK3 CLO3	12. Keamanan Pangan <i>12. Food Safety</i>	Kuliah Interaktif Praktik analisis mikrobiologi, fermentasi dan pengolahan makanan berbasis mikrobia dilakukan dalam praktikum <i>Interactive lectures and group assignment</i> <i>The practice of microbiological analysis, fermentation and microbial-based food processing conducted in the lab work</i>	2 x 50 menit kuliah sinkron 2 x 50 menit praktik laboratorium <i>2 x 50 minutes of synchronous lectures</i> <i>2 x 50 minutes of laboratory practice</i>
	UAS/ Hasil Tugas Project/Hasil Analisis Kasus Final Exam/Project Case Result/Special Case Analysis Result			

Metode Pembelajaran <i>Learning methods</i>	SCL: Case based and Project Based Learning					
Pengalaman Belajar Mahasiswa <i>Student Learning Experience</i>	Saat Sinkron : Melakukan diskusi terkait dengan topik kuliah serta kaitan dan potensi penerapannya dalam bidang mikrobiologi pertanian atau pertanian secara umum Saat Asinkron: 1. Mendapatkan informasi mengenai metode analisis serta pengolahan berbagai produk pertanian dengan memanfaatkan mikrobial 2. Memperoleh pengalaman dalam kerja sama tim melalui tugas kelompok 3. Mendapatkan teknik mengenai cara mempresentasikan data melalui tugas presentasi <i>Synchronous: Conducting discussions related to lecture topics and their relation and potential application in the field of agricultural microbiology or agriculture in general</i> <i>Asynchronous:</i> 1. Obtain information about the method of analysis and processing of various agricultural products by utilizing microbial 2. Gain experience in teamwork through group assignments 3. Get techniques on how to present data through presentation assignments					
Akses Media Pembelajaran / LMS dan Persentase Luring & Daring <i>Learning Media and Course Method Percentage</i>	https://elok.ugm.ac.id Luring 100% Offline 100%					
Metode Penilaian dan Keselarasan dengan CPMK <i>Assessment Plan and Relations with the CLOs</i>	Basis Evaluasi <i>Evaluation Basis</i>	Komponen Evaluasi <i>Evaluation Components</i>	Bobot <i>Percentage</i>	CPMK 1 <i>CLO 1</i>	CPMK 2 <i>CLO 2</i>	CPMK 3 <i>CLO 3</i>
	A. Aktivitas Partisipatif*) <i>Participatory Activity</i>	Tugas Presentasi Kelompok <i>Group Presentation Assignment</i>	10%		v	
		Tugas Individu <i>Individual Assignment</i>	10%			v

	B. Hasil <i>Project</i>/Hasil Studi Kasus/ Hasil PBL *) <i>Project Results/Case Study Results</i>	Praktikum <i>Practicum</i>	30%			v
	C. Kognitif <i>Cognitive</i>	UTS <i>Mid Exam</i>	25%	v		
		UAS <i>Final Exam</i>	25%		v	
		Total	100%			
) Sesuai IKU 7, jumlah persentase aktivitas partisipatif (A) dan hasil project/studi kasus/hasil PBL (B) adalah minimal 50%. <i>) In accordance with IKU 7, the total percentage of participatory activities (A) and project results/case studies/PBL results (B) is at least 50%.</i>						
Daftar Referensi <i>References</i>	Utama (<i>Main References</i>): - Bevilacqua, A., Corbo, M.R., and Sinigaglia, M. 2017. The Microbiological Quality of Food. Woodhead Publishing. London, UK. - Erkmen, O. And Bozoglu, T.F. 2016. Food microbiology : principles into practice. John Wiley & Sons, Ltd. - Ray, B. and Bhunia, A. 2014. Fundamental Food Microbiology 5th Edition. CRC Press, New York, USA. - Adams, M.R. and Moss, M.O. 2008. Food Microbiology 3rd Edition. RSC Publishing, Cambridge, UK. - Jay, J.M., Lossner, M.J., and Golden, D.A. 2005. Modern Food Microbiology 7th Edition. Springer, New York, USA. - Roberts, D. and Greenwood, M. 2003. Practical Food Microbiology 3rd Edition. Blackwell Publishing, Massachusetts, USA. Tambahan (<i>Additional References</i>): Mulyono, K. K., D. Widiyanto, T. D. Wahyuningsih, R. Pratiwi, and W. Widodo. 2021. Assessing the survival and ability of Lactobacillus strains in coconut neera to bolster its suitability as a functional beverage after storage. Food Research 5:220-225. - Buku Praktikum Mikrobiologi Pasca Panen - Video interaktif mengenai produksi pasca panen di YouTube <i>1. Post-Harvest Microbiology Practical Book</i> <i>2. Interactive video on post-harvest prdouction on YouTube</i>					
Nama Dosen Pengampu <i>(Team Teaching)</i>	- Ir. Donny Widiyanto, Ph.D. - Prof. Ir. Triwibowo Yuwono, Ph.D. - Dr. Ir. Sri Wedhastri, M.S.					

Otorisasi <i>Authorization</i>	Tanggal Penyusunan <i>Date of Authorization</i>	Koordinator Mata Kuliah <i>Course Coordinator</i>	Koordinator Bidang Keahlian (Jika Ada) <i>Expertise Coordinator (if any)</i>	Ketua Program Studi <i>Head of the Study Program</i>
	August 20 th 2023	Ir. Donny Widiyanto, Ph.D.	Tanda Tangan Nama Terang	Ir. Ngadiman, M.Si., Ph.D.