

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



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

**Kimia dan Teknologi Lipida**  
***Lipid Chemistry and Technology***

TPTP215123 (2 SKS)

Dosen Pengampu/*Lecturers*:

**Dr. Arima Diah Setiowati, S.T.P, M.Sc.**

Prof. Dr. Ir. Sri Raharjo, M.Sc.

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**UNIVERSITAS GADJAH MADA**  
**FACULTY OF AGRICULTURAL TECHNOLOGY**  
**2024**

|  | <b>Universitas Gadjah Mada</b><br>Faculty of Agricultural Technology<br>Department of Food and Agricultural Products Technology<br>Master in Food Science and Technology<br>Odd Semester 2024/2025                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                           |      |                               |                                              | <b>Kode Dokumen</b><br>(Document code):                |
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|                                                                                   | <b>RENCANA PROGRAM DAN KEGIATAN PEMBELAJARAN SEMESTER (RPKPS) (COURSE SYLLABUS)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                           |      |                               |                                              |                                                        |
| <b>Kode Mata Kuliah</b><br>(Course Number)                                        | <b>Nama Mata Kuliah</b><br>(Course Title)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>Bobot</b><br>(Credits) |      | <b>Semester</b><br>(Semester) | <b>Status Mata Kuliah</b><br>(Course Status) | <b>Mata Kuliah Prasyarat</b><br>(Prerequisite Courses) |
| TPTP215123                                                                        | Kimia dan Teknologi Lipida<br>(Lipid Chemistry and Technology)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | T: 2                      | P: - | Gasal<br>(Odd)                | Pilihan<br>(Elective)                        | -                                                      |
| <b>Deskripsi Singkat Mata Kuliah</b><br>(Short Course Description)                | <p>Mata kuliah ini membahas kimia, struktur, dan sifat fisikokimia lipid, termasuk lemak dan minyak yang berasal dari sumber konvensional maupun sumber yang sedang berkembang. Pokok bahasan meliputi ekstraksi dan pemurnian lipid, proses pemurnian, penilaian mutu, oksidasi dan stabilitas, teknologi modifikasi lipid (fraksinasi, hidrogenasi, dan interesterifikasi), serta peran lipid dalam mutu pangan, gizi, dan kesehatan. Mata kuliah ini juga mencakup lipid terstruktur dan fungsional, sumber lipid alternatif dan berkelanjutan, sistem penghantaran berbasis lipid, serta perkembangan teknologi terkini seperti oleogel, solid lipid nanoparticles, dan lipidomik. Untuk mendukung pemahaman terhadap perkembangan mutakhir dalam ilmu dan teknologi lipid, mata kuliah ini memperkenalkan eksplorasi literatur berbantuan AI agar mahasiswa mampu mengevaluasi publikasi ilmiah terbaru secara kritis. Pendekatan ini digunakan untuk menginterpretasikan data analitik, membandingkan teknologi proses, dan memahami hubungan struktur–fungsi dalam sistem lipid.</p> <p>Total mata kuliah ini setara dengan 3,7 ECTS. Capaian pembelajaran mata kuliah ini berkontribusi terhadap pencapaian Tujuan Pembangunan Berkelanjutan (Sustainable Development Goals/SDGs), khususnya SDG 2 (Tanpa Kelaparan) melalui peningkatan mutu dan fungsionalitas lipid dalam sistem pangan, SDG 3 (Kehidupan Sehat dan Sejahtera) melalui penelitian lipid yang berkaitan dengan gizi dan kesehatan, SDG 9 (Industri, Inovasi, dan Infrastruktur) melalui kemajuan teknologi pengolahan dan sistem penghantaran lipid, serta SDG 12 (Konsumsi dan Produksi yang Bertanggung Jawab) melalui pemanfaatan sumber lipid yang berkelanjutan dan valorisasi limbah.</p> <p><i>(This course explores the chemistry, structure, and physicochemical properties of lipids, including fats and oils from conventional and emerging sources. Topics include lipid extraction and purification, refining processes, quality assessment, oxidation and stability, lipid modification technologies (fractionation, hydrogenation, and interesterification), and the role of lipids in food quality, nutrition, and health. The course also addresses structured and functional lipids, alternative and sustainable lipid sources, lipid-based delivery systems, and recent technological advances such as oleogels, solid lipid nanoparticles, and lipidomics. To support understanding of current advances in lipid science and technology, the course introduces AI-assisted literature exploration to enable students to critically evaluate recent scientific publications. These</i></p> |                           |      |                               |                                              |                                                        |

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|                                                                                                                                                                  | <i>approaches are used to interpret analytical data, compare processing technologies, and understand structure–function relationships in lipid systems.</i>                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                          |                                                                                                                              |                                                                                                                                                                                                                                                                                   |
|                                                                                                                                                                  | <i>This course has a total workload equivalent to 3.7 ECTS. The learning outcomes contribute to the achievement of the Sustainable Development Goals (SDGs), particularly SDG 2 (Zero Hunger) through improved lipid quality and functionality in food systems, SDG 3 (Good Health and Well-being) through nutrition- and health-related lipid research, SDG 9 (Industry, Innovation and Infrastructure) through advances in lipid processing and delivery technologies, and SDG 12 (Responsible Consumption and Production) through sustainable lipid sourcing and waste valorization.)</i> |                                                                                                                                                                                                                                                                                          |                                                                                                                              |                                                                                                                                                                                                                                                                                   |
| <b>Capaian Pembelajaran Lulusan yang Dibebankan pada MK</b><br><i>(Program Learning Outcomes (PLO) Assigned to the Course)</i>                                   | <b>CPL 3</b><br><i>(PLO 3)</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Menguasai konsep teoritis dalam bidang spesifik ilmu dan teknologi pangan serta memahami perkembangan mutakhir di bidang tersebut<br><i>(Mastering theoretical concepts in specific areas of food science and technology and understand its recent advances)</i>                         |                                                                                                                              |                                                                                                                                                                                                                                                                                   |
| <b>Capaian Pembelajaran Mata Kuliah (CPMK)</b><br><i>(Course Learning Outcomes (CLO))</i>                                                                        | <b>Setelah menyelesaikan pembelajaran mata kuliah ini, mahasiswa diharapkan mampu:</b><br><i>(After completing this course, students are expected to be able to:)</i>                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                          |                                                                                                                              |                                                                                                                                                                                                                                                                                   |
|                                                                                                                                                                  | <b>CPMK 3.2</b><br><i>(CLO 3.2)</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Memahami perkembangan terkini dalam ilmu pangan dan teknologi pangan berdasarkan publikasi ilmiah terbaru <a href="#">[CPL 3]</a><br><i>(Understand the current development in food science and technology from recent scientific publications <a href="#">[PLO 3]</a>)</i>              |                                                                                                                              |                                                                                                                                                                                                                                                                                   |
| <b>Kaitan CPMK dengan Materi dan Bentuk Pembelajaran, serta Alokasi Waktu</b><br><i>(CLO Relation to Learning Material, Learning Forms, and Time Allocation)</i> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>Learning Materials</b>                                                                                                                                                                                                                                                                | <b>Forms of Learning</b>                                                                                                     | <b>Time Allocation</b>                                                                                                                                                                                                                                                            |
|                                                                                                                                                                  | <b>CPMK 3.2</b><br><i>(CLO 3.2)</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 1. Pendahuluan: Penjelasan silabus mata kuliah, penjelasan tugas, serta kesepakatan aturan perkuliahan. Gambaran umum materi perkuliahan<br><i>(Introduction: Explanation of course syllabus, explanation of assignments, agreement of lecture rules. Overview of lecture materials)</i> | <ul style="list-style-type: none"><li>Presentasi<br/><i>(Presentation)</i></li><li>Diskusi<br/><i>(Discussion)</i></li></ul> | <b>1 pertemuan</b><br><i>1 meeting</i><br><br><b>Setiap pertemuan terdiri atas:</b><br><i>Each meeting consists of:</i><br><br>2x50 menit sinkron<br><i>(2x50 minutes synchronous)</i><br><br>2x60 menit penugasan terstruktur<br><i>(2x60 minutes of structured assignments)</i> |

|  |  |                                                                                                                                                                                                                 |                                                                                                                       |                                                                                                                                                                                                                                                                                                                                            |
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|  |  |                                                                                                                                                                                                                 |                                                                                                                       | 2x60 menit belajar mandiri<br>(2x60 minutes of independent study)                                                                                                                                                                                                                                                                          |
|  |  | <p>2. Struktur kimia dan sifat fisik lipida: perilaku leleh (melting behaviour) dan polimorfisme I<br/><i>(Chemical structure and physical properties of lipids : Melting behaviour dan Polymorphism I)</i></p> | <ul style="list-style-type: none"> <li>• Presentasi<br/>(Presentation)</li> <li>• Diskusi<br/>(Discussion)</li> </ul> | <p><b>1 pertemuan</b><br/>1 meeting</p> <p><b>Setiap pertemuan terdiri atas:</b><br/>Each meeting consists of:</p> <p>2x50 menit sinkron<br/>(2x50 minutes synchronous)</p> <p>2x60 menit penugasan terstruktur<br/>(2x60 minutes of structured assignments)</p> <p>2x60 menit belajar mandiri<br/>(2x60 minutes of independent study)</p> |
|  |  | <p>3. Sifat kimia lipida: parameter mutu, hidrolisis, dan esterifikasi<br/><i>(Chemical properties of lipids: Quality parameters, hydrolysis and esterification)</i></p>                                        | <ul style="list-style-type: none"> <li>• Presentasi<br/>(Presentation)</li> <li>• Diskusi<br/>(Discussion)</li> </ul> | <p><b>1 pertemuan</b><br/>1 meeting</p> <p><b>Setiap pertemuan terdiri atas:</b><br/>Each meeting consists of:</p> <p>2x50 menit sinkron<br/>(2x50 minutes synchronous)</p> <p>2x60 menit penugasan terstruktur</p>                                                                                                                        |

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|  |  |                                                                                                                                                                                                                |                                                                                                               | <p>(2x60 minutes of structured assignments)</p> <p>2x60 menit belajar mandiri (2x60 minutes of independent study)</p>                                                                                                                                                                                                                      |
|  |  | <p>4. Pemurnian dan pemrosesan: Ekstraksi lemak dan minyak; Pemurnian dan penyulingan lemak dan minyak<br/>(Refining and purification: Extraction of fat and oil refining and purification of fat and oil)</p> | <ul style="list-style-type: none"> <li>• Presentasi (Presentation)</li> <li>• Diskusi (Discussion)</li> </ul> | <p><b>1 pertemuan</b><br/>1 meeting</p> <p><b>Setiap pertemuan terdiri atas:</b><br/>Each meeting consists of:</p> <p>2x50 menit sinkron<br/>(2x50 minutes synchronous)</p> <p>2x60 menit penugasan terstruktur<br/>(2x60 minutes of structured assignments)</p> <p>2x60 menit belajar mandiri<br/>(2x60 minutes of independent study)</p> |
|  |  | <p>5. Degradasi lipida selama proses pengolahan: Oksidasi; Pembentukan MCPD; Hidrolisis<br/>(Degradation of lipids during processing: Oxidation formation of MCPD hydrolysis)</p>                              | <ul style="list-style-type: none"> <li>• Presentasi (Presentation)</li> <li>• Diskusi (Discussion)</li> </ul> | <p><b>1 pertemuan</b><br/>1 meeting</p> <p><b>Setiap pertemuan terdiri atas:</b><br/>Each meeting consists of:</p> <p>2x50 menit sinkron<br/>(2x50 minutes synchronous)</p>                                                                                                                                                                |

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|  |  |                                                                                                                              |                                                                                                               | <p>2x60 menit penugasan terstruktur<br/>(2x60 minutes of structured assignments)</p> <p>2x60 menit belajar mandiri<br/>(2x60 minutes of independent study)</p>                                                                                                                                                                             |
|  |  | <p>6. Modifikasi lipida I: interesterifikasi<br/>(Lipids modification I: Interesterification)</p>                            | <ul style="list-style-type: none"> <li>• Presentasi (Presentation)</li> <li>• Diskusi (Discussion)</li> </ul> | <p><b>1 pertemuan</b><br/>1 meeting</p> <p><b>Setiap pertemuan terdiri atas:</b><br/>Each meeting consists of:</p> <p>2x50 menit sinkron<br/>(2x50 minutes synchronous)</p> <p>2x60 menit penugasan terstruktur<br/>(2x60 minutes of structured assignments)</p> <p>2x60 menit belajar mandiri<br/>(2x60 minutes of independent study)</p> |
|  |  | <p>7. Modifikasi lipida II: hidrogenasi dan oksidasi lipida<br/>(Lipids modification II: Hydrogenation, Lipid oxidation)</p> | <ul style="list-style-type: none"> <li>• Presentasi (Presentation)</li> <li>• Diskusi (Discussion)</li> </ul> | <p><b>1 pertemuan</b><br/>1 meeting</p> <p><b>Setiap pertemuan terdiri atas:</b><br/>Each meeting consists of:</p> <p>2x50 menit sinkron</p>                                                                                                                                                                                               |

|                                         |                                                                  |                                                                                                                 |                                                                                                            |                                                                                                                                                                                                                                                                                                   |
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|                                         |                                                                  |                                                                                                                 |                                                                                                            | (2x50 minutes synchronous)<br><br>2x60 menit penugasan terstruktur (2x60 minutes of structured assignments)<br><br>2x60 menit belajar mandiri (2x60 minutes of independent study)                                                                                                                 |
|                                         |                                                                  | Ujian Tengah Semester / Hasil Tugas Proyek / Studi Kasus<br>Midterm Exam/Project Results/Case Study Results     |                                                                                                            |                                                                                                                                                                                                                                                                                                   |
|                                         |                                                                  | 8. Perkembangan terkini dalam kimia dan teknologi lipida (Current update in Chemistry and Technology of Lipids) | <ul style="list-style-type: none"><li>• Presentasi (Presentation)</li><li>• Diskusi (Discussion)</li></ul> | 1 pertemuan 1 meeting<br><br>Setiap pertemuan terdiri atas: Each meeting consists of:<br><br>2x50 menit sinkron (2x50 minutes synchronous)<br><br>2x60 menit penugasan terstruktur (2x60 minutes of structured assignments)<br><br>2x60 menit belajar mandiri (2x60 minutes of independent study) |
|                                         |                                                                  | Ujian Akhir Semester / Hasil Tugas Proyek / Studi Kasus<br>Final Exam/Project Results/Case Study Results        |                                                                                                            |                                                                                                                                                                                                                                                                                                   |
|                                         |                                                                  |                                                                                                                 |                                                                                                            |                                                                                                                                                                                                                                                                                                   |
| Metode Pembelajaran<br>Learning Methods | Presentasi, Tanya Jawab, Diskusi (Presentation, Q&A, Discussion) |                                                                                                                 |                                                                                                            |                                                                                                                                                                                                                                                                                                   |

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| <b>Beban Kerja</b><br><i>Workload</i>                                                                            | <p>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.<br/> <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></p> <p><b>Perhitungan Workload per Semester</b><br/> <i>(Workload calculation for one semester)</i></p> <p>= 6 jam/minggu × 16 minggu/semester<br/> = 96 jam/semester<br/> = 96 jam/semester ÷ 26 jam/ECTS<br/> = 3,7 ECTS/semester</p> <p>= 6 hours/week × 16 weeks/semester<br/> = 96 hours/semester<br/> = 96 hours/semester ÷ 26 hours/ECTS<br/> = 3.7 ECTS/semester</p> <p>Total Workload = 3,7 ECTS/semester</p> <p>Catatan (Notes):<br/> 1 ECTS setara dengan 25–30 jam workload mahasiswa, dengan 26 jam ditetapkan sebagai standar minimum.<br/> <i>(1 ECTS is equivalent to 25-30 hours of work, with 26 hours set as the minimum standard.)</i></p> |
| <b>Aktivitas Mahasiswa</b><br><i>Students Activities</i>                                                         | <p><b>Selama Sesi Sinkron</b> <i>(During Synchronous Sessions):</i></p> <ul style="list-style-type: none"> <li>● Berpartisipasi aktif dalam diskusi tentang materi dan studi kasus<br/> <i>Actively engage in discussions on material and case studies</i></li> </ul> <p><b>Sesi Asinkron/Mandiri/Penugasan Terstruktur</b> <i>(During Asynchronous/Self-Study/Structured Assignments):</i></p> <ul style="list-style-type: none"> <li>● Belajar kelompok<br/> <i>Group study</i></li> <li>● Menyelesaikan kuis-kuis<br/> <i>Completing quizzes</i></li> <li>● Refleksi terhadap materi pembelajaran<br/> <i>Reflecting on material</i></li> <li>● Menelaah literatur serta isu-isu sosial kemasyarakatan<br/> <i>Reviewing literature and societal issues</i></li> <li>● Mengembangkan gagasan proyek multidisipliner<br/> <i>Working on multidisciplinary project ideas</i></li> </ul>                                                                                                                                                                                                                                                                                                                        |
| <b>Akses Media Pembelajaran/ LMS dan Persentase Luring &amp; Daring</b><br><i>(Learning Media Access/LMS and</i> | <p><a href="https://elok.ugm.ac.id">https://elok.ugm.ac.id</a><br/> <a href="https://simaster.ugm.ac.id/">https://simaster.ugm.ac.id/</a></p> <p>Luring <i>(Offline)</i>: 100%<br/> Daring <i>(Online)</i>: 0%</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |



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| 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 (Percent age) | CLO 3.2 |  |  |  |  |
|                                                                                                    | A. Aktivitas Partisipatif*) Participatory Activities                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Penugasan Assignments                    |                     |         |  |  |  |  |
|                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                          |                     |         |  |  |  |  |
|                                                                                                    | B. Hasil Project/Hasil Studi Kasus/ Hasil PBL*) Project Results/Case Study Results/PBL Results                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Presentasi Presentation                  | 30%                 | V       |  |  |  |  |
|                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                          |                     |         |  |  |  |  |
|                                                                                                    | C. Kognitif Cognitive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Skill-based Assessment (SBA)             |                     |         |  |  |  |  |
|                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Kuis Quiz                                |                     |         |  |  |  |  |
|                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | UTS Midterm Exam                         | 35%                 | V       |  |  |  |  |
| UAS Final Exam                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 35%                                      | V                   |         |  |  |  |  |
|                                                                                                    | Total                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 100%                                     |                     |         |  |  |  |  |
| Daftar Referensi (Reference)                                                                       | 1. Akoh, C. C., 2017. Food Lipids: Chemistry, Nutrition, and Biotechnology, Fourth Edition. CRC Press, Boca Raton, USA.<br>2. Balan, V., 2019. Microbial Lipid Production: Methods and Protocols. Humana Press, New York, USA.<br>3. Gunstone, F. D., 2011. Vegetable Oils in Food Technology: Composition, Properties and Uses. Blackwell Publishing Ltd., West Sussex, UK.<br>4. Gunstone, F.D., F.B. Padley, 1997. Lipid Technologies and Applications. Marcel Dekker Inc. New York, USA..<br>5. Pathak, A., Singh, S. P. 2025. Next-Generation Drug Delivery Systems. Humana Press, New York, USA.<br>6. Shahidi, F., 2020. Bailey's Industrial Oil and Fat Products, 7 Volume Set, 7th Edition. John Wiley & Son, Inc. New York, USA.<br>7. Relevant scientific literature sourced from peer-reviewed journals such as the <i>Journal of the American Oil Chemists’ Society (JAOCS)</i> , <i>INFORM</i> , <i>Lipids</i> , <i>Food Chemistry</i> , and the <i>Journal of Agricultural and Food Chemistry</i> , as well as other related international journals in lipid science and technology. |                                          |                     |         |  |  |  |  |
| Nama Dosen Pengampu (Teaching Team)                                                                | 1. Dr. Arima Diah Setiowati, S.T.P., M.Sc.<br>2. Prof. Dr. Ir. Sri Raharjo, M.Sc.<br>3. Dr. Lulum Leliana, S.T.P                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                          |                     |         |  |  |  |  |

| Otorisasi<br>(Authorization) | Tanggal<br>Penyusunan<br>(Date) | Koordinator Mata Kuliah<br>(Course Coordinator)                                                                                 | Koordinator Bidang<br>Keahlian<br>(Jika Ada)<br>(Head of Curriculum<br>(if available)) | Ketua Program<br>Studi<br>(Head of the Study<br>Program)                                                                      |
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|                              | 05 August<br>2024               | <br>Dr. Arima Diah Setiowati, S.T.P.,<br>M.Sc. | -                                                                                      | <br>Dr. Ir. Muhammad<br>Nur Cahyanto, M.Sc |