RENCANA PROGRAM DAN KEGIATAN PEMBELAJARAN SEMESTER (RPKPS)
COURSE SYLLABUS
SEMESTER GANJIL (*ODD*)
2024/2025

Master in Food Science and Technology

Department of Food and Agricultural Products Technology

Praktikum Gizi Eksperimental

Experimental Nutrition - Laboratory Practice

TPTP215127 (2 SKS)

Dosen Pengampu/*Lecturers*:

Dr. Ir. Priyanto Triwitono, M.P.

Yunika Mayangsari, S.Si., M.Biotech., Ph.D.

Wahyu Dwi Saputra, S.T.P., M.Agr.Sc., Ph.D.

Dr. Zaki Utama, S.T.P., M.P.

UNIVERSITAS GADJAH MADA

FACULTY OF AGRICULTURAL TECHNOLOGY

2024

	Universitas Gadjah Mada Faculty of Agricultural Technology Department of Food and Agricultural Products Technology Master in Food Science and Technology Odd Semester 2024/2025	**Kode Dokumen** (*Document code*): …

RENCANA PROGRAM DAN KEGIATAN PEMBELAJARAN SEMESTER (RPKPS) (*COURSE SYLLABUS*)

Kode Mata Kuliah (*Course Number*)	**Nama Mata Kuliah** *(Course Title)*	**Bobot** (*Credits*)		**Semester** (*Semester*)	**Status Mata Kuliah** (*Course Status*)	**Mata Kuliah Prasyarat** (*Prerequisite Courses*)
TPTP215127	Praktikum Gizi Eksperimental (*Experimental Nutrition - Laboratory Practice)*	T: 2	P: -	Gasal *(Odd)*	Pilihan *(Elective)*	-

Deskripsi Singkat Mata Kuliah (*Short Course Description*)	Praktikum Gizi Eksperimental adalah mata kuliah berbasis praktik laboratorium yang dirancang untuk membekali mahasiswa magister dengan kompetensi tingkat lanjut dalam merancang, melakukan, menganalisis, dan mengevaluasi secara kritis studi gizi eksperimental menggunakan model hewan dan in vitro. Mata kuliah ini mengintegrasikan desain eksperimental, pertimbangan etika, formulasi diet, penanganan hewan, teknik pengambilan sampel, analisis data, dan pelaporan ilmiah, dengan penekanan kuat pada pembelajaran berbasis masalah dan kemajuan penelitian terkini. Statistik untuk gizi eksperimental diimplementasikan dalam pekerjaan praktis ini seperti desain eksperimen, dan analisis statistik tingkat lanjut (ANOVA, model campuran, atau analisis multivariat). Mata kuliah ini berkontribusi pada SDG 4 - Pendidikan berkualitas dengan menerapkan literasi ilmiah dan penyebaran pengetahuan yang efektif dan berpotensi berkontribusi pada SDG - 2 Tanpa kelaparan dengan menilai kualitas gizi dan intervensi diet berbasis bukti, SDG - 3 Kesehatan dan kesejahteraan yang baik untuk strategi gizi yang meningkatkan kesehatan, SDG - 9 Industri, inovasi, dan infrastruktur melalui penelitian nutrisi berbasis data, dan ilmu translasional, serta SDG - 12 Konsumsi dan produksi yang bertanggung jawab dengan mempelajari etika penggunaan hewan. Penggunaan AI mencakup riset literatur yang dibantu AI dan perbandingan dengan riset sebelumnya. Analisis statistik tingkat lanjut diimplementasikan untuk mengevaluasi data yang dihasilkan melalui kerja laboratorium praktis. *(Experimental Nutrition - Laboratory practice is a laboratory-based course designed to equip graduate students with advanced competencies in designing, conducting, analyzing, and critically evaluating experimental nutrition studies using animal and in vitro models. The course integrates experimental design, ethical considerations, diet formulation, animal handling, sampling techniques, data analysis, and scientific reporting, with strong emphasis on problem-based learning and recent research advances. Statistics for experimental nutrition is implemented in this practical work such as experimental design, and advanced statistical analysis (ANOVA, mixed models, or multivariate analysis).* *This course contributes to SDG 4 - Quality education by implementing scientific literacy and effective knowledge dissemination and potentially contributes to SDG - 2 Zero hunger by*

	assessing nutrition quality and evidence-based dietary interventions, SDG - 3 Good health and well-being for health-promoting nutrition strategies, SDG - 9 Industry, innovation, and infrastructure through data-driven nutrition research, and translational science, as well as SDG - 12 Responsible consumption and production by learning animal use ethics. The use of AI includes AI assisted-literature research and comparison with previous findings. Advance statistical analysis is implemented to evaluate the data generated through practical laboratory work.)			
Capaian Pembelajaran Lulusan yang Dibebankan pada MK (*Program Learning Outcomes (PLO) Assigned to the Course*)	**CPL 5** (*PLO 5*)	Mampu menerapkan pendekatan ilmiah untuk memecahkan masalah melalui pengukuran variabel yang tepat, mengumpulkan data yang valid, menginterpretasikan data, dan menghubungkannya dengan pemecahan masalah dalam penelitian *(Able to take a scientific approach to solve problems through the measurement of appropriate variables, to collect valid data, to interprete the data, and relate it to research problem-solving)*		
Capaian Pembelajaran Mata Kuliah (CPMK) (*Course Learning Outcomes (CLO)*)	**Setelah menyelesaikan pembelajaran mata kuliah ini, mahasiswa diharapkan mampu:** *(After completing this course, students are expected to be able to:)*			
	CPMK 5.1 *(CLO 5.1)*	Mampu menerapkan pendekatan ilmiah untuk memecahkan masalah melalui pengukuran variabel yang tepat [CPL 5] *(Able to take a scientific approach to solve problem through the measurement of appropriate variables [PLO 5])*		
	CPMK 5.3 *(CLO 5.3)*	Mampu mengumpulkan data yang valid dari eksperimen [CPL 5] *(Able to collect valid data from the experiments [PLO 5])*		
Kaitan CPMK dengan Materi dan Bentuk Pembelajaran, serta Alokasi Waktu (*CLO Relation to Learning Material, Learning Forms, and Time Allocation*)		**Learning Materials**	**Forms of Learning**	**Time Allocation**
	CPMK 5.1 *(CLO 5.1)*	1. Pendahuluan *(Introduction)*	- Kuliah (*Lecture*) - Diskusi Interaktif (*Interactive Discussion*)	**1 pertemuan** *1 meeting* **Masing-masing terdiri dari:** *Each meeting consists of:* 2x50 menit sinkronus *(2x50 minutes synchronous)* 2x60 menit penugasan terstruktur (*2x60 minutes of structured assignments*) 2x60 kegiatan mandiri

				(*2x60 minutes of independent study*)
	CPMK 5.1 *(CLO 5.1)*	2. Desain penelitian dengan hewan coba/Persetujuan etik *(Research Design with Laboratory Animals/Ethical Clearance)*	- Kuliah (*Lecture*) - Diskusi Interaktif (*Interactive Discussion*)	**1 pertemuan** *1 meeting* **Masing-masing terdiri dari:** *Each meeting consists of:* 2x50 menit sinkronus *(2x50 minutes synchronous)* 2x60 menit penugasan terstruktur (*2x60 minutes of structured assignments*) 2x60 kegiatan mandiri (*2x60 minutes of independent study*)
	CPMK 5.1 *(CLO 5.1)*	3. Pemilihan hewan coba *(Selection of Laboratory Animals)*	- Kuliah (*Lecture*) - Diskusi Interaktif (*Interactive Discussion*)	**1 pertemuan** *1 meeting* **Masing-masing terdiri dari:** *Each meeting consists of:* 2x50 menit sinkronus *(2x50 minutes synchronous)* 2x60 menit penugasan terstruktur (*2x60 minutes of structured assignments*)

				2x60 kegiatan mandiri (*2x60 minutes of independent study*)
	CPMK 5.1 *(CLO 5.1)*	4. Manajemen riset dengan hewan coba *(Research Management with Experimental Animals)*	- Kuliah (*Lecture*) - Diskusi Interaktif (*Interactive Discussion*)	**1 pertemuan** *1 meeting* **Masing-masing terdiri dari:** *Each meeting consists of:* 2x50 menit sinkronus *(2x50 minutes synchronous)* 2x60 menit penugasan terstruktur (*2x60 minutes of structured assignments*) 2x60 kegiatan mandiri (*2x60 minutes of independent study*)
	CPMK 5.1 *(CLO 5.1)*	5. Diet dan formulasi diet hewan coba *(Diet and Experimental Animal Diet Formulation)*	- Kuliah (*Lecture*) - Diskusi Interaktif (*Interactive Discussion*)	**1 pertemuan** *1 meeting* **Masing-masing terdiri dari:** *Each meeting consists of:* 2x50 menit sinkronus *(2x50 minutes synchronous)* 2x60 menit penugasan terstruktur

				(*2x60 minutes of structured assignments*) 2x60 kegiatan mandiri (*2x60 minutes of independent study*)
	CPMK 5.1 *(CLO 5.1)*	6. Anestesi dan pengambilan sampel spesimen *(Anesthesia and Specimen Sampling)*	- Kuliah (*Lecture*) - Diskusi Interaktif (*Interactive Discussion*)	**1 pertemuan** *1 meeting* **Masing-masing terdiri dari:** *Each meeting consists of:* 2x50 menit sinkronus *(2x50 minutes synchronous)* 2x60 menit penugasan terstruktur (*2x60 minutes of structured assignments*) 2x60 kegiatan mandiri (*2x60 minutes of independent study*)
	CPMK 5.1 *(CLO 5.1)*	7. Rencana praktikum *(Practical Plan)*	- Kuliah (*Lecture*) - Diskusi Interaktif (*Interactive Discussion*)	**1 pertemuan** *1 meeting* **Masing-masing terdiri dari:** *Each meeting consists of:* 2x50 menit sinkronus *(2x50 minutes synchronous)*

				2x60 menit penugasan terstruktur (*2x60 minutes of structured assignments*) 2x60 kegiatan mandiri (*2x60 minutes of independent study*)
		Ujian Tengah Semester / Hasil Tugas Proyek / Studi Kasus *Midterm Exam/Project Results/Case Study Results*		
	CPMK 5.1 *(CLO 5.1)* **CPMK 5.3** *(CLO 5.3)*	8. Praktikum: penyusunan grup dan desain *(Laboratory practice: Group Arrangement, Design)*	● Pembelajaran berkelompok *(Team work)* ● Praktik Laboratorium *(Laboratory work)* ● Diskusi *(Discussion)*	**1 pertemuan** *1 meeting* **Masing-masing terdiri dari:** *Each meeting consists of:* 2x50 menit sinkronus *(2x50 minutes synchronous)* 2x60 menit penugasan terstruktur (*2x60 minutes of structured assignments*) 2x60 kegiatan mandiri (*2x60 minutes of independent study*)
	CPMK 5.1 *(CLO 5.1)* **CPMK 5.3** *(CLO 5.3)*	9. Prakrikum: Formulasi dan preparasi diet/pakan *(Laboratory practice: Formulation and preparation of diet/feed)*	● Pembelajaran berkelompok *(Team work)* ● Praktik Laboratorium *(Laboratory work)* ● Diskusi *(Discussion)*	**1 pertemuan** *1 meeting* **Masing-masing terdiri dari:** *Each meeting consists of:*

				2x50 menit sinkronus *(2x50 minutes synchronous)* 2x60 menit penugasan terstruktur (*2x60 minutes of structured assignments*) 2x60 kegiatan mandiri (*2x60 minutes of independent study*)
	CPMK 5.1 *(CLO 5.1)* **CPMK 5.3** *(CLO 5.3)*	10. Persiapan hewan coba dan analisis pendahuluan *(Experimental Animal Maintenance and Preliminary Analysis)*	● Pembelajaran berkelompok *(Team work)* ● Praktik Laboratorium *(Laboratory work)* ● Diskusi *(Discussion)*	**1 pertemuan** *1 meeting* **Masing-masing terdiri dari:** *Each meeting consists of:* 2x50 menit sinkronus *(2x50 minutes synchronous)* 2x60 menit penugasan terstruktur (*2x60 minutes of structured assignments*) 2x60 kegiatan mandiri (*2x60 minutes of independent study*)
	CPMK 5.1 *(CLO 5.1)* **CPMK 5.3** *(CLO 5.3)*	11. Analisis akhir *(Final Analysis)*	● Pembelajaran berkelompok *(Team work)* ● Praktik Laboratorium	**1 pertemuan** *1 meeting* **Masing-masing terdiri dari:**

			(Laboratory work) ● Diskusi *(Discussion)*	*Each meeting consists of:* 2x50 menit sinkronus *(2x50 minutes synchronous)* 2x60 menit penugasan terstruktur (*2x60 minutes of structured assignments*) 2x60 kegiatan mandiri (*2x60 minutes of independent study*)
	CPMK 5.1 *(CLO 5.1)* **CPMK 5.3** *(CLO 5.3)*	12. Diskusi hasil data laboratorium *(Final Lab Results Discussion)*	● Pembelajaran berkelompok *(Team work)* ● Praktik Laboratorium *(Laboratory work)* ● Diskusi *(Discussion)*	**1 pertemuan** *1 meeting* **Masing-masing terdiri dari:** *Each meeting consists of:* 2x50 menit sinkronus *(2x50 minutes synchronous)* 2x60 menit penugasan terstruktur (*2x60 minutes of structured assignments*) 2x60 kegiatan mandiri (*2x60 minutes of independent study*)
	CPMK 5.1 *(CLO 5.1)* **CPMK 5.3**	13. Penulisan laporan *(Report Writing)*	● Pembelajaran berkelompok *(Team work)*	**1 pertemuan** *1 meeting*

	(CLO 5.3)		● Diskusi *(Discussion)*	**Masing-masing terdiri dari:** *Each meeting consists of:* 2x50 menit sinkronus *(2x50 minutes synchronous)* 2x60 menit penugasan terstruktur (*2x60 minutes of structured assignments*) 2x60 kegiatan mandiri (*2x60 minutes of independent study*)
	CPMK 5.1 *(CLO 5.1)* **CPMK 5.3** *(CLO 5.3)*	14. Pengumpulan laporan *(Report Submission)*	● Pembelajaran berkelompok *(Team work)* ● Diskusi *(Discussion)*	**1 pertemuan** *1 meeting* **Masing-masing terdiri dari:** *Each meeting consists of:* 2x50 menit sinkronus *(2x50 minutes synchronous)* 2x60 menit penugasan terstruktur (*2x60 minutes of structured assignments*) 2x60 kegiatan mandiri (*2x60 minutes of independent study*)
		Ujian Akhir Semester / Hasil Tugas Proyek / Studi Kasus		

		Final Exam/Project Results/Case Study Results
Metode Pembelajaran (*Learning Methods*)	Presentasi, Tanya jawab, dan Studi Kasus *(Presentation, Q&A, and Case Study)*	
Beban kerja *(Workload)*	Total beban kerja adalah 96 jam per semester, terdiri dari 75 jam kerja praktikum, dan 21 jam untuk bimbingan, diskusi, dan laporan. *(The total workload is 96 hours per semester, consisting of 75 hours practical labwork, and 21 hours for assistance, discussion, and report.)* Perhitungan beban kerja untuk satu semester: (*Workload calculation for one semester)* Workload untuk kerja praktikum: = 75 jam ÷ 26 jam/ECTS = 2,9 ECTS/semester *(Workload for practical work:* *= 75 hours ÷ 26 hours/ECTS* *= 2.9 ECTS/semester)* Workload untuk bimbingan, diskusi, dan laporan: = 21 jam ÷ 26 jam/ECTS = 0,8 ECTS per semester *(Workload for assistance, discussion, and report:* *= 21 hours ÷ 26 hours/ECTS* *= 0.8 ECTS/semester)* *Total Workload = 3.7 ECTS/semester* Catatan (*Notes*): 1 ECTS setara dengan 25-30 jam kerja, dengan 26 jam ditetapkan sebagai standar minimum. *(1 ECTS is equivalent to 25-30 hours of work, with 26 hours set as the minimum standard.)*	
Pengalaman Belajar Mahasiswa (*Students Activities*)	**Sesi Sinkron** (*During Synchronous Sessions*): ● Aktif dalam praktikum dan diskusi. *Active practice and discussion.* **Sesi Asinkron/Mandiri/Penugasan Terstruktur** (*During Asynchronous/Self-Study/Structured Assignments*): ● Penyusunan laporan praktikum *Preparation of practical reports*	
Akses Media Pembelajaran/ LMS dan Persentase Luring & Daring	https://elok.ugm.ac.id https://simaster.ugm.ac.id/ Luring (*Offline*): 100% Daring (*Online*): 0%	

(*Learning Media Access/LMS and Offline & Online Percentage*)								
Metode Penilaian dan Keselarasan dengan CPMK (*Assessment Method for Each Course Learning Outcomes*)	**Basis Evaluasi** (*Evaluation Basis*)	**Komponen Evaluasi** (*Evaluation Component*)	**Bobot** (*Percentage*)	**CLO 5.1**	**CLO 5.3**			
	A. Aktivitas Partisipatif[*)] *Participatory Activities*	**Penugasan Terstruktur** *Structured Assignment*	30%	V	V			
	B. Hasil Project/Hasil Studi Kasus/ Hasil PBL[*)] *Project Results/Case Study Results/PBL Results*	**Ujian Praktik** *Practical exam*						
	C. Kognitif *Cognitive*	***Skill-based Assessment* (SBA)**						
		Kuis *Quiz*						
		UTS *Midterm Exam*	35%	V	V			
		UAS *Final Exam*	35%	V	V			
		Total	**100%**					
Daftar Referensi (*Reference*)	Kumar, S., Rajput, M. K., Yadav, P.K. (2021). Book Chapter: Laboratory Animal Nutrition in Essentials of Laboratory Animal Science: Principles and Practices. Ed: Nagarajan, P., Gudde, R., Srinivasan, R. Springer Nature Singapore. https://doi.org/10.1007/978-981-16-0987-9 Baker, D.H.. (2008). Animal Models in Nutrition Research., The Journal of Nutrition, 138: 391-396. Bogdanske, J. J., Hubbard-Van Stelle, S., Rankin Riley, M., Schiffman, B. M. (2021). Laboratory Mouse and Laboratory Rat Procedural Techniques: Manuals and DVDs. United States: Taylor & Francis. Hau, J., Schapiro, S. J (Ed). (2021). Handbook of Laboratory Animal Science: Essential Principles and Practices. United States: CRC Press. Percie du Sert N, Hurst V, Ahluwalia A, Alam S, Avey MT, Baker M, et al. (2020) The ARRIVE guidelines 2.0: Updated guidelines for reporting animal research. PLoS Biol 18(7): e3000410. https://doi.org/10.1371/journal.pbio.3000410 Mayangsari, Y., Sugimachi, N., Xu, W., Mano, C., Tanaka, Y., Ueda, O., Sakuta, T., Suzuki, Y., Yamamoto, Y., & Suzuki, T. (2021). 3,5,7,3′,4′-Pentamethoxyflavone Enhances the Barrier Function through Transcriptional Regulation of the Tight Junction in Human Intestinal Caco-2 Cells. J. Agric. Food Chem. 2021, 69, 35, 10174–10183. https://doi.org/10.1021/acs.jafc.1c04295.							

<table>
<tr><td></td><td colspan="4">Mayangsari, Y., Okudaira, M., Mano, C., Tanaka, Y., Ueda, O., Sakuta, T., Suzuki, Y., Yamamoto, Y., & Suzuki T. (2021). 5,7-Dimethoxyflavone enhances barrier function by increasing occludin and reducing claudin-2 in human intestinal Caco-2 cells. Journal of Functional Foods, Vol 85, 104641. https://doi.org/10.1016/j.jff.2021.104641.
Mayangsari, Y., & Suzuki, T. (2018). Resveratrol Ameliorates Intestinal Barrier Defects and Inflammation in Colitic Mice and Intestinal Cells. J. Agric. Food Chem. 2018, 66, 48, 12666–12674. https://doi.org/10.1021/acs.jafc.8b04138.
Mayangsari, Y., & Suzuki, T. (2018). Resveratrol enhances intestinal barrier function by ameliorating barrier disruption in Caco-2 cell monolayers. Journal of Functional Foods, Vol 51, 39-46. https://doi.org/10.1016/j.jff.2018.10.009.</td></tr>
<tr><td>Nama Dosen Pengampu
(Teaching Team)</td><td colspan="4">1. Dr. Ir. Priyanto Triwitono, M.P.
2. Yunika Mayangsari, S.Si., M.Biotech., Ph.D
3. Wahyu Dwi Saputro, S.T.P., M.Agr.Sc., Ph.D.
4. Dr. Zaki Utama, S.T.P., MP.</td></tr>
<tr><td rowspan="2">Otorisasi
(Authorization)</td><td>Tanggal Penyusunan
(Date)</td><td>Koordinator Mata Kuliah
(Course Coordinator)</td><td>Koordinator Bidang Keahlian (Jika Ada)
(Head of Curriculum (if available))</td><td>Ketua Program Studi
(Head of the Study Program)</td></tr>
<tr><td>05 Agustus 2024</td><td> 
Dr. Ir. Priyanto Triwitono, M.P.</td><td>-</td><td> 
Dr. Ir. Muhammad Nur Cahyanto, M.Sc</td></tr>
</table>