Course Module

Advanced Forest Products Processing

Faculty of Forestry

Mulawarman University

Module name	Advanced Forest Products Processing
Module level, if applicable	Graduates Programme
Code, if applicable	190401802W007
Subtitle, if applicable	
Courses, if applicable	Regular
Semester(s) in which the module is taught	I (one)
Person responsible for the module	Dr. Ir. Isna Yuniar Wardhani, M.P.
Lecturer	Prof. Dr. Ir. Edy Budiarso Prof. Dr. Rudianto Amirta, S.Hut., M.P. Prof. Dr. Harlinda Kuspradini, S.Hut., M.P. Dr. Ir. Isna Yuniar Wardhani, M.P.
Language	Indonesia
Relation to curriculum	Programme, mandatory
Type of teaching, contact hours	Lecture, 3 lecture contact hours
Workload	Number of meetings per semester: 16 meetings (14 meetings for learning activity, 1 meeting for mid semester, 1 meeting for final examination) 2 x 50 minutes lectures, 2 x 60 minutes structured assignment, 2 x 60 minutes individual activity, with a total time of 4760 minutes or equivalent to a total of 79.3 hours in 14 weeks per semester
Credit points	2 SKS (3.2 ECTS) Details: 1 Credit = 170 min/week 1 Credit = 170 min x 14 week = 2,380 min/semester 1 ECTS = 25 h / semester 1 Credit = 2,380 / 60 / 25 = 1.59 = 1.6 ECTS 2 Credit = 1.6 x 2 = 3.2 ECTS
Requirements according to the examination regulations	Have attended not less than 80% class meetings
Recommended prerequisites	
Module objectives/intended learning outcomes	**Intended Learning Outcomes (ILO):** **Knowledge and Understanding** **ILO-1:** Applying scientific ethics, norms, and values of professionalism **Engineering Analysis** **ILO-2:** Mastering specialized knowledge, skills and techniques in the field of forestry and tropical environment and being able to develop innovative theories, models and methods in their field. **Investigation** **ILO-3:** Able to analyze current problems and issues, and assess the ecological, social, and economic impacts of implementing programs in the forestry and tropical environmental sectors **Course Learning Outcomes (CLO):** **Knowledge and Understanding**

<table>
<tr><td></td><td>CLO-1: Students are able to organize forest products based on raw materials and manufacturing processes
<u>Engineering Analysis</u>
CLO- : Students are able to select various NTFP based on government policies
<u>Investigation</u>
CLO-3: Students are able to work together in abstracting various sources of information related to forest products</td></tr>
<tr><td>Content</td><td>This course provides an in-depth understanding of the latest techniques and technologies in forest product processing. The course covers various aspects of forest product processing, from raw materials to final products, with a focus on sustainability and efficiency.

After attending this course, students have the ability to:
1. Able to describe the basic processes in wood processing (drying and preservation) (CLO-1)
2. Able to organize various forest products based on raw materials and manufacturing processes (CLO-1)
3. Able to abstract information related to wood processing products (CLO-1)
4. Able to examine plant HHBK groups based on SNI (CLO-2)
5. Able to detect essential oil HHBK commodities in Indonesia (CLO-2)
6. Able to analyze raw materials, processes and products of renewable energy sources from plants (CLO-3)
7. Able to examine forms of renewable energy based on their benefits (CLO-3)</td></tr>
<tr><td>Study and examination requirements and forms of examination</td><td>
<table>
<tr><th>No.</th><th>Objects of Assessment</th><th>Forms of Assessment</th><th>Quantity (%)</th></tr>
<tr><td>1</td><td>Affective</td><td>Participation</td><td>10</td></tr>
<tr><td>2</td><td>Assignment/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 semester test</td><td>Written test</td><td>25</td></tr>
<tr><td></td><td></td><td>TOTAL</td><td>100</td></tr>
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<tr><td>Media employed</td><td>Class, MS. Powerpoint, Ms.Word, Laptop, LCD</td></tr>
<tr><td>Reading list</td><td>1. Shmulsky, R and P.D. Jones. 2019. Forest Products and Wood Science. An Introduction. 7th Edition. John Wiley & Sons Ltd, West Sussex, UK.
2. Kollmann F.F.P., E.W. Kuenzi & A.J. Stamm. 1975. Principles of Wood Science and Technology. Vol. I. Wood Based Materials. Springer-Verlag. Berlin New York
3. Dimitriou I dan Rutz D. 2015. Sustainable Short Rotation Coppice: A Handbook. WIP Renewable Energies, Munich, Germany, 1-109.
4. Kollmann F.F.P. and W.A. Côte, Jr. 1984. Principles of Wood Science and Technology. Vol. I. Solid Wood. Springer-Verlag. Berlin
5. Pizzi, A. and K. L. Mittal. 2012. Wood Adhesives. CRC Press Taylor & Francis Group. Leiden Boston</td></tr>
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7. Louie H.. 2018. Off-Grid Electrical Systems in Developing Countries. Springer International Publishing, Switzerland. 1-477.
8. Sharma D dan Saini A. 2020. Lignocellulosic Ethanol Production from a Biorefinery Perspective: Sustainable Valorization of Waste. Springer
9. Amirta R, Suwinarti W, Yuliansyah, Haqiqi MT, Susanto D, dan Wulandari R. 2021. Peran Strategis Sektor Kehutanan dalam Mewujudkan Kemandirian dan Kedaulatan Energi di Kalimantan Timur: Percepatan Penyediaan Listrik Desa di Wilayah Pedalaman (Remote Area), (Chapter). UNMUL Hebat, Kaltim Berdaulat, Kuat: Kontribusi Pemikiran Universitas Mulawarman di Usia 60 Tahun. IPB Press, 391-414.
10. Amirta R,. 2018. Pellet Kayu Energi Hijau Masa Depan. Mulawarman University Press, 1-93.
11. Amirta R, Angi EM, Yuliansyah, Ananto BR, Setiyono B. 2017. Desa Mandiri Listrik: Potensi Pengembangan Energi Listrik Berbasis Biomassa Hutan. Mulawarman University Press, 1-115
12. Amirta R, Haqiqi MT, Saparwadi, Septia E, Mujiasih D, Setiawan KA, Sekedang MA, Yuliansyah, Wijaya A, Setiyono B, Suwinarti W. 2019. Searching for potential wood biomass for green energy feedstock: A study in tropical swamp-peat forest of Kutai Kertanegara, Indonesia. Biodiversitas, 20 (6): 1516-1523.
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14. Amirta R, Nafitri SI, Wulandari R, Yuliansyah, Suwinarti W, Candra KP, Watanabe T. 2016. Comparative characterization of Macaranga species collected from secondary forests in East Kalimantan for biorefinery of unutilized fast growing wood. Biodiversitas, 17 (1): 116-123.
15. Amirta R, Yuliansyah, Angi EM, Ananto BR, Setiyono B, Haqiqi MT, Septiana HA, Lodong M, Oktavianto RN. 2016. Plant diversity and energy potency of community forest in East Kalimantan, Indonesia: Searching for fast growing wood species for energy production. Nusantara Bioscience, 8 (1): 22-31.
16. Amirta R, Herawati E, Suwinarti W, Watanabe T. 2016. Two-steps Utilization of Shorea Wood Waste Biomass for The Production of Oyster Mushroom and Biogas – A zero waste approach. Agriculture and Agricultural Science Procedia, 9: 202–208.
17. McKendry P. 2002. Energy production from biomass (part 1): overview of biomass. Bioresour Technol 83 (1): 37-46
18. McKendry P. 2002. Energy production from biomass (part 2): conversion technologies. Bioresour Technol 83 (1): 47-54
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