

**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

Kimia dan Teknologi Protein
Protein Chemistry and Technology
TPTP215121 (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)
TPTP215121	Kimia dan Teknologi Protein (Protein Chemistry and Technology)	T: 2	P: -	Gasal (Odd)	Pilihan (Elective)	-
Deskripsi Singkat Mata Kuliah (Short Course Description)	Mata kuliah ini membahas permasalahan dan tantangan dalam kimia dan teknologi protein, khususnya aspek sifat fungsional dan modifikasi, serta teknik ekstraksi dan isolasi. Mata kuliah ini juga menekankan perkembangan di bidang kimia dan teknologi protein yang mendukung SDGs 9 mengenai inovasi di bidang teknologi pangan. Pembelajaran melibatkan case-based learning (pembelajaran berbasis kasus), di mana mahasiswa menganalisis secara kritis publikasi ilmiah terbaru (≥ 2020) untuk merumuskan solusi berbasis ilmiah yang akan didiskusikan dalam sesi presentasi. Kecerdasan Buatan (AI) diperkenalkan untuk mendukung eksplorasi literatur, sementara pendekatan statistik dasar diterapkan untuk mengevaluasi dan menarik kesimpulan dari data eksperimental. Total beban kerja mahasiswa setara dengan 3,7 ECTS. <i>(This course discusses the problems and challenges in protein chemistry and technology, especially aspects of functional properties and modifications, extraction and isolation techniques. The course also emphasizes the developments in the field of protein chemistry and technology, which support SDGs 9 regarding the innovation in the field of food technology. The course also involves case-based learning, where students critically analyze recent publications (≥ 2020) to define problems in protein extraction, modification, and functionality, and formulate scientific-based solutions which will be discussed during the presentation section. Artificial intelligence (AI) is introduced to support literature exploration and trend mapping, while basic statistical approaches are applied to evaluate, interpret, and draw conclusions from experimental data reported in the referenced studies. The total student workload corresponds to 3.7 ECTS.)</i>					
Capaian Pembelajaran Lulusan yang Dibebankan pada MK (Program Learning)	CPL 3 (PLO 3)	Menguasai konsep teoritis dalam bidang spesifik ilmu dan teknologi pangan serta memahami perkembangan mutakhir di bidang tersebut (Mastering theoretical concepts in specific areas of food science and technology and understand its recent advances)				

Outcomes (PLO) Assigned to the Course)				
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 3.2 (CLO 3.2)	Memahami perkembangan terkini dalam ilmu dan teknologi pangan dari publikasi ilmiah terbaru [CPL 3] (Understand the current development in food science and technology from recent scientific publications [PLO 3])		
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 3.2 CLO 3.2	1. Pengantar Protein (Introduction of Proteins)	- 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)
		2. Karakterisasi Fisikokimia Protein (Physicochemical Characterization of Proteins)	- 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)
		3. Protein Berbasis Nabati dan Hewani (<i>Plant-Based and Animal-Based Proteins</i>)	- Kuliah (<i>Lecture</i>) - Diskusi Interaktif (<i>Interactive Discussion</i>)	1 pertemuan 1 meeting 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)
		4. Karakterisasi Fungsional Protein (1)(<i>Protein Functional Characterization (1)</i>)	- Kuliah (<i>Lecture</i>) - Diskusi Interaktif (<i>Interactive Discussion</i>)	1 pertemuan 1 meeting 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)
		5. Karakterisasi Fungsional Protein (2) (<i>Protein Functional Characterization (2)</i>)	- Kuliah (<i>Lecture</i>) - Diskusi Interaktif (<i>Interactive Discussion</i>)	1 pertemuan 1 meeting 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)
		6. Nutrigenomik (<i>Nutrigenomic</i>)	- Kuliah (<i>Lecture</i>) - Diskusi Interaktif (<i>Interactive Discussion</i>)	1 pertemuan 1 meeting 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)
		7. Proteomik (<i>Proteomic</i>)	- Kuliah (<i>Lecture</i>) - Diskusi Interaktif (<i>Interactive Discussion</i>)	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)
		Ujian Tengah Semester / Hasil Tugas Proyek / Studi Kasus <i>Midterm Exam/Project Results/Case Study Results</i>		
	CPMK 3.2 CLO 3.2	8. Presentasi Mahasiswa terkait Topik Kimia & Teknologi Protein (<i>Student Presentation on Chemistry & Protein Technology</i>)	- Presentasi (<i>Presentation</i>) - Diskusi Interaktif (<i>Interactive Discussion</i>)	1 pertemuan <i>1 meeting</i> Masing-masing terdiri dari: <i>Each meeting consists of:</i>

				3x50 menit sinkronus (3x50 minutes synchronous) 3x60 menit penugasan terstruktur (3x60 minutes of structured assignments) 3x60 kegiatan mandiri (3x60 minutes of independent study)
		Ujian Akhir Semester / Hasil Tugas Proyek / Studi Kasus Final Exam/Project Results/Case Study Results		
Metode Pembelajaran (Learning Methods)	Pembelajaran dilaksanakan melalui pembelajaran berbasis masalah atau kasus (problem/case-based learning), tanya jawab, dan diskusi interaktif. Kegiatan pembelajaran menekankan kemampuan berpikir kritis dalam menelaah literatur ilmiah, merumuskan permasalahan penelitian, merancang penelitian eksperimental dan non-eksperimental, serta menyusun justifikasi analisis statistik. Pemanfaatan AI dilakukan secara terbimbing dengan tetap menjunjung tinggi etika dan penalaran ilmiah. (Learning is conducted through problem or case-based learning, Q&A, and interactive discussions. Learning activities emphasize critical thinking in reviewing scientific literature, formulating research problems, designing experimental and non-experimental research, and justifying statistical analysis. The use of AI is carried out in a guided manner while upholding ethics and scientific reasoning.)			
Beban kerja (Workload)	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. (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.) Perhitungan Workload per Semester (Workload calculation for one semester) = 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 (Notes): 1 ECTS setara dengan 25–30 jam workload mahasiswa, 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 <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> - Mengembangkan gagasan proyek multidisipliner <i>Working on multidisciplinary project ideas</i>							
Akses Media Pembelajaran/ LMS dan Persentase Luring & Daring <i>(Learning Media Access/LMS and Offline & Online Percentage)</i>	<u>Google Classroom</u> 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>(Percentage)</i>	CLO 3.2				
	Aktivitas Partisipatif^{*)} <i>Participatory Activities</i>	Penugasan <i>Assignments</i>						
	Hasil Project/Hasil Studi Kasus/ Hasil PBL^{*)} <i>Project Results/Case Study Results/PBL Results</i>	Presentasi <i>Presentation</i>	30%	v				

	Kognitif <i>Cognitive</i>	Skill-based Assessment (SBA)						
		Kuis Quiz						
		UTS <i>Midterm Exam</i>	35%	v				
		UAS <i>Final Exam</i>	35%	v				
		Total	100%					
Daftar Referensi <i>(Reference)</i>	- Damodaran, S. 2017. Food Proteins and Their Applications. United Kingdom: CRC Press. - Kumar M., et al. 2022. Functional characterization of plant-based protein to determine its quality for food applications, Food Hydrocolloids, Volume 123. https://doi.org/10.1016/j.foodhyd.2021.106986. - Poluri, K.M. et al. 2021. Protein-Protein Interactions: Principles and Techniques. Springer Singapore. https://doi.org/10.1007/978-981-16-1594-8. - Steemburgo, T. et al. 2024. Nutrigenetics and Nutrigenomics. in Precision Nutrition Book. Academic Press. - Udenigwe C. (editor). 2021. Food Proteins and Peptides: Emerging Biofunctions, Food and Biomaterial Applications, The Royal Society of Chemistry. - Setiowati, A. D., Wijaya, W., & Meeren, P. 2020. Whey protein-polysaccharide conjugates obtained via dry heat treatment to improve the heat stability of whey protein stabilized emulsions, Vol 98: 150-161. https://doi.org/10.1016/j.tifs.2020.02.011. Daftar buku-buku fundamental lainnya (yang lebih lama) dapat diakses melalui tautan berikut: (A list of additional foundational textbooks (older editions) is available at the following link) http://ugm.id/ProteinChemAndTech							
Nama Dosen Pengampu <i>(Teaching Team)</i>	- Andriati Ningrum, S.T.P., M.Agr., Ph.D. - Dr. rer.nat. Lucia Dhiantika Witasari, S.Farm., Apt., M.Biotech. - Dr. Arima Diah Setiowati, S.T.P, M.Sc.							
Otorisasi <i>(Authorization)</i>	Tanggal Penyusunan <i>(Date)</i>	Koordinator Mata Kuliah <i>(Course Coordinator)</i>	Koordinator Bidang Keahlian (Jika Ada) <i>(Head of Curriculum (if available))</i>		Ketua Program Studi <i>(Head of the Study Program)</i>			
	05 Agustus 2024	 Andriati Ningrum, S.T.P., M.Agr., Ph.D.	-		 Dr. Ir. Muhammad Nur Cahyanto, M.Sc			