

**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
Ilmu Gizi Eksperimental
Experimental Nutrition
TPTP215126 (2 SKS)

Dosen Pengampu/*Lecturers*:

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**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):
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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)
TPTP215126	Ilmu Gizi Eksperimental (Experimental Nutrition)	T: 2	P: -	Ganjil (Odd)	Pilihan (Elective)	-
Deskripsi Singkat Mata Kuliah (Short Course Description)	Gizi Eksperimental adalah mata kuliah tingkat magister yang memberikan pemahaman komprehensif kepada mahasiswa tentang pendekatan eksperimental dalam ilmu gizi, dengan fokus pada bioavailabilitas gizi, fisiologi gastrointestinal, fungsi usus, dan mekanisme seluler-molekuler penyerapan dan metabolisme gizi. Mata kuliah ini menekankan analisis kritis terhadap data eksperimental dari makalah gizi eksperimental terbaru yang telah berbasis artikel peer review (>2020), integrasi konsep gizi klasik dengan metodologi penelitian modern, dan interpretasi data dari studi gizi eksperimental in vivo, ex vivo, dan in vitro. Kegiatan pembelajaran dilakukan melalui kuliah, diskusi terarah, dan studi kasus berbasis makalah terstruktur yang dilanjutkan dengan presentasi lisan mahasiswa, mempersiapkan mahasiswa untuk merancang dan mengevaluasi penelitian gizi eksperimental di tingkat magister. Mata kuliah ini berkontribusi pada SDG 4 - Pendidikan berkualitas melalui pembelajaran berbasis penelitian dan kritis, SDG 2 – Tanpa kelaparan dengan menggabungkan dasar ilmiah bioavailabilitas nutrisi dan kualitas diet, SDG 3 - Kesehatan dan kesejahteraan yang baik melalui pemahaman mekanistik tentang hubungan nutrisi-kesehatan. Mata kuliah ini berpotensi berkontribusi pada SDG 9 - Industri, Inovasi, dan Infrastruktur dengan memahami penelitian dan inovasi gizi berbasis data. Penggunaan AI mencakup riset literatur yang dibantu AI dan perbandingan dengan riset sebelumnya. <i>(Experimental Nutrition is a graduate-level course that provides students with a comprehensive understanding of experimental approaches in nutrition science, focusing on nutrient bioavailability, gastrointestinal physiology, intestinal barrier function, and cellular–molecular mechanisms of nutrient absorption and metabolism.</i> <i>The course emphasizes critical analysis of experimental evidence of recent peer-reviewed experimental nutrition papers (>2020), integration of classical nutrition concepts with modern research methodologies, and interpretation of data from in vivo, ex vivo, and in vitro experimental nutrition studies. Learning activities are conducted primarily through lectures, guided discussions, and structured paper-based case studies followed by student oral presentation, preparing students to design and evaluate experimental nutrition research at the master’s level. This course contribute to SDG 4 - Quality education through research-based and critical learning, SDG 2 – Zero hunger by incorporating scientific basis of nutrient bioavailability</i>					

	and diet quality, SDG 3 - Good health and well being by mechanistic understanding of nutrition–health relationships. The course potentially contributes to SDG 9 - Industry, Innovation and Infrastructure by understanding an evidence-based nutrition research and innovation. The use of AI includes AI assisted-literature research and comparison with previous findings.)			
Capaian Pembelajaran Lulusan yang Dibebankan pada MK (Program Learning Outcomes (PLO) Assigned to the Course)	CPL 5 (PLO 5)	Mampu menerapkan pendekatan ilmiah untuk pemecahan permasalahan melalui pengukuran variabel yang sesuai, mendapatkan data yang valid, menginterpretasikan data dan menghubungkannya dengan pemecahan permasalahan penelitian (Able to take a scientific approach to solve problems through the measurement of appropriate variables, to collect valid data, to interpret 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 melakukan pendekatan ilmiah untuk pemecahan permasalahan melalui pengukuran variabel yang sesuai [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 mendapatkan data yang valid dari hasil percobaan [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)		Materi Pembelajaran (Learning Materials)	Bentuk Pembelajaran (Forms of Learning)	Alokasi Waktu (Time Allocation)
	CPMK 5.1 (CLO 5.1)	Pendahuluan: Gizi: Macam, Fungsi, dan Kebutuhan (Introduction: Nutrients: Types, Functions, Needs)	- Lecture - 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)	Fisiologi Gastrointestinal (<i>Gastrointestinal physiology</i>)	- Lecture - Discussion	1 pertemuan <i>1 meeting</i> Masing-masing terdiri dari: <i>Each meeting consists of:</i> 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)	Bioavailabilitas Karbohidrat (<i>Carbohydrate Bioavailability</i>)	• Lecture • Discussion	1 pertemuan <i>1 meeting</i> Masing-masing terdiri dari: <i>Each meeting consists of:</i> 2x50 menit sinkronus (2x50 minutes synchronous) 2x60 menit penugasan terstruktur (2x60 minutes of structured assignments)

				2x60 kegiatan mandiri (2x60 minutes of independent study)
	CPMK 5.3 (CLO 5.3)	Bioavailabilitas Protein (Protein Bioavailability)	- Lecture - 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 5.3 (CLO 5.3)	Bioavailabilitas Lemak - SOPE (Sorbitol Oleat Polyester) (Lipid bioavailability – SOPE (Sorbitol Oleat Polyester))	- Lecturer - Discussion	2 pertemuan 2 meetings 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)	Presentasi mahasiswa (Student presentation)	- Presentation - Discussion	2 pertemuan 2 meetings 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)	Barrier Intestinal 1 (Intestinal Barrier 1)	- Lecturer - Discussion	2 pertemuan 2 meetings Masing-masing terdiri dari: Each meeting consists of: 2x50 menit sinkronus

				<i>(2x50 minutes synchronous)</i> 2x60 menit penugasan terstruktur <i>(2x60 minutes of structured assignments)</i> 2x60 kegiatan mandiri <i>(2x60 minutes of independent study)</i>
	CPMK 5.1 <i>(CLO 5.1)</i>	Barrier Intestinal 2 (dan penyakit terkait) <i>(Intestinal Barrier 2 (and related diseases))</i>	- Lecturer - Discussion	2 pertemuan <i>2 meetings</i> Masing-masing terdiri dari: <i>Each meeting consists of:</i> 2x50 menit sinkronus <i>(2x50 minutes synchronous)</i> 2x60 menit penugasan terstruktur <i>(2x60 minutes of structured assignments)</i> 2x60 kegiatan mandiri <i>(2x60 minutes of independent study)</i>
	CPMK 5.3 <i>(CLO 5.3)</i>	Analisis Cell Line dan Molekuler <i>(Cell line and Molecular Experimental Analysis)</i>	- Lecturer - Discussion	1 pertemuan <i>1 meeting</i> Masing-masing terdiri dari: <i>Each meeting consists of:</i>

				2x50 menit sinkronus (<i>2x50 minutes synchronous</i>) 2x60 menit penugasan terstruktur (<i>2x60 minutes of structured assignments</i>) 2x60 kegiatan mandiri (<i>2x60 minutes of independent study</i>)
	CPMK 5.1 (CLO 5.1) CPMK 5.3 (CLO 5.3)	Bioavailabilitas vitamin (<i>Vitamin Bioavailability</i>)	- Lecturer - Discussion	1 pertemuan 1 meeting Masing-masing terdiri dari: <i>Each meeting consists of:</i> 2x50 menit sinkronus (<i>2x50 minutes synchronous</i>) 2x60 menit penugasan terstruktur (<i>2x60 minutes of structured assignments</i>) 2x60 kegiatan mandiri (<i>2x60 minutes of independent study</i>)
	CPMK 5.1 (CLO 5.1) CPMK 5.3 (CLO 5.3)	Bioavailabilitas Mineral (<i>Mineral Bioavailability</i>)	- Lecturer - Discussion	1 pertemuan 1 meeting

				Masing-masing terdiri dari: <i>Each meeting consists of:</i> 2x50 menit sinkronus <i>(2x50 minutes synchronous)</i> 2x60 menit penugasan terstruktur <i>(2x60 minutes of structured assignments)</i> 2x60 kegiatan mandiri <i>(2x60 minutes of independent study)</i>
	CPMK 5.1 <i>(CLO 5.1)</i> CPMK 5.3 <i>(CLO 5.3)</i>	Presentasi Mahasiswa <i>(Student presentation)</i>	- Lecturer - Discussion	2 pertemuan <i>2 meetings</i> Masing-masing terdiri dari: <i>Each meeting consists of:</i> 2x50 menit sinkronus <i>(2x50 minutes synchronous)</i> 2x60 menit penugasan terstruktur <i>(2x60 minutes of structured assignments)</i> 2x60 kegiatan mandiri <i>(2x60 minutes of independent study)</i>

		Ujian Akhir Semester / Hasil Tugas Proyek / Studi Kasus <i>Final Exam/Project Results/Case Study Results</i>
Metode Pembelajaran <i>(Learning Methods)</i>	Presentasi, Tanya jawab, dan Studi Kasus <i>(Presentation, Q&A, and Case Study)</i>	
Beban kerja <i>(Workload)</i>	Total workload per semester adalah 96 jam, yang terdiri atas 120 menit per minggu untuk kegiatan perkuliahan, 120 menit per minggu untuk tugas terstruktur, dan 120 menit per minggu untuk belajar mandiri, dengan total 16 minggu termasuk UTS dan UAS. <i>(The total workload is approximately 96 hours per semester, consisting of 120 minutes of lectures per week, 120 minutes of structured assignments per week, and 120 minutes of self-study per week, for a total of 16 weeks, including mid-term and final examinations.)</i> Perhitungan Workload per Semester <i>(Workload calculation for one semester)</i> = 6 jam/minggu × 16 minggu/semester = 96 jam/semester = 96 jam/semester ÷ 26 jam/ECTS = 3,7 ECTS/semester = 6 hours/week × 16 weeks/semester = 96 hours/semester = 96 hours/semester ÷ 26 hours/ECTS = 3.7 ECTS/semester Total Workload = 3,7 ECTS/semester Catatan <i>(Notes)</i>: 1 ECTS setara dengan 25–30 jam workload mahasiswa, dengan 26 jam ditetapkan sebagai standar minimum. <i>(1 ECTS is equivalent to 25-30 hours of work, with 26 hours set as the minimum standard.)</i>	
Pengalaman Belajar Mahasiswa <i>(Students Activities)</i>	Sesi Sinkron <i>(During Synchronous Sessions)</i>: - Berpartisipasi aktif dalam diskusi terkait materi pembelajaran dan studi kasus. <i>Actively engage in discussions on material and case studies.</i> Sesi Asinkron/Mandiri/Penugasan Terstruktur <i>(During Asynchronous/Self-Study/Structured Assignments)</i>: - Belajar kelompok <i>Group study</i> - Menyelesaikan kuis-kuis <i>Completing quizzes</i> - Refleksi terhadap materi pembelajaran <i>Reflecting on material</i> - Menelaah literatur serta isu-isu sosial kemasyarakatan <i>Reviewing literature and societal issues</i>	

Akses Media Pembelajaran/ LMS dan Persentase Luring & Daring <i>(Learning Media Access/LMS and Offline & Online Percentage)</i>	https://elok.ugm.ac.id https://simaster.ugm.ac.id/ Luring (<i>Offline</i>): 100% Daring (<i>Online</i>): 0%							
Metode Penilaian dan Keselarasan dengan CPMK <i>(Assessment Method for Each Course Learning Outcomes)</i>	Basis Evaluasi <i>(Evaluation Basis)</i>	Komponen Evaluasi <i>(Evaluation Component)</i>	Bobot <i>(Percent age)</i>	CLO 5.1	CLO 5.3			
	A. Aktivitas Partisipatif^{*)} <i>Participatory Activities</i>	Penugasan <i>Assignments</i>						
	B. Hasil Project/Hasil Studi Kasus/ Hasil PBL^{*)} <i>Project Results/Case Study Results/PBL Results</i>	Presentasi <i>Presentation</i>	30%	V	V			
	C. Kognitif <i>Cognitive</i>	UTS <i>Midterm Exam</i>	35%	V	V			
		UAS <i>Final Exam</i>	35%	V	V			
Total		100%						
Daftar Referensi <i>(Reference)</i>	Malik, D., Narayanasamy, N., Pratyusha, V. A., Thakur, J., Sinha, N. (2023). Textbook of Nutritional Biochemistry. Germany: Springer Nature Singapore. Hau, J., Schapiro, S. J (Ed). (2021). Handbook of Laboratory Animal Science: Essential Principles and Practices. United States: CRC Press. Dopico, A. M., Bukiya, A. N (Ed). (2022). Cholesterol: From Chemistry and Biophysics to the Clinic. Netherlands: Academic Press. Grundy, M. M., Wilde, P. J. (2021). Bioaccessibility and Digestibility of Lipids from Food. Germany: Springer International Publishing. 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. <i>J. Agric. Food Chem.</i> 2021, 69, 35, 10174–10183. https://doi.org/10.1021/acs.jafc.1c04295 . 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. <i>Journal of Functional Foods</i> , Vol 85, 104641. https://doi.org/10.1016/j.jff.2021.104641 .							

	Carbonaro, M., & Nucara, A. (2022). Legume proteins and peptides as compounds in nutraceuticals: a structural basis for dietary health effects. <i>Nutrients</i>, 14(6), 1188. Turner, J. R. (2009). Intestinal mucosal barrier function in health and disease. <i>Nature reviews immunology</i>, 9(11), 799-809. Mayangsari, Y., & Suzuki, T. (2018). Resveratrol Ameliorates Intestinal Barrier Defects and Inflammation in Colitic Mice and Intestinal Cells. <i>J. Agric. Food Chem.</i> 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. <i>Journal of Functional Foods</i>, Vol 51, 39-46. https://doi.org/10.1016/j.jff.2018.10.009. Brodkorb, A., Egger, L., Alminger, M., Alvito, P., Assunção, R., Ballance, S., ... & Recio, I. (2019). INFOGEST static in vitro simulation of gastrointestinal food digestion. <i>Nature protocols</i>, 14(4), 991-1014. Smith, M. E., Morton, D. G. (2011). <i>The Digestive System: Systems of the Body Series</i>. United Kingdom: Churchill Livingstone. Rekomendasi Jurnal untuk Studi Kasus <i>Recommended Journals for Case Studies</i> • American Journal of Clinical Nutrition • Advances in Nutrition • Journal of Nutrition • Nutrients • The Lancet Global Health • Food & Function			
Nama Dosen Pengampu (Teaching Team)	1. Dr. Ir. Priyanto Triwitono, M.P. 2. Yunika Mayangsari, S.Si., M.Biotech., Ph.D. 3. Wahyu Dwi Saputra, S.T.P., M.Agr.Sc., Ph.D. 4. Dr. Zaki Utama, S.T.P., M.P.			
Otorisasi (Authorization)	Tanggal Penyusunan (Date)	Koordinator Mata Kuliah (Course Coordinator)	Koordinator Bidang Keahlian (Jika Ada) (Head of Curriculum (if available))	Ketua Program Studi (Head of the Study Program)
	05 Agustus 2024	 Dr. Ir. Priyanto Triwitono, M.P.	-	 Dr. Ir. Muhammad Nur Cahyanto, M.Sc