

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



Master in Food Science and Technology
Department of Food and Agricultural Products Technology

Metodologi Penelitian

Research Methodology

TPTP215011 (3 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/Even 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)
TPTP215011	Metodologi Penelitian (Research Methodology)	T: 3	P: -	Gasal/Genap (Odd/Even)	Wajib (Compulsory)	-
Deskripsi Singkat Mata Kuliah (Short Course Description)	Mata kuliah ini membahas prinsip dan pendekatan sistematis dalam penelitian ilmiah di bidang ilmu dan teknologi pangan, meliputi identifikasi masalah penelitian, telaah pustaka, perancangan penelitian, pengumpulan data, analisis statistik, serta etika penelitian. Mahasiswa dilatih untuk merumuskan permasalahan penelitian, menyusun kerangka konseptual, serta merancang penelitian eksperimental maupun non-eksperimental dengan menggunakan desain statistik dan eksperimental yang sesuai. Melalui telaah literatur secara kritis, perancangan penelitian yang tepat, serta analisis data yang bertanggung jawab, mahasiswa diarahkan untuk menyusun proposal penelitian yang relevan dengan tantangan nyata di bidang sistem pangan dan masyarakat. Mata kuliah ini berkontribusi pada SDG 2 (Tanpa Kelaparan), 4 (Pendidikan Berkualitas), 6 (Air Bersih dan Sanitasi Layak), 9 (Industri, Inovasi, dan Infrastruktur), 12 (Konsumsi dan Produksi yang Bertanggung Jawab), dan 17 (Kemitraan untuk Mencapai Tujuan). (This course covers principles and systematic approaches to scientific research in food science and technology, including problem identification, literature review, research design, data collection, statistical analysis, and research ethics. Students are trained to formulate research problems, develop conceptual frameworks, and design experimental and non-experimental studies using appropriate statistical and experimental designs. Through critical literature review, appropriate research design, and responsible data analysis, students are trained to develop research proposals that address real-world societal challenges related to food systems. This course contributes to SDG 2 (Zero Hunger), 4 (Quality Education), 6 (Clean Water and Sanitation), 9 (Industry, Innovation, and Infrastructure), 12 (Responsible Consumption and Production), and 17 (Partnerships for The Goals).					
Capaian Pembelajaran Lulusan yang Dibebankan pada MK (Program Learning Outcomes (PLO) Assigned to the Course)	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)				
	CPL 4 (PLO 4)	Mampu mengumpulkan informasi dari hasil penelitian sebelumnya menjadi suatu pola pikir yang bermanfaat dan merumuskan permasalahan penelitian (Able to gather information from scientific findings, develop a conceptual framework and formulate research problems)				
	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 <i>(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)</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 be able to:)</i>			
	CPMK 3.1 <i>(CLO 3.1)</i>	Menguasai konsep teoretis pada bidang spesifik ilmu dan teknologi pangan (kimia pangan/mikrobiologi pangan/rekayasa proses pangan/pangan gizi) [CPL 3] <i>(Mastering theoretical concepts in specific areas of food science and technology (food chemistry/food microbiology/food process engineering/food nutrition) [PLO 3])</i>		
	CPMK 4.1 <i>(CLO 4.1)</i>	Mampu mengumpulkan informasi dari hasil-hasil penelitian sebelumnya yang dipublikasikan dalam jurnal ilmiah menjadi suatu pola pikir yang bermanfaat [PLO 4] <i>(Able to gather information from previous findings published in scientific journals and develop a conceptual framework [PLO 4])</i>		
	CPMK 4.2 <i>(CLO 4.2)</i>	Mampu merumuskan permasalahan penelitian [CPL 4] <i>(Able to formulate research problems [PLO 4])</i>		
	CPMK 5.1 <i>(CLO 5.1)</i>	Mampu melakukan pendekatan ilmiah untuk pemecahan permasalahan melalui pengukuran variabel yang sesuai [CPL 5] <i>(Able to take a scientific approach to solve problem through the measurement of appropriate variables [PLO 5])</i>		
Kaitan CPMK dengan Materi dan Bentuk Pembelajaran, serta Alokasi Waktu <i>(CLO Relation to Learning Material, Learning Forms, and Time Allocation)</i>		Materi Pembelajaran <i>(Learning Materials)</i>	Bentuk Pembelajaran <i>(Forms of Learning)</i>	Alokasi Waktu <i>(Time Allocation)</i>
	CPMK 5.1 <i>CLO 5.1</i>	1. Pengantar dan Sumber Informasi Ilmiah <i>(Introduction and Sources of Scientific Information)</i> Prinsip penelitian ilmiah, jenis-jenis penelitian di bidang ilmu dan teknologi pangan, pengenalan basis data akademik, jurnal bereputasi, etika sitasi, serta pemanfaatan AI secara terbimbing untuk penelusuran dan pemetaan literatur. <i>(Principles of scientific inquiry, types of research in food science and technology, and sources of scientific information. Introduction to academic databases, peer-reviewed journals, citation)</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> 3x50 menit sinkronus <i>(3x50 minutes synchronous)</i> 3x60 menit penugasan terstruktur <i>(3x60 minutes of structured assignments)</i>

		<i>ethics, and strategies for identifying credible and up-to-date scientific references. AI-assisted literature searching, screening, and mapping of research topics.)</i>		3x60 menit kegiatan mandiri (3x60 minutes of independent study)
	CPMK 4.2 CLO 4.2	2. Penulisan Latar Belakang, Perumusan Masalah, dan Tujuan Penelitian (<i>Writing the Background, Problem Formulation, and Research Objectives</i>) Teknik penyusunan latar belakang berbasis bukti ilmiah, perumusan masalah penelitian, keselarasan tujuan dengan pertanyaan penelitian, serta pemanfaatan AI untuk identifikasi kesenjangan riset secara kritis. <i>(Techniques for developing a strong research background based on scientific evidence, formulation of clear and researchable problems, and alignment of research objectives with research questions. AI-assisted identification of research gaps and refinement of problem statements. Translating research problems into testable variables and measurable outcomes.)</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> 3x50 menit sinkronus (3x50 minutes synchronous) 3x60 menit penugasan terstruktur (3x60 minutes of structured assignments) 3x60 kegiatan mandiri (3x60 minutes of independent study)
	CPMK 4.2 CLO 4.2	3. Penulisan tinjauan pustaka, Manajemen Referensi, dan Perumusan Hipotesis (<i>Writing the Literature Review, Reference Management, and Hypothesis</i>) Pendekatan sistematis dalam telaah pustaka, sintesis hasil penelitian sebelumnya, identifikasi celah penelitian, serta penggunaan AI secara bertanggung jawab untuk manajemen referensi.	- 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> 3x50 menit sinkronus (3x50 minutes synchronous) 3x60 menit penugasan terstruktur

		<i>(Systematic approaches to reviewing scientific literature, synthesizing previous findings, identifying research gaps, and formulating hypotheses. AI-assisted reference management, literature summarization, and thematic clustering (used critically, not automatically).)</i>		<i>(3x60 minutes of structured assignments)</i> 3x60 kegiatan mandiri <i>(3x60 minutes of independent study)</i>
	CPMK 3.1 CLO 3.1	4. Pengantar Rancangan Percobaan (<i>Introduction to Experimental Design</i>) Konsep dasar rancangan percobaan: unit percobaan, faktor, taraf, ulangan, pengacakan, dan pengendalian keragaman. <i>(Fundamental concepts of experimental design, including experimental units, factors, levels, replication, randomization, and control of variability. Statistics context: Principles of variance, experimental error, and assumptions for statistical testing.)</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> 3x50 menit sinkronus <i>(3x50 minutes synchronous)</i> 3x60 menit penugasan terstruktur <i>(3x60 minutes of structured assignments)</i> 3x60 kegiatan mandiri <i>(3x60 minutes of independent study)</i>
	CPMK 3.1 CLO 3.1	5. Rancangan Acak Lengkap (RAL) (<i>Completely Randomized Design (CRD)</i>) Prinsip, asumsi, aplikasi, serta analisis data menggunakan ANOVA dan interpretasi hasil. <i>(Principles, assumptions, applications, and data analysis of CRD in experimental research. Statistics context: Analysis of variance (ANOVA), interpretation</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> 3x50 menit sinkronus <i>(3x50 minutes synchronous)</i>

		<i>of significance, and model assumptions.)</i>		3x60 menit penugasan terstruktur (3x60 minutes of structured assignments) 3x60 kegiatan mandiri (3x60 minutes of independent study)
	CPMK 3.1 CLO 3.1	6. Rancangan Acak Kelompok (RAK) (<i>Randomized Block Design</i> (RBD)) Konsep pengelompokan untuk mengurangi keragaman dan analisis ANOVA untuk efek perlakuan dan kelompok. <i>(Concepts and applications of RBD to reduce experimental variability through blocking.</i> <i>Statistics context: ANOVA for RBD, interpretation of treatment and block effects.)</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> 3x50 menit sinkronus (3x50 minutes synchronous) 3x60 menit penugasan terstruktur (3x60 minutes of structured assignments) 3x60 kegiatan mandiri (3x60 minutes of independent study)
	CPMK 5.1 CLO 5.1	7. Rancangan Bujur Sangkar Latin dan Split-Plot (<i>Latin Square Design and Split-Plot Design</i>) Prinsip rancangan percobaan dengan struktur hierarkis dan berbagai sumber keragaman. <i>(Design principles for experiments involving multiple sources of variability and hierarchical structures.</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> 3x50 menit sinkronus (3x50 minutes synchronous)

		Statistics context: ANOVA models for Latin Square and Split-Plot designs, interpretation of main and interaction effects.)		3x60 menit penugasan terstruktur (3x60 minutes of structured assignments) 3x60 kegiatan mandiri (3x60 minutes of independent study)
		Ujian Tengah Semester / Hasil Tugas Proyek / Studi Kasus <i>Midterm Exam/Project Results/Case Study Results</i>		
	CPMK 5.1 CLO 5.1	8. Rancangan Faktorial Fraksional, Box–Behnken, dan Central Composite Design (<i>Fractional Factorial Design, Box-Behnken Design, and Central Composite Design</i>) Rancangan lanjutan untuk optimasi multifaktor dan Response Surface Methodology (RSM), termasuk visualisasi data multivariat berbantuan AI secara terbimbing. (Advanced experimental designs for multifactor studies and optimization. Statistics context: Response Surface Methodology (RSM), model fitting, ANOVA, significance testing, and interpretation of response surfaces. AI support (selected): AI-assisted visualization and interpretation of multivariate experimental data.)	- Kuliah (Lecture) - Diskusi Interaktif (Interactive Discussion)	1 pertemuan 1 meeting Masing-masing terdiri dari: Each meeting consists of: 3x50 menit sinkronus (3x50 minutes synchronous) 3x60 menit penugasan terstruktur (3x60 minutes of structured assignments) 3x60 kegiatan mandiri (3x60 minutes of independent study)
	CPMK 3.1 CLO 3.1	9. Penelitian Kualitatif, Survei, dan Penyajian Data (<i>Qualitative Research, Survey, and Data Presentation</i>) Prinsip penelitian kualitatif dan survei, penyusunan kuesioner, validasi data, etika penelitian, serta penyajian data dalam bentuk tabel, grafik, dan gambar.	- Kuliah (Lecture) - Diskusi Interaktif (Interactive Discussion)	2 pertemuan 2 meeting Masing-masing terdiri dari: Each meeting consists of: 3x50 menit sinkronus

		<i>(Principles of qualitative research and survey methods, questionnaire design, data validation, ethical considerations, and effective data presentation using tables, graphs, and figures.)</i>		(3x50 minutes synchronous) 3x60 menit penugasan terstruktur (3x60 minutes of structured assignments) 3x60 kegiatan mandiri (3x60 minutes of independent study)
	CPMK 4.1 <i>CLO 4.1</i>	10. Presentasi Proposal Penelitian Mahasiswa (<i>Student Proposal Presentation</i>) Presentasi dan diskusi kritis proposal penelitian mahasiswa dengan fokus pada kejelasan masalah, ketepatan metodologi, kelayakan penelitian, serta justifikasi analisis statistik. <i>(Presentation and critical discussion of student research proposals, focusing on clarity of problem formulation, methodological soundness, feasibility, and scientific relevance. Justification of experimental design and statistical analysis plans.)</i>	- Presentasi (<i>Presentation</i>) - Diskusi Interaktif (<i>Interactive Discussion</i>) - <i>Paper-based learning</i> - <i>Project-based learning</i>	2 pertemuan <i>2 meetings</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 <i>Final Exam/Project Results/Case Study Results</i>		
Metode Pembelajaran <i>(Learning Methods)</i>	Pembelajaran dilaksanakan melalui kuliah, diskusi interaktif, pembelajaran berbasis makalah, dan pembelajaran berbasis proyek. 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.			

	<i>(Lectures, interactive discussions, paper-based learning, and project-based learning. Learning activities emphasize critical evaluation of scientific literature, formulation of research problems, design of experimental and non-experimental studies, and justification of statistical analysis plans. AI-assisted tools are used in a guided manner to support literature review, reference management, and research planning, while maintaining scientific reasoning and research ethics.)</i>
Workload	Total workload per semester adalah 144 jam, yang terdiri atas 180 menit per minggu untuk kegiatan perkuliahan, 180 menit per minggu untuk tugas terstruktur, dan 180 menit per minggu untuk belajar mandiri, dengan total 16 minggu termasuk UTS dan UAS. <i>(The total workload is approximately 144 hours per semester, consisting of 180 minutes of lectures per week, 180 minutes of structured assignments per week, and 180 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> = 9 jam/minggu × 16 minggu/semester = 144 jam/semester = 144 jam/semester ÷ 26 jam/ECTS = 5,55 ECTS/semester = 9 hours/week × 16 weeks/semester = 144 hours/semester = 144 hours/semester ÷ 26 hours/ECTS = 5.55 ECTS/semester Total Workload = 5.55 ECTS/semester Catatan (Notes): 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> ● 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> ● Menyusun proposal

	Writing a proposal							
Akses Media Pembelajaran/ LMS dan Persentase Luring & Daring (Learning Media Access/LMS and Offline & Online Percentage)	https://elok.ugm.ac.id https://simaster.ugm.ac.id/ Offline (Luring): 100% Online (Daring): 0%							
Metode Penilaian dan Keselarasan dengan CPMK (Assessment Method for Each Course Learning Outcomes)	Basis Evaluasi (Evaluation Basis)	Komponen Evaluasi (Evaluation Component)	Bobot (Percentage)	CPMK 3.1 (CLO 3.1)	CPMK 4.1 (CLO 4.1)	CPMK 4.2 (CLO 4.2)	CPMK 5.1 (CLO 5.1)	
	A. Aktivitas Partisipatif Participatory Activities*)	Diskusi, Q&A Discussion, Q&A						
	B. Hasil Project/Hasil Studi Kasus/ Hasil PBL Project Results/Case Study Results/PBL Results*)	Penulisan Proposal Proposal writing	25%			v		
		Presentasi Presentation	25%		v			
	C. Kognitif Cognitive	Skill-based Assessment (SBA)						
		Kuis Quiz						
		UTS Midterm Exam	25%	v				
		UAS Final Exam	25%				v	
	Total	100%						
Daftar Referensi (Reference)	1. Creswell, J. W., & Creswell, J. D. (2018). <i>Research Design: Qualitative, Quantitative, and Mixed Methods Approaches</i> (5th ed.). SAGE. 2. Machi, L. A., & McEvoy, B. T. (2020). <i>The Literature Review: Six Steps to Success</i> (3rd ed.). Corwin. 3. Montgomery, D. C. (2019). <i>Design and Analysis of Experiments</i> (10th ed.). Wiley. 4. National Academies of Sciences, Engineering, and Medicine. (2017). <i>Fostering Integrity in Research</i>. National Academies Press. 5. Committee on Publication Ethics (COPE). (2019). <i>Core Practices</i>. 6. Perkel, J. M. (2023). Six tips for using AI in literature review. <i>Nature</i>, 613, 423–425. 7. van Eck, N. J., & Waltman, L. (2020). VOSviewer manual & bibliometric mapping. <i>Scientometrics</i>.							

	8. Dillman, D. A., Smyth, J. D., & Christian, L. M. (2014). <i>Internet, Phone, Mail, and Mixed-Mode Surveys</i> . Wiley.			
Nama Dosen Pengampu (Teaching Team)	1. Rachma Wikandari, S.T.P., M.Biotech., Ph.D. 2. Dr. Widiastuti Setyaningsih, S.T.P., M.Sc. 3. Dr. Dwi Larasatie Nur Fibri, S.T.P., M.Sc. 4. Wahyu Dwi Saputra, S.T.P., M.Agr.Sc., Ph.D. 5. Bambang Dwi Wijatniko, S.T.P., M.Agr.Sc, M.Sc., Ph.D.			
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 August 2024	 Rachma Wikandari, S.T.P., M.Biotech, PhD	-	 Dr. Ir. Muhammad Nur Cahyanto, M.Sc