Course Module

Processing and Utilization Technology of Fiber

Faculty of Forestry

Mulawarman University

1) Module description

A Module Handbook or collection of module descriptions that is also available for students to consult should contain the following information about the individual modules:

Module name	Processing and Utilization Technology of Fiber
Modul level, if applicable	Doctoral
Code, if applicable	220401902P039
Subtitle, if applicable	-
Courses, if applicable	-
Semester(s) in which the module is taught	The subject is available throughout all academic semesters
Person responsible for the module	Dr. Wiwin Suwinarti, M.P.
Lecturer	Dr. Wiwin Suwinarti, M.P. Prof. Dr. Rudianto Amirta, M.P.
Language	Indonesia
Relation to curriculum	Compulsory Course
Type of teaching, contact hours	Direct instruction, discussion, and assignment
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	-
Recommended prerequisites	-
Module objectives/intended learning outcomes	**Intended Learning Outcome (ILO)** **Attitude (A)** 1. **ILO1 (A1)** - Internalize scientific values, norms, and ethics **Knowledge (K)** 2. **ILO2 (K1)** - Able to synthesize knowledge acquired from research findings with novelty and its implementation 3. **ILO3 (K2)** - Able to discover and develop scientific conceptions with novelty value, and able to develop scientific arguments as science solutions **Specific Skills (SS)** 4. **ILO6 (SS1)** - Able to manage data and information to support decision-making processes **Content Learning Outcome (CLO)** 1. **CLO1**: Students are able to critically analyze and synthesize advanced fiber processing technologies through the evaluation of scientific articles and research publications in fiber-based industries. **ILO2 (K1).** 2. **CLO2**: Students are able to evaluate and discuss innovative fiber utilization technologies for bioenergy production by engaging in critical reviews of recent journal articles and case studies. **ILO3 (K2).** 3. **CLO3**: Students are able to design and lead research projects, supported by thorough literature reviews and discussions, to contribute to advancements in sustainable fiber processing and bioenergy utilization. **ILO6 (SS1).** 4. **CLO4:** Students are able to demonstrate ethical responsibility and sustainability awareness in fiber-based industry practices and bioenergy research. **ILO1 (A1).**
Contents	This course provides an in-depth exploration of fiber processing technologies and their utilization in various industries, including bioenergy applications. Students will gain a strong foundation in fiber properties and characteristics, enabling them to critically analyze fiber processing methods, innovations, and industrial applications. The course also emphasizes sustainability, ethical considerations, and research-driven advancements in fiber-based industries. Through scientific article reviews, case studies, and group discussions, students will develop critical thinking and problem-solving

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<tr><td></td><td>skills necessary for evaluating fiber processing technologies and bioenergy utilization. Assessments include a midterm examination, research presentations, and a final examination to ensure a comprehensive understanding and application of fiber technology concepts. List below:

1. Introduction to Fiber Processing and Utilization (1st session) → CLO1
2. Properties and Characteristics of Fibers (2nd and 3rd sessions) → CLO1
3. Fiber Processing Technologies (4th and 5th sessions) → CLO1
4. Fiber Utilization in Fiber-Based Industries (6th and 7th sessions) → CLO2
5. Midterm Examination (UTS) (8th session) → Assessment
6. Fiber Utilization in Bioenergy (9th and 10th sessions) → CLO2
7. Innovations and Future Trends in Fiber Processing and Utilization (11th session) → CLO2
8. Article Discussions on Fiber Technology and Bioenergy (12th and 13th sessions) → CLO3
9. Case Studies in Industrial Applications of Fiber Processing (14th session) → CLO3
10. Research Presentation and Group Discussions (15th session) → CLO4
11. Final Examination (UAS) (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:
<table>
<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>
</table></td></tr>
<tr><td>Media employed</td><td>Class, Ms. Powerpoint, Ms. Word, Computer, LCD, STAR</td></tr>
<tr><td>Reading list</td><td>1. Kolowski, R. and M.M. Talarczyk. 2020. Handbook of Natural Fibres 2nd Edition Volume 1. Woodhead Publishing.
2. Kolowski, R. and M.M. Talarczyk. 2020. Handbook of Natural Fibres 2nd Edition Volume 2. Woodhead Publishing.
3. Fanguiero, R and S. Rana. 2015. Natural Fibres: Advances In Science and Technology Towards Industrial Applications. Springer.</td></tr>
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	4. Dahiya, A. 2020. Bioenergy. 2nd Edition. Biomass to Biofuel and Waste To Energy. Academic Press. 5. Dahiya, A. 2014. Bioenergy. 1st Edition. Biomass to Biofuels. Academic Press. 6. Love, J. And J.A. Bryant. 2017. Biofuels and Bioenergy. John Wiley & Sons Ltd. 7. Kaltschmitt, M. And H. Hofbauer. 2019. Biomass Conversion and Biorefinery. Hybrid-Springer. 8. Zhang, B. And Y. Wang. 2013. Biomass Processing, Conversion And Biorefinery. Nova. 9. Jurnal Tentang Serat, Bioenergi dan Konversi Biomassa 10. Additional articles which related to subjects