Course Module

Technology of Aromatic Plant Processing

Faculty of Forestry

Mulawarman University

Module name	Technology of Aromatic Plant Processing
Modul level, if applicable	Doctoral (Ph.D)
Code, if applicable	220401902P037
Subtitle, if applicable	Processing and Application of Aromatic Plant Products
Courses, if applicable	Technology of Aromatic Plant Processing
Semester(s) in which the module os taught	
Person resposible for the module	Prof. Harlinda Kuspradini, M.P.
Lecturer	Prof. Dr. Harlinda Kuspradini, M.P. Dr. Ir. Enih Rosamah
Language	Indonesia, English
Relation to curriculum	Elective course
Type of teaching, contact hours	Lectures, seminars, practical sessions, discussions, and independent research.
Workload	Number of meetings per semester 16 meetings (14 meetings for learning activity, 1 meeting for mid-semester, 1 meeting for final examination) For this course, students are required to meet a minimum of 79.3 hours per semester, which consist of : - 23.33 hours for lecture - 28 hours for structured assignments - 28 hours for individual study
Credit points	Credit points: 2 SKS / 3.2 ECTS Details: 1 Credit = 170 min / week 1 Credit = 170 min x 14 week = 2380 min / semester 1 Credit = 39.7 h / semester 1 ECTS = 25 h/ Semester 1 Credit = 1.59 » 1.6 2 Credit = 1.6 x 2 = 3.2 ECTS
Requirements according to the examination regulations	Completion of all assignments, midterm, and final exam

Recommended prerequisites	Background in forest science or equivalent field of study
Module objectives/intended learning outcomes	**Intended Learning Outcome (ILO)** **Attitude (A)** 1. **ILO1 (A1) -** Internalize values, norms, and ethics **Knowledge (K)** 2. **ILO2 (K1) -** Able to synthesize knowledge acquired from research findings with novelty and its implementation **General Skills (GS)** 3. **ILO4 (GS1) -** Able to criticize the philosophy, theory, and methodology of research in forestry and moist tropical environment studies through interdisciplinary, multidisciplinary, and transdisciplinary approaches. **Specialized Skills (SS)** 4. **ILO6 (SS1) -** Able to manage data and information to support decision-making processes. **Course Learning Outcome (CLO)** 1. **CLO1:** Demonstrate a deep understanding and ethical responsibility in conducting research on aromatic plant processing technology, ensuring sustainability and compliance with scientific integrity. **ILO1 (A1)** 2. **CLO2:** Synthesize and integrate advanced research findings on extraction techniques, bioactive compounds, and industrial applications of aromatic plants to develop novel processing technologies. **ILO2 (K1)** 3. **CLO3:** Critically evaluate and refine the philosophical foundations, theoretical frameworks, and research methodologies in aromatic plant processing using interdisciplinary, multidisciplinary, and transdisciplinary approaches. **ILO4 (GS1)** 4. **CLO4:** Demonstrate expertise in managing and analyzing complex datasets in aromatic plant processing, utilizing advanced statistical models and decision-making tools for product development and quality assurance. **ILO6 (SS1)**
Content	This course explores advanced processing techniques for aromatic plants, focusing on extraction, refinement, and quality assessment. Students will critically analyze traditional vs. modern methods, assess processing parameters, and apply scientific testing for product

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<tr><td></td><td>evaluation. Emphasizing research-driven and interdisciplinary approaches, this course integrates sustainability, innovation, and commercialization strategies. Designed for doctoral students in forestry and bioproducts, it equips them with expertise in data-driven decision-making and technological advancements in aromatic plant processing.
1. Contract Introduction to Aromatic Plant Products (1st session) → CLO1 & CLO2
2. Traditional vs. Modern Processing Techniques (2nd-4th sessions) → CLO2, CLO4
3. Midterm Exam (8th session) → Assessment
4. Analysis of Processing Parameters (9th-11th sessions) → CLO4, CLO5
5. Product Testing and Evaluation (12th-14th sessions) → CLO4, CLO5
6. Synthesizing Applications (15th session) → CLO2, CLO4
7. Final Exam (16th session) → Assessment</td></tr>
<tr><td>Study and examination requirements and forms of examination</td><td>Evaluation and assessment of learning achievement based on scheme 1 in the Academic Regulations of Mulawarman University:
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<tr><th>No</th><th>Objects of Evaluation/Assessment:</th><th>Forms of E/A</th><th>Quantity (%)</th></tr>
<tr><td>1</td><td>Affective</td><td>Participation</td><td>10</td></tr>
<tr><td>2</td><td>Assignments/Case Study</td><td>Group Presentation</td><td>25</td></tr>
<tr><td>3</td><td>Project</td><td>Presentation</td><td>25</td></tr>
<tr><td>4</td><td>Mid-Semester Test</td><td>Written test</td><td>15</td></tr>
<tr><td>5</td><td>Final Examination</td><td>Written test</td><td>25</td></tr>
<tr><td colspan="3">Total</td><td>100</td></tr>
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<tr><td>Media employed</td><td>PowerPoint slides, multimedia videos, scientific journals, laboratory equipment for testing simulations, and discussion forums.</td></tr>
<tr><td>Reading list</td><td>1. Handa, S.S., et al. Extraction Technologies for Medicinal and Aromatic Plants. International Centre for Science and High Technology, 2008.
2. Hunter, M. Essential Oils: Art, Agriculture, Science, Industry, and Entrepreneurship. Nova Science, 2009.
3. Li, Y., et al. Essential Oils: From Conventional to Green Extraction. SpringerBriefs in Green Chemistry, 2014.
4. Cannon, J.B., et al. “Modification of Yield and Composition of Essential Oils by Distillation Time.” Industrial Crops and Products, 2013.</td></tr>
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	5. Tembe, M., et al. “Yield Dependency Parameters for Essential Oils Extraction Techniques.” *IJRASET*, 2018. 6. Tongnuanchan, P., Benjakul, S. “Essential Oils: Extraction, Bioactivities, and Their Uses for Food Preservation.” *Journal of Food Science*, 2014. 7. Any additional source related to the subject.