



Transformation
Towards the Ultimate



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MODULE HANDBOOK (REVISION)

MASTER DEGREE OF FORESTRY STUDY PROGRAM



FACULTY OF FORESTRY
UNIVERSITAS SUMATERA UTARA
2025



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Compulsory Courses

Module designation	Statistical Analysis					
Subtitle	Analisis Statistik					
Code	IKH 1 600					
The year in which the module is taught						
Person responsible for the module	Dr. Nurdin Sulistiyono S.Hut., M.Si.					
Lecturer	Prof. Dr. Delvian SP., MP. Prof. Ir. Siti Latifah S.Hut, M.Si, Ph.D, IPU Prof. Dr. Ir. Yunasfi M.Si.					
Language	Indonesia / English					
Relation to curriculum	Compulsory / elective / specialisation Names of other study programmes with which the module is shared					
Teaching methods	Lecture and discussion: 150 minute, 14 Lecturer = 35 hour Structured Activities: 180 minute, 14 activities = 42 hour Self Learning (Individual/Group Project): 450 minute, 14 week = 105 hour Middle exam: 100 minute = 1.6 hour Final exam: 100 minute = 1,6 hour					
Workload (incl. contact hours, self-study hours)	Activity	Lecture and Discussion	Structured Activites	Self Learning (Individual / Group Project)	Exam	Total
	Hours	35	42	105	3.2	185
Credit points	3 semester credit unit (SCU) equivalen 6.64 ECTS					
Required prerequisites for joining the module	none					
Recommended prerequisites for joining the module	none					
Module objectives/intended learning outcomes	<p>PLO 3 Having competency in research techniques, scientific analysis of study findings, and presentation of findings.</p> <p>PLO 4 Having understanding of the theories and advancements in the forestry industry basic science, cultivation, management, technology, and conservation.</p> <p>PLO 5 Capable of demonstrating independent and team work, quality and measurable performance, able to apply various methods of science and technology in forestry issue identification and solving.</p> <p>PLO 6 Capable of making appropriate decisions based on standard procedures and data, in communication, supervision and evaluation of work in forestry field.</p>					
Content	<p>Study materials (teaching materials):</p> <ol style="list-style-type: none"> 1. Introduction, Data sharing, descriptive and inferential statistics 2. Sample Withdrawal Technique 3. OLS (<i>Ordinary Least Square</i>) Regression and <i>Path analysis</i> 4. Path Analysis 5. GLM (<i>General Linear Model</i>) 6. Geo statistics and GWR (<i>Geographic Weight Regression</i>) 7. <i>Experimental design</i> concept and completely randomised design (CRD) 					

	8. Randomised Group Design (RGD) 9. Randomised Factorial Design (RFD) 10. Latin square design 11. PCA (<i>Principal Component Analysis</i>) 12. Discriminant Analysis 13. Cluster Analysis 14. Introduction to SEM (<i>Structural Equation Model</i>)																								
Examination forms	<ul style="list-style-type: none"> • Quiz: Short questions related to the lecture subject (topic) given to students at the beginning or end of the lecture. • Assignment: Assignments to deepen the lecture topics given to students after several lectures. • Project Based: Problem-based individual or group assignments to strengthen skills related to learning topics in several lectures. • Case Study: Individual or group assignments based on case study to strengthen skills related to learning topics in several lectures. • Midle Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in the first to seventh lectures. • Final Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in lectures after half a semester until the end of the semester. 																								
Study and examination requirements	<ul style="list-style-type: none"> - Minimum lecture attendance is 80%. - Weighting composition for the final grade is quiz (5%), Assignment (5%), Project Based (25%), Case Study (25%). Midle Exam (20%), and Final Exam (20%). - Final grade is defined as: <table border="1"> <thead> <tr> <th>Score</th> <th>Grade</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>≥ 80</td> <td>A</td> <td>4</td> </tr> <tr> <td>75 - < 80</td> <td>B+</td> <td>3,5</td> </tr> <tr> <td>70 - < 75</td> <td>B</td> <td>3</td> </tr> <tr> <td>65 - < 70</td> <td>C+</td> <td>2,5</td> </tr> <tr> <td>60 - < 65</td> <td>C</td> <td>2</td> </tr> <tr> <td>50 - < 60</td> <td>D</td> <td>1</td> </tr> <tr> <td>< 50</td> <td>E</td> <td>0</td> </tr> </tbody> </table> 	Score	Grade	Value	≥ 80	A	4	75 - < 80	B+	3,5	70 - < 75	B	3	65 - < 70	C+	2,5	60 - < 65	C	2	50 - < 60	D	1	< 50	E	0
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≥ 80	A	4																							
75 - < 80	B+	3,5																							
70 - < 75	B	3																							
65 - < 70	C+	2,5																							
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50 - < 60	D	1																							
< 50	E	0																							
Learning media	Class room, TV Projector, In Focus, Power Point																								
Reading List	<ol style="list-style-type: none"> 1. Fauzy. 2019. Sampling Methods. Open University Press. 2. Sarwono. 2022. Path Analysis for Research. Elexmedia Komputindo Kompas Gramedia Jakarta. 3. Ghozali, I. 2005. Structural Equation Modeling, Theory, Concepts and Applications. Diponegoro University Press. Semarang 4. Siegel, S. 1994. Nonparametric Statistics for the Social Sciences. Gramedia Publisher, Jakarta. 5. Savitri et al. 2021. Multivariate Statistics in Research. Widina Bhakti Persada Publishing House, Bandung. 6. Sari et al. 2023. Experimental Design and Statistics. CV. Eureka Media Aksara Publishing House, Purbalingga. 7. Rowell, R. M. (2012). Handbook of Wood Chemistry and Wood Composites. CRC Press. 																								

Module designation	Tropical Silviculture					
Subtitle	Silvikultur Tropika					
Code	IKH 1 602					
The year in which the module is taught						
Person responsible for the module	Dr. Kansih Sri Hartini S.Hut., MP.					
Lecturer	Dr. Nelly Anna S.Hut., M.Si. Prof. Dr. Arida Susilowati S.Hut., M.Si Prof. Dr. Budi Utomo SP., MP.					
Language	Indonesia / English					
Relation to curriculum	Compulsory / elective / specialisation Names of other study programmes with which the module is shared					
Teaching methods	Lecture and discussion: 150 minute, 14 Lecturer = 35 hour Structured Activities: 180 minute, 14 activities = 42 hour Self Learning (Individual/Group Project): 450 minute, 14 week = 105 hour Middle exam: 100 minute = 1.6 hour Final exam: 100 minute = 1,6 hour					
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Credit points	3 semester credit unit (SCU) equivalen 6.64 ECTS					
Required prerequisites for joining the module	none					
Recommended prerequisites for joining the module	none					
Module objectives/intended learning outcomes	<p>PLO 4 Having understanding of the theories and advancements in the forestry industry basic science, cultivation, management, technology, and conservation.</p> <p>PLO 5 Capable of demonstrating independent and team work, quality and measurable performance, able to apply various methods of science and technology in forestry issue identification and solving.</p> <p>PLO 9 Having skill to innovate forest cultivation, including biotechnology and other silvicultural activities in forest rehabilitation and reforestation effort.</p>					
Content	<p>Study materials (teaching materials):</p> <ol style="list-style-type: none"> 1. Scope 2. Current State of Tropical Forests 3. Silviculture's Link to Sustainable Forest Management 4. Silvicultural Measures in Stand Management 5. Stand Growth and Quality 6. Indigenous Species Study 7. Exotic Species Study 8. Global Silviculture System 9. Applications of Silviculture Systems in Tropical Countries 10. Application of Silviculture System in Indonesia 					

	<p>11. Case study exposure 12. Evaluation of Silviculture Systems in Natural Forests 13. Evaluation of Silviculture System in Plantation Forest 14. Project Based Learning Exposure</p>																								
Examination forms	<ul style="list-style-type: none"> • Quiz: Short questions related to the lecture subject (topic) given to students at the beginning or end of the lecture. • Assignment: Assignments to deepen the lecture topics given to students after several lectures. • Project Based: Problem-based individual or group assignments to strengthen skills related to learning topics in several lectures. • Case Study: Individual or group assignments based on case study to strengthen skills related to learning topics in several lectures. • Midle Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in the first to seventh lectures. • Final Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in lectures after half a semester until the end of the semester. 																								
Study and examination requirements	<ul style="list-style-type: none"> - Minimum lecture attendance is 80%. - Weighting composition for the final grade is quiz (10%), Assignment (10%), Project Based (25%), Case Study (25%), Midle Exam (15%), and Final Exam (15%). - Final grade is defined as: <table border="1" style="margin-left: 40px;"> <thead> <tr> <th>Score</th> <th>Grade</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>> 80</td> <td>A</td> <td>4</td> </tr> <tr> <td>75 - < 80</td> <td>B+</td> <td>3,5</td> </tr> <tr> <td>70 - < 75</td> <td>B</td> <td>3</td> </tr> <tr> <td>65 - < 70</td> <td>C+</td> <td>2,5</td> </tr> <tr> <td>60 - < 65</td> <td>C</td> <td>2</td> </tr> <tr> <td>50 - < 60</td> <td>D</td> <td>1</td> </tr> <tr> <td>< 50</td> <td>E</td> <td>0</td> </tr> </tbody> </table>	Score	Grade	Value	> 80	A	4	75 - < 80	B+	3,5	70 - < 75	B	3	65 - < 70	C+	2,5	60 - < 65	C	2	50 - < 60	D	1	< 50	E	0
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Learning media	Class room, TV Projector, In Focus, Power Point																								
Reading List	<ol style="list-style-type: none"> 1. Forestry Manual; Indonesian Ministry of Forestry, 1992 2. Indonesian Forestry Guide 3. Intensive Silviculture Techniques (SILIN); Soekotjo, Gadjah Mada University Press, 2009 4. Guide to Rehabilitation and Silviculture Techniques in Peatlands, Wibisono et al., Wetlands International-IP, 2005 5. Silviculture in the Tropics; Sven Gunter et al., Springer, 2011 6. Ministry of Forestry Regulation No. P.11/Menhut-II/2009 concerning Silviculture Systems in IUPHHK Areas in Production Forests 7. Director General of Forestry Production Regulation No. P.9/VI/BPHA/2009 concerning Guidelines for the Implementation of Silviculture Systems in IUPHHK Areas in Production Forests and its attachments (Attachments 1, 2, 3 and 4) 8. Other references in the form of papers, articles, and exposés related to the theme of silviculture 9. Ministry of Forestry Regulation No. P.65/Menhut-II/2014 10. http://www.for.gov.bc.ca/hfd/pubs/SSIntroworkbook 																								

Module designation	Advanced Forest Management					
Subtitle	Manajemen Hutan Lanjutan					
Code	IKH 1 603					
The year in which the module is taught						
Person responsible for the module	Prof. Ir. Siti Latifah S.Hut, M.Si, Ph.D, IPU					
Lecturer	Prof. Rahmawaty S.Hut., M.Si., Ph.D. Dr. Ir OK Hasnanda Syahputra MP Dr. Oding Affandi S.Hut., MP.					
Language	Indonesia / English					
Relation to curriculum	Compulsory / elective / specialisation Names of other study programmes with which the module is shared					
Teaching methods	Lecture and discussion: 150 minute, 14 Lecturer = 35 hour Structured Activities: 180 minute, 14 activities = 42 hour Self Learning (Individual/Group Project): 450 minute, 14 week = 105 hour Middle exam: 100 minute = 1.6 hour Final exam: 100 minute = 1,6 hour					
Workload (incl. contact hours, self-study hours)	Activity	Lecture and Discussion	Structured Activites	Self Learning (Individual / Group Project)	Exam	Total
	Hours	35	42	105	3.2	185
Credit points	3 semester credit unit (SCU) equivalen 6.64 ECTS					
Required prerequisites for joining the module	None					
Recommended prerequisites for joining the module	None					
Module objectives/intended learning outcomes	<p>PLO 4 Having understanding of the theories and advancements in the forestry industry basic science, cultivation, management, technology, and conservation.</p> <p>PLO 7 Capable of arranging scientific research, compile the scientific and non-scientific reports in the form of thesis and prevent the plagiarism.</p> <p>PLO 8 Having skill to enhance the sustainable forest resource management, including watershed management, forest assessment, socio-economics, communication, as well as adapting to developments through various technological approaches: GIS, drones and info</p>					
Content	<p>Study material:</p> <ol style="list-style-type: none"> 1. Indonesian forest areas 2. Natural forest management for REDD+ development 3. Community-based forest management 4. Stand growth models 5. Forest Management Units (KPH) 6. Forest Management Units (KPH) 7. Addressing the causes of deforestation and forest degradation 8. Mid Semester Examination 					

	<p>9. Forestry techniques to support sustainable production forest management</p> <p>10. Forestry certification and timber legality (SVLK)</p> <p>11. Ecolabels and ISO in sustainable production forest management</p> <p>12. HTI management</p> <p>13. Yield regulation</p> <p>14. National park management</p> <p>15. Economic value and contribution of forest products, both tangible and intangible</p> <p>16. Final Exam</p>																								
Examination forms	<ul style="list-style-type: none"> • Project Based: Problem-based individual or group assignments to strengthen skills related to learning topics in several lectures. • Case Study: Individual or group assignments based on case study to strengthen skills related to learning topics in several lectures. • Midle Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in the first to seventh lectures. • Final Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in lectures after half a semester until the end of the semester. 																								
Study and examination requirements	<ul style="list-style-type: none"> - Minimum lecture attendance is 80%. - Weighting composition for the final grade is Project Based (30%), Case Study (30%), Midle Exam (20%), and Final Exam (20%). - Final grade is defined as: <table border="1" style="margin-left: 40px;"> <thead> <tr> <th>Score</th> <th>Grade</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>≥ 80</td> <td>A</td> <td>4</td> </tr> <tr> <td>75 - < 80</td> <td>B+</td> <td>3,5</td> </tr> <tr> <td>70 - < 75</td> <td>B</td> <td>3</td> </tr> <tr> <td>65 - < 70</td> <td>C+</td> <td>2,5</td> </tr> <tr> <td>60 - < 65</td> <td>C</td> <td>2</td> </tr> <tr> <td>50 - < 60</td> <td>D</td> <td>1</td> </tr> <tr> <td>< 50</td> <td>E</td> <td>0</td> </tr> </tbody> </table>	Score	Grade	Value	≥ 80	A	4	75 - < 80	B+	3,5	70 - < 75	B	3	65 - < 70	C+	2,5	60 - < 65	C	2	50 - < 60	D	1	< 50	E	0
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Learning media	Class room, TV Projector, In Focus, Power Point.																								
Reading List	<ol style="list-style-type: none"> 1. Status of Indonesia's Forests & Forestry. 2018 (Ministry of Forestry, 2018). 2. The academic essence of corrective environmental and forestry policies. Dr. Ir. Siti Nurbaya Bakar, MSc 3. Sustainable production forest management (Endang Suhendang, Herman Haeruman, Ishemat Soerinegara, 1995) 4. KPH development (concept, regulations and implementation) (Ministry of Forestry, Directorate General of Planning, 2011) 5. Introduction to Forestry Certification (Sitalatifah, Rudi Hartono, Rahmawati, 2016) 6. Forest Management Unit Development (FMU) (Ministry of Forestry, Directorate General of Forest Planning, 2011) 7. Forest Management (Davis, LS and KN Johnson, 1987) 8. Forest Management and Economics (Buongiorno and Giles, 1986) 9. Timber Management A Quantitative Approach (Clutter, J. et al, 1988) 																								

	10. Forest Management: Regulation and Valuation (Kenneth P. Davis, 1966)
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Module designation	Flora and Fauna Conservation					
Subtitle	Konservasi Flora dan Fauna					
Code	IKH 1 604					
The year in which the module is taught						
Person responsible for the module	Dr. Ir Ma'rifatin Zahrah M.Si					
Lecturer	Dr. Ir. Alfian Gunawan Ahmad S.Hut., M.Si., IPU Dr. Ir. Pindi Patana S.Hut., M.Sc., IPU Onrizal S.Hut, M.Si, Ph.D					
Language	Indonesia / English					
Relation to curriculum	Compulsory / elective / specialisation Names of other study programmes with which the module is shared					
Teaching methods	Lecture and discussion: 150 minute, 14 Lecturer = 35 hour Structured Activities: 180 minute, 14 activities = 42 hour Self Learning (Individual/Group Project): 450 minute, 14 week = 105 hour Middle exam: 100 minute = 1.6 hour Final exam: 100 minute = 1,6 hour					
Workload (incl. contact hours, self-study hours)	Activity	Lecture and Discussion	Structured Activites	Self Learning (Individual / Group Project)	Exam	Total
	Hours	35	42	105	3.2	185
Credit points	3 semester credit unit (SCU) equivalen 6.64 ECTS					
Required prerequisites for joining the module	None					
Recommended prerequisites for joining the module	None					
Module objectives/intended learning outcomes	<p>PLO 4 Having understanding of the theories and advancements in the forestry industry basic science, cultivation, management, technology, and conservation.</p> <p>PLO 6 Capable of making appropriate decisions based on standard procedures and data, in communication, supervision and evaluation of work in forestry field. fforts at various levels (genetic, species and ecosystem)</p> <p>PLO 11 Having skill to elaborate the forest resources conservation efforts, including provide the solution alternatives, community collaborations, prioritizing a holistic approach (ecological, economic and socio-cultural) in forest resources conservation</p>					
Content	<p>Study materials (teaching materials):</p> <ol style="list-style-type: none"> 1. Course Contract and Description of course material 2. Distribution of Flora and Fauna Diversity in Indonesia 3. Reasons for conservation of Flora and Fauna: 4. Threats to flora and fauna extinction: overexploitation, hunting/trading, improper land use, habitat fragmentation, climate change 5. Concept/criteria of rarity and extinction of flora and fauna based on 					

	6. IUCN and Law/PP and trade regulation under CITES 7. Conservation Strategy for Wildlife Species 8. Area Conservation Strategy 9. International co-operation, agreements and funding for flora & fauna conservation 10. Flora Insitu Conservation 11. In situ conservation of flora 12. Flora and Fauna Conservation in Production Forest/HTI 13. Restoration of Forest Ecological Function 14. The role of Flora and Fauna for sustainable development 15. Review of Implementation of Laws and Regulations																								
Examination forms	<ul style="list-style-type: none"> • Quiz: Short questions related to the lecture subject (topic) given to students at the beginning or end of the lecture. • Assignment: Assignments to deepen the lecture topics given to students after several lectures. • Project Based: Problem-based individual or group assignments to strengthen skills related to learning topics in several lectures. • Case Study: Individual or group assignments based on case study to strengthen skills related to learning topics in several lectures. • Midle Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in the first to seventh lectures. • Final Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in lectures after half a semester until the end of the semester. 																								
Study and examination requirements	<ul style="list-style-type: none"> - Minimum lecture attendance is 80%. - Weighting composition for the final grade is quiz (5%), Assignment (5%), Project Based (25%), Case Study (25%). Midle Exam (20%), and Final Exam (20%). - Final grade is defined as: <table border="1" style="margin-left: 40px;"> <thead> <tr> <th>Score</th> <th>Grade</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>≥ 80</td> <td>A</td> <td>4</td> </tr> <tr> <td>75 - < 80</td> <td>B+</td> <td>3,5</td> </tr> <tr> <td>70 - < 75</td> <td>B</td> <td>3</td> </tr> <tr> <td>65 - < 70</td> <td>C+</td> <td>2,5</td> </tr> <tr> <td>60 - < 65</td> <td>C</td> <td>2</td> </tr> <tr> <td>50 - < 60</td> <td>D</td> <td>1</td> </tr> <tr> <td>< 50</td> <td>E</td> <td>0</td> </tr> </tbody> </table>	Score	Grade	Value	≥ 80	A	4	75 - < 80	B+	3,5	70 - < 75	B	3	65 - < 70	C+	2,5	60 - < 65	C	2	50 - < 60	D	1	< 50	E	0
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Learning media	Class room, TV Projector, In Focus, Power Point.																								
Reading List	<p>Di Marco, M., Ferrier, S., Harwood, T. D., Hoskins, A. J., & Watson, J. E. (2019). Wilderness areas halve the extinction risk of terrestrial biodiversity. <i>Nature</i>, 573(7775), 582-585.</p> <p>Gorobets, A. (2020). Wild fauna conservation: IUCN-CITES match is required. <i>Ecological Indicators</i>, 112, 106091.</p> <p>Kuipers, K. J., Hellweg, S., & Verones, F. (2019). Potential Consequences of regional species loss for global species richness: A quantitative approach for estimating global extinction probabilities. <i>Environmental science & technology</i>, 53(9), 4728-4738.</p>																								

- Löki, V., Deák, B., Lukács, A. B., & Molnár, A. (2019). Biodiversity potential of burial places—a review on the flora and fauna of cemeteries and churchyards. *Global Ecology and Conservation*, *18*, e00614.
- Lucardi, R. D., Cunard, C. E., Hughes, S. C., Burgess, K. S., Reed, J. N., Whitehurst, L. E., ... & Marsico, T. D. (2020). An initial industrial flora: A framework for botanical research in cooperation with industry for biodiversity conservation. *PloS one*, *15*(4), e0230729.
- Mills, J. G., Weinstein, P., Gellie, N. J., Weyrich, L. S., Lowe, A. J., & Breed, M. F. (2017). Urban habitat restoration provides a human health benefit through microbiome rewilding: the Microbiome Rewilding Hypothesis. *Restoration ecology*, *25*(6), 866-872.
- Nic Lughadha, E., Bachman, S. P., Leão, T. C., Forest, F., Halley, J. M., Moat, J., ... & Gonçalves, S. C. (2020). Extinction risk and threats to plants and fungi. *Plants, People, Planet*, *2*(5), 389-408.
- Slik, J. F., Franklin, J., Arroyo-Rodríguez, V., Field, R., Aguilar, S., Aguirre, N., ... & Avella, A. (2018). Phylogenetic classification of the world's tropical forests. *Proceedings of the National Academy of Sciences*, *115*(8), 1837-1842.
- Tali, B. A., Khuroo, A. A., Nawchoo, I. A., & Ganie, A. H. (2019). Prioritizing conservation of medicinal flora in the Himalayan biodiversity hotspot: an integrated ecological and socioeconomic approach. *Environmental Conservation*, *46*(2), 147-154.
- Tollefson, J. (2019). One million species face extinction. *Nature*, *9*.
- Tonietto, R. K., & Larkin, D. J. (2018). Habitat restoration benefits wild bees: A meta-analysis. *Journal of Applied Ecology*, *55*(2), 582-590.
- Vasconcelos, R., Pujol-Buxó, E., Llorente, G. A., Saeed, A., & Carranza, S. (2020). Micro-hotspots for conservation: An umbrella tree species for the unique Socotran reptile fauna. *Forests*, *11*(3), 353.

Module designation	Wood Science and Technology					
Subtitle	Ilmu dan Teknologi Kayu					
Code	IKH 1 605					
The year in which the module is taught						
Person responsible for the module	Dr. Evalina Herawati S.Hut., M.Si.					
Lecturer	Prof. Dr. Rudi Hartono S.Hut., M.Si. Prof. Dr. Apri Heri Iswanto S.Hut., M.Si.					
Language	Indonesia / English					
Relation to curriculum	Compulsory / elective / specialisation Names of other study programmes with which the module is shared					
Teaching methods	Lecture and discussion: 150 minute, 14 Lecturer = 35 hour Structured Activities: 180 minute, 14 activities = 42 hour Self Learning (Individual/Group Project): 450 minute, 14 week = 105 hour Midle exam: 100 minute = 1.6 hour Final exam: 100 minute = 1,6 hour					
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Recommended prerequisites for joining the module	None					
Module objectives/intended learning outcomes	<p>PLO 4 Having understanding of the theories and advancements in the forestry industry basic science, cultivation, management, technology, and conservation.</p> <p>PLO 5 Capable of demonstrating independent and team work, quality and measurable performance, able to apply various methods of science and technology in forestry issue identification and solving.</p> <p>PLO 10 Having skill to improve and to inovate timber and non-timber forest product technology, as well as value enhancement and business feasibility analysis of forest products.</p>					
Content	<p>Study materials (teaching materials):</p> <ol style="list-style-type: none"> 1. Introduction and course contract, Course material description 2. Wood anatomical structure, including types, varieties, characteristics, and morphology of wood-forming cells at the macro, micro, and ultramicroscopic levels; wood cell wall organization; wood reaction, defects, and abnormalities; relationship between structure and wood properties and processing. 3. Types and main chemical characteristics of wood constituents (cellulose, hemicellulose, lignin) and extractives, including the distribution of chemical components in wood cell walls and the reactions that occur, the influence of wood's chemical properties on its properties and processing 					

	<ol style="list-style-type: none"> 4. Moisture content, density, specific gravity and dimensional stability, thermal properties of wood, electrical properties of wood, and acoustic properties of wood 5. Basic statics, types of mechanical properties of wood, testing and standardization, factors affecting mechanical properties, basic stress, introduction to the classification of construction timber, determination of allowable stress in wood 6. General definitions/understanding of wood technology related to biocomposite products, plywood, LVL and Glulam, particle board, Oriented Strand Board (OSB), fiberboard, and Inorganic-Bonded Composites 7. Chemical processing related to the total utilization of lignocellulosic biomass, Basic principles and technologies for converting forest biomass into chemicals, energy, and natural fibers and their derivatives 																								
Examination forms	<ul style="list-style-type: none"> • Quiz: Short questions related to the lecture subject (topic) given to students at the beginning or end of the lecture. • Assignment: Assignments to deepen the lecture topics given to students after several lectures. • Project Based: Problem-based individual or group assignments to strengthen skills related to learning topics in several lectures. • Case Study: Individual or group assignments based on case study to strengthen skills related to learning topics in several lectures. • Middle Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in the first to seventh lectures. • Final Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in lectures after half a semester until the end of the semester. 																								
Study and examination requirements	<ul style="list-style-type: none"> - Minimum lecture attendance is 80%. - Weighting composition for the final grade is quiz (5%), Assignment (5%), Project Based (25%), Case Study (25%), Middle Exam (20%), and Final Exam (20%). - Final grade is defined as: <table border="1" style="margin-left: 40px;"> <thead> <tr> <th>Score</th> <th>Grade</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>≥ 80</td> <td>A</td> <td>4</td> </tr> <tr> <td>75 - < 80</td> <td>B+</td> <td>3,5</td> </tr> <tr> <td>70 - < 75</td> <td>B</td> <td>3</td> </tr> <tr> <td>65 - < 70</td> <td>C+</td> <td>2,5</td> </tr> <tr> <td>60 - < 65</td> <td>C</td> <td>2</td> </tr> <tr> <td>50 - < 60</td> <td>D</td> <td>1</td> </tr> <tr> <td>< 50</td> <td>E</td> <td>0</td> </tr> </tbody> </table>	Score	Grade	Value	≥ 80	A	4	75 - < 80	B+	3,5	70 - < 75	B	3	65 - < 70	C+	2,5	60 - < 65	C	2	50 - < 60	D	1	< 50	E	0
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Learning media	Class room, TV Projector, In Focus, Power Point.																								
Reading List	<ol style="list-style-type: none"> 1. Forest Products Laboratory. 2010. Wood handbook—Wood as an engineering material. General Technical Report FPL-GTR-190. Madison, WI: U.S. Department of Agriculture, Forest Service, Forest Products Laboratory. 2. Rowell RM. 2005. Handbook of Wood Chemistry and Wood Composites. Florida: CRC Press. 3. Shmulsky R, Jones PD. 2011. Forest Products and Wood Science, An Introduction Sixth edition. 																								

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| | <ol style="list-style-type: none">4. Tsoumis G, 1991. Science and Technology of Wood: structure, properties, utilization. New York: Van Nostrand Reinhold.5. Walker JCF. 2006. Primary Wood Processing, Principles and Practice 2nd edition. Netherlands: Springer. |
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Module designation	Research Methodology					
Subtitle	Metodologi Penelitian					
Code	IKH 1 606					
The year in which the module is taught						
Person responsible for the module	Prof. Dr. Apri Heri Iswanto S.Hut., M.Si.					
Lecturer	Prof. Mohammad Basyuni S.Hut., M.Si., Ph.D. Dr. Ir. Bejo Slamet S.Hut, M.Si, IPM Onrizal S.Hut, M.Si, Ph.D					
Language	Indonesia / English					
Relation to curriculum	Compulsory / elective / specialisation Names of other study programmes with which the module is shared					
Teaching methods	Lecture and discussion: 100 minute, 14 Lecturer = 23.33 hour Structured Activities: 120 minute, 14 activities = 24 hour Self Learning (Individual/Group Project): 300 minute, 14 week = 84 hour Middle exam: 100 minute = 1.6 hour Final exam: 100 minute = 1,6 hour					
Workload (incl. contact hours, self-study hours)	Activity	Lecture and Discussion	Structured Activites	Self Learning (Individual / Group Project)	Exam	Total
	Hours	23.33	24	84	3.2	134.53
Credit points	2 semester credit unit (SCU) equivalen 4.43 ECTS					
Required prerequisites for joining the module	None					
Recommended prerequisites for joining the module	None					
Module objectives/intended learning outcomes	<p>PLO 3 Having competency in research techniques, scientific analysis of study findings, and presentation of findingsrmaton technology.</p> <p>PLO 5 Capable of demonstrating independent and team work, quality and measurable performance, able to apply various methods of science and technology in forestry issue identification and solving.</p> <p>PLO 7 Capable of arranging scientific research, compile the scientific and non-scientific reports in the form of thesis and prevent the plagiarism.</p>					
Content	<p>Study materials (teaching materials):</p> <ol style="list-style-type: none"> 1. Introduction and Lecture Contract 2. Science 3. Research Methods 4. State of the Art Research 5. Research Problem Formulation 6. Framework and Hypothesis 7. Variables and Measurement Methods 8. Objects and Research Methods 9. Data Collection Sources and Techniques 10. Data Analysis and Interpretation 11. Research Conclusions and Implications 12. Research Proposal Writing 					

	<p>13. Research Report / Thesis Writing</p> <p>14. Journal Article Writing</p>																								
Examination forms	<ul style="list-style-type: none"> • Quiz: Short questions related to the lecture subject (topic) given to students at the beginning or end of the lecture. • Assignment: Assignments to deepen the lecture topics given to students after several lectures. • Project Based: Problem-based individual or group assignments to strengthen skills related to learning topics in several lectures. • Case Study: Individual or group assignments based on case study to strengthen skills related to learning topics in several lectures. • Midle Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in the first to seventh lectures. • Final Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in lectures after half a semester until the end of the semester. 																								
Study and examination requirements	<ul style="list-style-type: none"> - Minimum lecture attendance is 80%. - Weighting composition for the final grade is quiz (10%), Assignment (10%), Project Based (25%), Case Study (25%), Midle Exam (15%), and Final Exam (15%). - Final grade is defined as: <table border="1"> <thead> <tr> <th>Score</th> <th>Grade</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>≥ 80</td> <td>A</td> <td>4</td> </tr> <tr> <td>75 - < 80</td> <td>B+</td> <td>3,5</td> </tr> <tr> <td>70 - < 75</td> <td>B</td> <td>3</td> </tr> <tr> <td>65 - < 70</td> <td>C+</td> <td>2,5</td> </tr> <tr> <td>60 - < 65</td> <td>C</td> <td>2</td> </tr> <tr> <td>50 - < 60</td> <td>D</td> <td>1</td> </tr> <tr> <td>< 50</td> <td>E</td> <td>0</td> </tr> </tbody> </table>	Score	Grade	Value	≥ 80	A	4	75 - < 80	B+	3,5	70 - < 75	B	3	65 - < 70	C+	2,5	60 - < 65	C	2	50 - < 60	D	1	< 50	E	0
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Learning media	Class room, TV Projector, In Focus, Power Point.																								
Reading List	<ol style="list-style-type: none"> 1. Creswell, J. W. (2014). <i>Research Design: Qualitative, Quantitative, and Mixed Methods Approaches</i>. Sage Publications. 2. Bryman, A. (2016). <i>Social Research Methods</i>. Oxford University Press. 3. Kumar, R. (2019). <i>Research Methodology: A Step-by-Step Guide for Beginners</i>. Sage Publications. 4. Flick, U. (2018). <i>An Introduction to Qualitative Research</i>. Sage Publications. 5. Robson, C., & McCartan, K. (2016). <i>Real World Research</i>. Wiley. 6. Saunders, M., Lewis, P., & Thornhill, A. (2019). <i>Research Methods for Business Students</i>. Pearson Education. 7. Babbie, E. R. (2020). <i>The Practice of Social Research</i>. Cengage Learning. 8. Denscombe, M. (2017). <i>The Good Research Guide: For Small-Scale Social Research Projects</i>. Open University Press. 9. Neuman, W. L. (2014). <i>Social Research Methods: Qualitative and Quantitative Approaches</i>. Pearson. 10. Mertens, D. M. (2014). <i>Research and Evaluation in Education and Psychology: Integrating Diversity with Quantitative, Qualitative, and Mixed Methods</i>. Sage Publications 																								

Module designation	Research proposal seminar			
Subtitle	Kolokium			
Code	IKH 1 607			
The year in which the module is taught				
Person responsible for the module	Dr. Samsuri S.Hut., M.Si.			
Lecturer				
Language	Indonesia / English			
Relation to curriculum	Compulsory / elective / specialisation Names of other study programmes with which the module is shared			
Teaching methods	Self Learning (Individual/Group Project): 150 minute, 14 week = 35 hour Exam: 60 minute = 1 hour			
Workload (incl. contact hours, self-study hours)	Activity	Self Learning (Individual / Group Project)	Exam	Total
	Hours	35	1	49
Credit points	1 semester credit unit (SCU) equivalen 1.75 ECTS			
Required prerequisites for joining the module	none			
Recommended prerequisites for joining the module	none			
Module objectives/intended learning outcomes	<p>PLO 1 Demonstrating a religious, humanist, nationalist, respect differences and diversity, and a long-life learner's attitude</p> <p>PLO 2 Demonstrating a law abiding and discipline, ethical, independently responsible, entrepreneurial spirit</p> <p>PLO 3 Having competency in research techniques, scientific analysis of study findings, and presentation of findingsrmation technology.</p> <p>PLO 4 Having understanding of the theories and advancements in the forestry industry basic science, cultivation, management, technology, and conservation.</p> <p>PLO 5 Capable of demonstrating independent and team work, quality and measurable performance, able to apply various methods of science and technology in forestry issue identification and solving.</p> <p>PLO 6 Capable of making appropriate decisions based on standard procedures and data, in communication, supervision and evaluation of work in forestry field. fforts at various levels (genetic, species and ecosystem)</p> <p>PLO 7 Capable of arranging scientific research, compile the scientific and non-scientific reports in the form of thesis and prevent the plagiarism.</p> <p>PLO 7 Capable of arranging scientific research, compile the scientific and non-scientific reports in the form of thesis and prevent the plagiarism.</p> <p>PLO 9 Having skill to innovate forest cultivation, including biotechnology and other silvicultural activities in forest rehabilitation and reforestation effort.</p>			

	<p>PLO 10 Having skill to improve and to inovate timber and non-timber forest product technology, as well as value enhancement and business feasibility analysis of forest products.</p> <p>PLO 11 Having skill to elaborate the forest resources conservation efforts, including provide the solution alternatives, community collaborations, prioritizing a holistic approach (ecological, economic and socio-cultural) in forest resources conservation</p>																								
Content	<p>Study materials (teaching materials):</p> <ol style="list-style-type: none"> 1. Understand the guidelines for writing postgraduate final projects. 2. Select journals/articles that are relevant to the research topic. 3. Identify the objectives, methods, and results of research from various sources related to the student's research topic. 4. Create citations using various citation styles. Optimize the use of Mendeley in creating references and citations. 5. Paraphrasing writing and optimizing similarity tests with Turnitin. 6. Identifying current research trends or state of the art. Mapping existing research topics and the position of the proposed research topic 7. Formulating research questions and research objectives 8. Proofreading using Grammarly and White Smoke 9. Write an abstract and formulate a title that covers all research variables. 10. Formulate research questions and research objectives. 11. Analyze the rationality of the selected research topic and present theories that support the research topic. 12. Justify the appropriate research method (qualitative, quantitative, mixed method) 13. Proofread the language using Grammarly or other applications 14. Write a draft research proposal in accordance with the final paper writing guidebook 15. Disseminate the draft research proposal that has been created following academic presentation guidelines. 																								
Examination forms	<ul style="list-style-type: none"> - Systematics of writing (20%) - Element of novelty (10%) - Clarity of the method (20%) - Presentation (20%) - Argument and reasoning (30%) 																								
Study and examination requirements	<p>Final grade is defined as:</p> <table border="1"> <thead> <tr> <th>Score</th> <th>Grade</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>≥ 80</td> <td>A</td> <td>4</td> </tr> <tr> <td>75 - < 80</td> <td>B+</td> <td>3,5</td> </tr> <tr> <td>70 - < 75</td> <td>B</td> <td>3</td> </tr> <tr> <td>65 - < 70</td> <td>C+</td> <td>2,5</td> </tr> <tr> <td>60 - < 65</td> <td>C</td> <td>2</td> </tr> <tr> <td>50 - < 60</td> <td>D</td> <td>1</td> </tr> <tr> <td>< 50</td> <td>E</td> <td>0</td> </tr> </tbody> </table>	Score	Grade	Value	≥ 80	A	4	75 - < 80	B+	3,5	70 - < 75	B	3	65 - < 70	C+	2,5	60 - < 65	C	2	50 - < 60	D	1	< 50	E	0
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Learning media	Class room, TV Projector, In Focus, Power Point.																								
Reading List	<ul style="list-style-type: none"> - Bailey, S. (2014). <i>Academic writing: A handbook for international students</i>. Routledge. 																								

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Module designation	Deseminasi Research			
Subtitle	Seminar Hasil			
Code	IKH 1 608			
The year in which the module is taught				
Person responsible for the module	Dr. Samsuri S.Hut., M.Si.			
Lecturer				
Language	Indonesia / English			
Relation to curriculum	Compulsory / elective / specialisation Names of other study programmes with which the module is shared			
Teaching methods	Self Learning (Individual/Group Project): 150 minute, 14 week = 35 hour Exam: 60 minute = 1 hour			
Workload (incl. contact hours, self-study hours)	Activity	Self Learning (Individual / Group Project)	Exam	Total
	Hours	35	1	49
Credit points	1 semester credit unit (SCU) equivalen 1.75 ECTS			
Required prerequisites for joining the module	None			
Recommended prerequisites for joining the module	None			
Module objectives/intended learning outcomes	<p>PLO 1 Demonstrating a religious, humanist, nationalist, respect differences and diversity, and a long-life learner's attitude</p> <p>PLO 2 Demonstrating a law abiding and discipline, ethical, independently responsible, entrepreneurial spirit</p> <p>PLO 3 Having competency in research techniques, scientific analysis of study findings, and presentation of findingsrmation technology.</p> <p>PLO 4 Having understanding of the theories and advancements in the forestry industry basic science, cultivation, management, technology, and conservation.</p> <p>PLO 5 Capable of demonstrating independent and team work, quality and measurable performance, able to apply various methods of science and technology in forestry issue identification and solving.</p> <p>PLO 6 Capable of making appropriate decisions based on standard procedures and data, in communication, supervision and evaluation of work in forestry field. fforts at various levels (genetic, species and ecosystem)</p> <p>PLO 7 Capable of arranging scientific research, compile the scientific and non-scientific reports in the form of thesis and prevent the plagiarism.</p> <p>PLO 8 Having skill to enhance the sustainable forest resource management, including watershed management, forest assessment, socio-economics, communication, as well as adapting to developments through various technological approaches: GIS, drones and info</p>			

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Content	<p>Study materials (teaching materials):</p> <ol style="list-style-type: none"> 1. Students are able to understand the standards, structure, ethics, and mechanisms of thesis seminars in the field of forestry. 2. Students are able to systematically compile the Research Results Chapter in accordance with scientific principles. 3. Students are able to present forestry research data through tables, graphs, maps, or models in an accurate and informative manner. 4. Students are able to analyze and validate data using relevant scientific methods (statistical/spatial/biometric/socio-economic). 5. Students are able to interpret research results and relate them to forestry theory, policy, and practice. 6. Students are able to compile conclusions based on findings and formulate implications and recommendations for forestry research. 7. Students are able to design effective, concise, and communicative scientific presentation slides in accordance with seminar standards. 8. Students are able to present research results in a structured and communicative manner. 9. Students are able to defend research findings through evidence-based scientific argumentation. 10. Students are able to apply academic ethics, scientific citation, and courtesy in discussions and writing. 11. Students are able to prepare seminar result documents (manuscripts, data attachments, analysis evidence, supporting publications). 12. Students are able to present research result developments for academic testing. 13. Students are able to revise thesis documents based on input and criticism from examiners and reviewers. 14. Students are able to compile scientific articles based on thesis results for publication in national/international journals. 15. Students are able to present and defend research results scientifically in seminar forums. 16. Students are able to complete thesis and scientific article revisions according to seminar recommendations.
Examination forms	<ul style="list-style-type: none"> - Systematics of writing (20%) - Element of novelty (10%) - Clarity of the method (20%) - Presentation (20%) - Argument and reasoning (30%)

Study and examination requirements	Final grade is defined as: <table border="1"> <thead> <tr> <th>Score</th> <th>Grade</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>> 80</td> <td>A</td> <td>4</td> </tr> <tr> <td>75 - < 80</td> <td>B+</td> <td>3,5</td> </tr> <tr> <td>70 - < 75</td> <td>B</td> <td>3</td> </tr> <tr> <td>65 - < 70</td> <td>C+</td> <td>2,5</td> </tr> <tr> <td>60 - < 65</td> <td>C</td> <td>2</td> </tr> <tr> <td>50 - < 60</td> <td>D</td> <td>1</td> </tr> <tr> <td>< 50</td> <td>E</td> <td>0</td> </tr> </tbody> </table>	Score	Grade	Value	> 80	A	4	75 - < 80	B+	3,5	70 - < 75	B	3	65 - < 70	C+	2,5	60 - < 65	C	2	50 - < 60	D	1	< 50	E	0
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Reading List	<ul style="list-style-type: none"> - Bailey, S. (2014). <i>Academic writing: A handbook for international students</i>. Routledge. - Billups, F. D. (2019). <i>Qualitative data collection tools: Design, development, and applications (Vol. 55)</i>. Sage Publications. - Creswell, J. W. (2014). <i>Qualitative, quantitative and mixed methods approaches</i>. Sage. - Hartley, J. (2008). <i>Academic writing and publishing: A practical handbook</i>. Routledge. - Janert, P. K. (2010). <i>Data analysis with open source tools: a hands-on guide for programmers and data scientists</i>. " O'Reilly Media, Inc." - Jesson, J., Matheson, L., & Lacey, F. M. (2011). <i>Doing your literature review: Traditional and systematic techniques</i>. - Olson, L. (2014). <i>How to get your writing published in scholarly journals</i>. Eacademia. 																								

Module designation	Research and thesis			
Subtitle	Penelitian dan Tesis			
Code	IKH 1 609			
The year in which the module is taught				
Person responsible for the module	Dr. Samsuri S.Hut., M.Si.			
Lecturer				
Language	Indonesia / English			
Relation to curriculum	Compulsory / elective / specialisation Names of other study programmes with which the module is shared			
Teaching methods	Self Learning (Individual/Group Project): 1800 minute, 14 week = 420 hour Exam: 120 minute = 2 hour			
Workload (incl. contact hours, self-study hours)	Activity	Self Learning (Individual / Group Project)	Exam	Total
	Hours	420	2	1008
Credit points	6 semester credit unit (SCU) equivalen 36 ECTS			
Required prerequisites for joining the module	none			
Recommended prerequisites for joining the module	none			
Module objectives/intended learning outcomes	<p>PLO 1 Demonstrating a religious, humanist, nationalist, respect differences and diversity, and a long-life learner's attitude</p> <p>PLO 2 Demonstrating a law abiding and discipline, ethical, independently responsible, entrepreneurial spirit</p> <p>PLO 3 Having competency in research techniques, scientific analysis of study findings, and presentation of findingsrmation technology.</p> <p>PLO 4 Having understanding of the theories and advancements in the forestry industry basic science, cultivation, management, technology, and conservation.</p> <p>PLO 5 Capable of demonstrating independent and team work, quality and measurable performance, able to apply various methods of science and technology in forestry issue identification and solving.</p> <p>PLO 6 Capable of making appropriate decisions based on standard procedures and data, in communication, supervision and evaluation of work in forestry field. fforts at various levels (genetic, species and ecosystem)</p> <p>PLO 7 Capable of arranging scientific research, compile the scientific and non-scientific reports in the form of thesis and prevent the plagiarism.</p> <p>PLO 8 Having skill to enhance the sustainable forest resource management, including watershed management, forest assessment, socio-economics, communication, as well as adapting to developments through various technological approaches: GIS, drones and info</p>			

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Content	<p>Study materials (teaching materials):</p> <ol style="list-style-type: none"> 1. Students are able to identify and formulate specific forestry research problems based on current issues. 2. Students are able to compile scientific literature reviews and determine research gaps to reinforce the urgency of research. 3. Students are able to formulate research objectives and hypotheses/scientific arguments relevant to forestry concepts. 4. Students are able to design research methodologies, determine variables, units of analysis, and research instruments. 5. Students are able to determine data collection methods and apply forestry research ethics in the field. 6. Students are able to select and apply data analysis techniques (statistics, GIS, modeling, ecology, social) as needed. 7. Students are able to validate data and control the quality of the research data collected. 8. Students are able to systematically present the progress of preliminary data analysis in scientific evaluation forums. 9. Students are able to interpret research data and relate it to forestry theory and policy. 10. Students are able to compile the Results and Discussion chapters logically in accordance with scientific writing rules. 11. Students are able to compile conclusions based on findings and formulate policy implications and recommendations/research prospects. 12. Students are able to compile a complete research draft and adhere to academic integrity and anti-plagiarism. 13. Students are able to write scientific articles from their research results for reputable national/international publications. 14. Students are able to present research results scientifically and defend their arguments based on data. 15. Students are able to revise their theses and scientific articles professionally based on examiners' criticism and suggestions. 16. Students are able to demonstrate readiness for thesis defense through final review of research results and thesis documents.
Examination forms	<ul style="list-style-type: none"> - Systematics of writing (20%) - Element of novelty (10%) - Clarity of the method (20%) - Presentation (20%) - Argument and reasoning (30%)

Study and examination requirements	Final grade is defined as: <table border="1"> <thead> <tr> <th>Score</th> <th>Grade</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>≥ 80</td> <td>A</td> <td>4</td> </tr> <tr> <td>75 - < 80</td> <td>B+</td> <td>3,5</td> </tr> <tr> <td>70 - < 75</td> <td>B</td> <td>3</td> </tr> <tr> <td>65 - < 70</td> <td>C+</td> <td>2,5</td> </tr> <tr> <td>60 - < 65</td> <td>C</td> <td>2</td> </tr> <tr> <td>50 - < 60</td> <td>D</td> <td>1</td> </tr> <tr> <td>< 50</td> <td>E</td> <td>0</td> </tr> </tbody> </table>	Score	Grade	Value	≥ 80	A	4	75 - < 80	B+	3,5	70 - < 75	B	3	65 - < 70	C+	2,5	60 - < 65	C	2	50 - < 60	D	1	< 50	E	0
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< 50	E	0																							
Learning media	Class room, TV Projector, In Focus, Power Point.																								
Reading List	<ul style="list-style-type: none"> - Coghill, Anne M., L. R. G. E. (Ed.). (2006). <i>The ACS Style Guide, 3rd Ed. American Chemical Society.</i> - Deb, D., Dey, R., & Balas, V. E. (2013). <i>Engineering Research Methodolog; A Practical Insight for Researchers- Springer Singapore (2019).pdf.</i> - Kotari, C. R. (2004). <i>Research Methodology; Methods & Techniques (2nd ed.).</i> - Kumar, R. (2011). <i>Research Methodology; a step-by-step guide for beginners.</i> - Pandey, P., & Pandey, M. M. (2015). <i>Research Methodology; Tools and Techniques</i> - Setiabudi, A. and Hardian, R., 2020 <i>Principles and Techniques for Compiling Literature Reviews in Scientific Research, UPI Press.</i> 																								

Module designation	Internsip						
Subtitle	Magang						
Code							
The year in which the module is taught							
Person responsible for the module	Dr. Samsuri S.Hut., M.Si. Dr. Nurdin Sulistiyono S.Hut., M.Si.						
Lecturer							
Language	Indonesia / English						
Relation to curriculum	Compulsory / elective / specialisation Names of other study programmes with which the module is shared						
Teaching methods	Lecture and discussion: 100 minute, 14 Lecturer = 23.33 hour Structured Activities: 120 minute, 14 activities = 24 hour Self Learning (Individual/Group Project): 300 minute, 14 week = 84 hour Middle exam: 100 minute = 1.6 hour Final exam: 100 minute = 1,6 hour						
Workload (incl. contact hours, self-study hours)	Activity	Lecture and Discussion	Structured Activites	Self Learning (Individual / Group Project)	Exam	Total	
	Hours	23.33	24	84	3.2	134.53	
Credit points	2 semester credit unit (SCU) equivalen 4.43 ECTS						
Required prerequisites for joining the module	none						
Recommended prerequisites for joining the module	none						
Module objectives/intended learning outcomes	<p>PLO 1 Demonstrating a religious, humanist, nationalist, respect differences and diversity, and a long-life learner's attitude</p> <p>PLO 2 Demonstrating a law abiding and discipline, ethical, independently responsible, entrepreneurial spirit</p> <p>PLO 3 Having competency in research techniques, scientific analysis of study findings, and presentation of findingsrmation technology.</p> <p>PLO 4 Having understanding of the theories and advancements in the forestry industry basic science, cultivation, management, technology, and conservation.</p> <p>PLO 5 Capable of demonstrating independent and team work, quality and measurable performance, able to apply various methods of science and technology in forestry issue identification and solving.</p> <p>PLO 6 Capable of making appropriate decisions based on standard procedures and data, in communication, supervision and evaluation of work in forestry field.fforts at various levels (genetic, species and ecosystem)</p> <p>PLO 7 Capable of arranging scientific research, compile the scientific and non-scientific reports in the form of thesis and prevent the plagiarism.</p> <p>PLO 8 Having skill to enhance the sustainable forest resource management, including watershed management, forest assessment, socio-economics,</p>						

	<p>communication, as well as adapting to developments through various technological approaches: GIS, drones and info</p> <p>PLO 9 Having skill to innovate forest cultivation, including biotechnology and other silvicultural activities in forest rehabilitation and reforestation effort.</p> <p>PLO 10 Having skill to improve and to inovate timber and non-timber forest product technology, as well as value enhancement and business feasibility analysis of forest products.</p> <p>PLO 11 Having skill to elaborate the forest resources conservation efforts, including provide the solution alternatives, community collaborations, prioritizing a holistic approach (ecological, economic and socio-cultural) in forest resources conservation</p>
Content	<p>Week 1: Introduction to Forestry and Basic Concepts*</p> <p>Objective: Build a strong foundation in forestry principles, ecosystems, and conservation practices.</p> <p><i>Day 1: Orientation and Introduction*</i></p> <ul style="list-style-type: none"> - Welcome session and introduction to the organization. - Overview of the internship program, goals, and expectations. - Icebreaker activities and team introductions. <p><i>Day 2: Fundamentals of Forestry*</i></p> <ul style="list-style-type: none"> - Lecture: What is forestry? History and importance. - Key concepts: Forest ecosystems, biodiversity, and ecosystem services. - Activity: Group discussion on the role of forests in climate regulation. <p><i>Day 3: Forest Types and Classification</i></p> <ul style="list-style-type: none"> - Lecture: Types of forests (tropical, temperate, boreal, etc.). - Activity: Map analysis of global and local forest distribution. - Field visit: Local forest area to observe different forest types. <p><i>Day 4: Forest Ecology</i></p> <ul style="list-style-type: none"> - Lecture: Forest structure, flora, fauna, and ecological interactions. - Activity: Identify common tree species and their ecological roles. - Field exercise: Collect and analyze soil and leaf samples. <p><i>Day 5: Forest Conservation and Policy</i></p> <ul style="list-style-type: none"> - Lecture: Conservation strategies, protected areas, and international agreements (e.g., REDD+, UNFCCC). - Activity: Case study analysis of successful forest conservation projects. - Group discussion: Challenges in forest conservation. <p>Week 2: Forest Management and Sustainable Practices</p> <p>Objective: Learn about sustainable forest management, resource utilization, and restoration techniques.</p> <p><i>Day 6: Sustainable Forest Management</i></p> <ul style="list-style-type: none"> - Lecture: Principles of sustainable forest management (SFM). - Activity: Develop a basic SFM plan for a hypothetical forest area. <p><i>Day 7: Timber Harvesting and Non-Timber Forest Products (NTFPs)</i></p> <ul style="list-style-type: none"> - Lecture: Timber harvesting techniques and regulations. - Activity: Identify and discuss NTFPs (e.g., medicinal plants, resins, fruits). - Field visit: Observe sustainable harvesting practices.

- Day 8: Agroforestry and Community Forestry*
- Lecture: Agroforestry systems and their benefits.
 - Activity: Design an agroforestry model for a local community.
 - Case study: Community-based forest management success stories.

- Day 9: Forest Restoration and Reforestation**
- Lecture: Techniques for forest restoration and reforestation.
 - Activity: Plan a reforestation project for a degraded area.
 - Field exercise: Participate in a tree-planting activity.

- Day 10: Forest Fire Management**
- Lecture: Causes, prevention, and control of forest fires.
 - Activity: Develop a fire management plan.
 - Simulation: Fire response and evacuation drill.

Week 3: Fieldwork and Practical Applications

Objective: Gain hands-on experience in forestry techniques and data collection.

- Day 11: Forest Inventory and Data Collection**
- Lecture: Methods for forest inventory (e.g., tree measurement, biodiversity assessment).
 - Field exercise: Conduct a forest inventory using tools like clinometers, diameter tapes, and GPS.

- Day 12: GIS and Remote Sensing in Forestry**
- Lecture: Basics of GIS and remote sensing for forest monitoring.
 - Activity: Use GIS software to analyze forest cover changes.
 - Case study: Satellite imagery analysis of deforestation hotspots.

- Day 13: Wildlife Management in Forests**
- Lecture: Wildlife habitats, corridors, and human-wildlife conflict.
 - Activity: Identify animal tracks and signs in the forest.
 - Field visit: Wildlife sanctuary or protected area.

- Day 14: Forest Hydrology and Watershed Management*
- Lecture: Role of forests in water cycle and watershed protection.
 - Activity: Analyze a watershed and its forest cover.
 - Field exercise: Measure streamflow and water quality in a forested area.

- Day 15: Climate Change and Forests*
- Lecture: Impact of climate change on forests and mitigation strategies.
 - Activity: Carbon footprint calculation and offsetting through reforestation.
 - Group discussion: Role of forests in achieving net-zero emissions.

Week 4: Project Work and Wrap-Up

Objective: Apply knowledge to a real-world project and conclude the internship.

Day 16-19: Group Project
 Project Theme: Develop a comprehensive forest management plan for a specific area.

- Tasks:
 - Conduct field surveys and data analysis.
 - Propose sustainable management practices.
 - Prepare a presentation and report.
- Mentors will guide and review progress.

Day 20: Project Presentations

	<ul style="list-style-type: none"> - Each group presents their project to a panel of experts. - Feedback and Q&A session. <p><i>Day 21: Career Development in Forestry</i></p> <ul style="list-style-type: none"> - Lecture: Career opportunities in forestry (research, NGOs, government, private sector). - Activity: Resume-building workshop and mock interviews. <p><i>Day 22: Final Feedback and Certification</i></p> <ul style="list-style-type: none"> - Review of the internship experience. - Feedback session: Interns share their learnings and suggestions. - Certificate distribution and closing ceremony. 																								
Examination forms	<ul style="list-style-type: none"> • Practical Work: Problem-based individual or group assignments to strengthen skills related to learning topics in several lectures. • Final Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in lectures after half a semester until the end of the semester. 																								
Study and examination requirements	<p>The weight of assessment to final grade:</p> <ul style="list-style-type: none"> - Practical Works: 60% - Report of Practical Works: 40% - Minimum lecture attendance is 100%. <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Score</th> <th>Grade</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>≥ 80</td> <td>A</td> <td>4</td> </tr> <tr> <td>75 - < 80</td> <td>B+</td> <td>3,5</td> </tr> <tr> <td>70 - < 75</td> <td>B</td> <td>3</td> </tr> <tr> <td>65 - < 70</td> <td>C+</td> <td>2,5</td> </tr> <tr> <td>60 - < 65</td> <td>C</td> <td>2</td> </tr> <tr> <td>50 - < 60</td> <td>D</td> <td>1</td> </tr> <tr> <td>< 50</td> <td>E</td> <td>0</td> </tr> </tbody> </table>	Score	Grade	Value	≥ 80	A	4	75 - < 80	B+	3,5	70 - < 75	B	3	65 - < 70	C+	2,5	60 - < 65	C	2	50 - < 60	D	1	< 50	E	0
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Learning media	Class room, TV Projector, In Focus, Power Point.																								
Reading List																									

Elective Courses

Silviculture

Module designation	Forest Site Management					
Subtitle	Pengelolaan Tapak Hutan					
Code	IKH 2 610					
The year in which the module is taught						
Person responsible for the module	Dr. Deni Elfiati SP., MP.					
Lecturer	Dr. Alfian Gunawan Ahmad S.Hut., M.Si.					
Language	Indonesia / English					
Relation to curriculum	Compulsory / elective / specialisation Names of other study programmes with which the module is shared					
Teaching methods	Lecture and discussion: 150 minute, 14 Lecturer = 35 hour Structured Activities: 180 minute, 14 activities = 42 hour Self Learning (Individual/Group Project): 450 minute, 14 week = 105 hour Middle exam: 100 minute = 1.6 hour Final exam: 100 minute = 1,6 hour					
Workload (incl. contact hours, self-study hours)	Activity	Lecture and Discussion	Structured Activities	Self Learning (Individual / Group Project)	Exam	Total
	Hours	35	42	105	3.2	185
Credit points	3 semester credit unit (SCU) equivalen 6.64 ECTS					
Required prerequisites for joining the module	none					
Recommended prerequisites for joining the module	none					
Module objectives/intended learning outcomes	<p>PLO 4 Having understanding of the theories and advancements in the forestry industry basic science, cultivation, management, technology, and conservation.</p> <p>PLO 6 Capable of making appropriate decisions based on standard procedures and data, in communication, supervision and evaluation of work in forestry field. fforts at various levels (genetic, species and ecosystem)</p> <p>PLO 9 Having skill to innovate forest cultivation, including biotechnology and other silvicultural activities in forest rehabilitation and reforestation effort.</p>					
Content	<p>Study materials (teaching materials):</p> <ol style="list-style-type: none"> 1. Introduction: definition of soil, properties of soil 2. Soil and plant growth 3. Forest soil characteristics 4. Soil and root system 5. Forest nutrient management 6. Microbial management in the rhizosphere 7. Organic matter management 8. Forest site quality 9. Effect of Forest Disturbance on Forest Footprint 10. Forest Biogeochemistry 11. Long-term forest productivity 					

Examination forms	<ul style="list-style-type: none"> • Quiz: Short questions related to the lecture subject (topic) given to students at the beginning or end of the lecture. • Assignment: Assignments to deepen the lecture topics given to students after several lectures. • Project Based: Problem-based individual or group assignments to strengthen skills related to learning topics in several lectures. • Case Study: Individual or group assignments based on case study to strengthen skills related to learning topics in several lectures. • Midle Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in the first to seventh lectures. • Final Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in lectures after half a semester until the end of the semester. 																								
Study and examination requirements	<ul style="list-style-type: none"> - Minimum lecture attendance is 80%. - Weighting composition for the final grade is quiz (5%), Assignment (15%), Project Based (25%), Case Study (25%), Midle Exam (15%), and Final Exam (15%). - Final grade is defined as: <table border="1"> <thead> <tr> <th>Score</th> <th>Grade</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>≥ 80</td> <td>A</td> <td>4</td> </tr> <tr> <td>75 - < 80</td> <td>B+</td> <td>3,5</td> </tr> <tr> <td>70 - < 75</td> <td>B</td> <td>3</td> </tr> <tr> <td>65 - < 70</td> <td>C+</td> <td>2,5</td> </tr> <tr> <td>60 - < 65</td> <td>C</td> <td>2</td> </tr> <tr> <td>50 - < 60</td> <td>D</td> <td>1</td> </tr> <tr> <td>< 50</td> <td>E</td> <td>0</td> </tr> </tbody> </table> 	Score	Grade	Value	≥ 80	A	4	75 - < 80	B+	3,5	70 - < 75	B	3	65 - < 70	C+	2,5	60 - < 65	C	2	50 - < 60	D	1	< 50	E	0
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Learning media	Class room, TV Projector, In Focus, Power Point.																								
Reading List	<ol style="list-style-type: none"> 1. Budi, S. (2020). Sustainable Forest Management. Jakarta: Hutan Publishers. 2. Rahayu, T. (2019). Forest Ecosystems: Structure and Function. Yogyakarta: Flora Publishers. 3. Suharto, A. (2021). Forest Policy in Indonesia. Bandung: Alam Publishing. 4. Hartono, J. (2022). Forest Rehabilitation and Restoration. Surabaya: Lingkungan Publishing. 5. Ministry of Environment and Forestry. (2023). Forest Management Guidelines. Jakarta: KLHK. 6. FAO. (2013). Forest Management and Planning. Food and Agriculture Organization of the United Nations. 7. Mulyana, D. (2015). Sustainable Forest Management in Indonesia. Yogyakarta: Andi Publishers. 8. Forest Research and Development Center. (2017). Sustainable Forest Site Management Guidelines. 																								

Module designation	Forest genetics resources cultivation					
Subtitle	Pemanfaatan Sumberdaya Genetika Hutan					
Code	IKH 2 611					
The year in which the module is taught						
Person responsible for the module	Prof. Dr. Arida Susilowati S.Hut., M.Si					
Lecturer						
Language	Indonesia / English					
Relation to curriculum	Compulsory / elective / specialisation Names of other study programmes with which the module is shared					
Teaching methods	Lecture and discussion: 150 minute, 14 Lecturer = 35 hour Structured Activities: 180 minute, 14 activities = 42 hour Self Learning (Individual/Group Project): 450 minute, 14 week = 105 hour Middle exam: 100 minute = 1.6 hour Final exam: 100 minute = 1,6 hour					
Workload (incl. contact hours, self-study hours)	Activity	Lecture and Discussion	Structured Activites	Self Learning (Individual / Group Project)	Exam	Total
	Hours	35	42	105	3.2	185
Credit points	3 semester credit unit (SCU) equivalen 6.64 ECTS					
Required prerequisites for joining the module	None					
Recommended prerequisites for joining the module	None					
Module objectives/intended learning outcomes	<p>PLO 4 Having understanding of the theories and advancements in the forestry industry basic science, cultivation, management, technology, and conservation.</p> <p>PLO 6 Capable of making appropriate decisions based on standard procedures and data, in communication, supervision and evaluation of work in forestry field. fforts at various levels (genetic, species and ecosystem)</p> <p>PLO 9 Having skill to innovate forest cultivation, including biotechnology and other silvicultural activities in forest rehabilitation and reforestation effort.</p>					
Content	<p>Study materials (teaching materials):</p> <ol style="list-style-type: none"> 1. Introduction: definition, potential, and strategic issues of forest genetic resources 2. Forest population genetics, adaptation, and genetic variation 3. Genetic conservation techniques for forest tree species 4. Tissue culture, cloning, DNA markers, forest genomics 5. Breeding techniques, tree selection plus, progeny testing 6. Nagoya Protocol, BRIN policy, KLHK, FAO 7. Innovation-based forest genetic management model 8. Presentation of student design results 					
Examination forms	<ul style="list-style-type: none"> • Quiz: Short questions related to the lecture subject (topic) given to students at the beginning or end of the lecture. 					

	<ul style="list-style-type: none"> • Assignment: Assignments to deepen the lecture topics given to students after several lectures. • Project Based: Problem-based individual or group assignments to strengthen skills related to learning topics in several lectures. • Case Study: Individual or group assignments based on case study to strengthen skills related to learning topics in several lectures. • Midle Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in the first to seventh lectures. • Final Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in lectures after half a semester until the end of the semester. 																								
Study and examination requirements	<ul style="list-style-type: none"> - Minimum lecture attendance is 80%. - Weighting composition for the final grade is quiz (5%), Assignment (5%), Project Based (25%), Case Study (25%). Midle Exam (20%), and Final Exam (20%). - Final grade is defined as: <table border="1"> <thead> <tr> <th>Score</th> <th>Grade</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>≥ 80</td> <td>A</td> <td>4</td> </tr> <tr> <td>75 - < 80</td> <td>B+</td> <td>3,5</td> </tr> <tr> <td>70 - < 75</td> <td>B</td> <td>3</td> </tr> <tr> <td>65 - < 70</td> <td>C+</td> <td>2,5</td> </tr> <tr> <td>60 - < 65</td> <td>C</td> <td>2</td> </tr> <tr> <td>50 - < 60</td> <td>D</td> <td>1</td> </tr> <tr> <td>< 50</td> <td>E</td> <td>0</td> </tr> </tbody> </table> 	Score	Grade	Value	≥ 80	A	4	75 - < 80	B+	3,5	70 - < 75	B	3	65 - < 70	C+	2,5	60 - < 65	C	2	50 - < 60	D	1	< 50	E	0
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Learning media	Class room, TV Projector, In Focus, Power Point.																								
Reading List	<ol style="list-style-type: none"> 1. FAO (2020). State of the World's Forest Genetic Resources. 2. Kang, K.S., et al. (2015). Forest Genetics and Tree Breeding. Springer. 3. Zobel, B. & Talbert, J. (1984). Applied Forest Tree Improvement. Wiley. 4. Regulation of the Minister of Environment and Forestry of the Republic of Indonesia concerning Genetic Resource Management. 																								

Module designation	Advance of forest ecology					
Subtitle	Ekologi Hutan Lanjutan					
Code	IKH 2 612					
The year in which the module is taught						
Person responsible for the module	Onrizal S.Hut, M.Si, Ph.D					
Lecturer	Prof. Dr. Budi Utomo SP., MP. Prof. Mohammad Basyuni S.Hut., M.Si., Ph.D. Prof. Dr. Ir. Yunasfi M.Si.					
Language	Indonesia / English					
Relation to curriculum	Compulsory / elective / specialisation Names of other study programmes with which the module is shared					
Teaching methods	Lecture and discussion: 150 minute, 14 Lecturer = 35 hour Structured Activities: 180 minute, 14 activities = 42 hour Self Learning (Individual/Group Project): 450 minute, 14 week = 105 hour Middle exam: 100 minute = 1.6 hour Final exam: 100 minute = 1,6 hour					
Workload (incl. contact hours, self-study hours)	Activity	Lecture and Discussion	Structured Activites	Self Learning (Individual / Group Project)	Exam	Total
	Hours	35	42	105	3.2	185
Credit points	3 semester credit unit (SCU) equivalen 6.64 ECTS					
Required prerequisites for joining the module	none					
Recommended prerequisites for joining the module	none					
Module objectives/intended learning outcomes	<p>PLO 3 Having competency in research techniques, scientific analysis of study findings, and presentation of findingsrmaton technology.</p> <p>PLO 4 Having understanding of the theories and advancements in the forestry industry basic science, cultivation, management, technology, and conservation.</p> <p>PLO 9 Having skill to innovate forest cultivation, including biotechnology and other silvicultural activities in forest rehabilitation and reforestation effort.</p>					
Content	<p>Study materials (teaching materials):</p> <ol style="list-style-type: none"> 1. Introduction: scope, objectives, relevance of the field of study, and course contract. 2. Spatial variation in tree species composition in forests: patterns and processes. 3. Species dispersal mechanisms, measuring diversity between biomes, and estimating the history of biome areas. 4. Ecological organization of tropical forest tree communities, evolution of ecological characteristics of tropical forest trees, phylogenetic structure of tropical tree species, plant interactions 					

	<p>and habitat filtering in a community, global biogeography and prediction of forest community composition.</p> <ol style="list-style-type: none"> 5. Historical perspectives on species diversity dynamics, tropical forest community structure through tropical forest dynamics plots, tropical forest dynamics and ecological theory: early net model theory for communities, negative density dependence, and gap specialization. Limitations, future development of forest dynamics plots. 6. Invasive tropical ecosystems: tropical islands, forests with open canopies. Disturbed forests, fragmented forests, and managed ecosystems. Impact of exotic plants on tropical ecosystems: Testing various hypotheses. 7. Tree competition for light, competition for nutrients, soil quality and forest productivity: above- and below-ground allocation, tree adaptation to nutrient-poor soils in relation to wood density and leaf age. Animals and pathogens: Lotka-Volterra theory. 8. Niche: definition and implications, functional mechanisms for light competition, species richness and its relationship to niche, differences in vertical light from ontogenetic exchange, and niche dimensions. 9. Theories of colonization and maintenance of species diversity (the influence of stabilization equilibrium, competitive competition in homogeneous environments), colonization and habitat partitioning, methods for evaluating the presence and role of colonization, empirical evidence in tropical forests (trade-offs in colonization competition, trade-offs in fertility tolerance, and trade-offs in fertility dispersion). 10. Processes and pathways of gap-phase regeneration, gaps caused by fallen trees: hypotheses and mechanisms for maintaining species diversity. Empirical tests (is there evidence to support the gap hypothesis?), variation in the impact of gaps in highly diverse environments. 11. Are tropical tree seeds limited? Do pioneer recruitment patterns reflect seed limitations? Does long seed persistence cause spatial dispersal limitations? Context of seed limitations. 12. Endophyte transmission in tropical forests, colonization and abundance of endophytes in tropical forests, diversity of tropical endophytes, alpha diversity (host affinity and spatial structure), endophyte function and tropical forest community ecology (endophytes as neutral host inhabitants, endophytes as parasites, endophytes as mutualism, do endophytes act as an immune system acquired from the environment?, endophytes: mutualism from herbivorous insects). 13. Predators, evolution, and food specialization. Ecosystem damage in closed forest fragments. Phenology and its relationship to wildlife populations in tropical forests. 14. Deforestation and threats to tropical forests, ecological research, bioprospecting, conservation, and the economic value of biodiversity.
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Examination forms	<ul style="list-style-type: none"> • Quiz: Short questions related to the lecture subject (topic) given to students at the beginning or end of the lecture. • Assignment: Assignments to deepen the lecture topics given to students after several lectures. • Project Based: Problem-based individual or group assignments to strengthen skills related to learning topics in several lectures. • Case Study: Individual or group assignments based on case study to strengthen skills related to learning topics in several lectures. • Midle Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in the first to seventh lectures. • Final Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in lectures after half a semester until the end of the semester. 																								
Study and examination requirements	<ul style="list-style-type: none"> - Minimum lecture attendance is 80%. - Weighting composition for the final grade is quiz (5%), Assignment (5%), Project Based (25%), Case Study (25%). Midle Exam (20%), and Final Exam (20%). - Final grade is defined as: <table border="1"> <thead> <tr> <th>Score</th> <th>Grade</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>≥ 80</td> <td>A</td> <td>4</td> </tr> <tr> <td>75 - < 80</td> <td>B+</td> <td>3,5</td> </tr> <tr> <td>70 - < 75</td> <td>B</td> <td>3</td> </tr> <tr> <td>65 - < 70</td> <td>C+</td> <td>2,5</td> </tr> <tr> <td>60 - < 65</td> <td>C</td> <td>2</td> </tr> <tr> <td>50 - < 60</td> <td>D</td> <td>1</td> </tr> <tr> <td>< 50</td> <td>E</td> <td>0</td> </tr> </tbody> </table>	Score	Grade	Value	≥ 80	A	4	75 - < 80	B+	3,5	70 - < 75	B	3	65 - < 70	C+	2,5	60 - < 65	C	2	50 - < 60	D	1	< 50	E	0
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Reading List	<ol style="list-style-type: none"> 1. Barnes, B. V., Zak, D. R., Denton, S. R., & Spurr, S. H. (1998). <i>Forest Ecology</i>. John Wiley & Sons. 2. Chapin, F. S., Matson, P. A., & Vitousek, P. M. (2011). <i>Principles of Terrestrial Ecosystem Ecology</i>. Springer. 3. Kimmins, J. P. (2004). <i>Forest Ecology: A Foundation for Sustainable Forest Management and Environmental Ethics in Forestry</i>. Pearson Education. 4. Odum, E. P., & Barrett, G. W. (2005). <i>Fundamentals of Ecology</i>. Thomson Brooks/Cole. 5. Perry, D. A., Oren, R., & Hart, S. C. (2008). <i>Forest Ecosystems</i>. Johns Hopkins University Press. 6. Smith, T. M., & Smith, R. L. (2015). <i>Elements of Ecology</i>. Pearson. 7. Waring, R. H., & Running, S. W. (2007). <i>Forest Ecosystems: Analysis at Multiple Scales</i>. Academic Press. 8. Lindenmayer, D. B., & Franklin, J. F. (2002). <i>Conserving Forest Biodiversity: A Comprehensive Multiscaled Approach</i>. Island Press. 9. FAO. (2020). <i>Global Forest Resources Assessment 2020</i>. Food and Agriculture Organization of the United Nations. 10. IPCC. (2019). <i>Climate Change and Land: An IPCC Special Report on Climate Change, Desertification, Land Degradation, Sustainable Land Management, Food Security, and Greenhouse Gas Fluxes in Terrestrial Ecosystems</i> 																								

Module designation	Ecology of mangrove and peat swamp forest					
Subtitle	Ekologi Hutan Mangrove dan Rawa Gambut					
Code	IKH 2 613					
The year in which the module is taught						
Person responsible for the module	Dr. Alfian Gunawan Ahmad S.Hut., M.Si.					
Lecturer	Prof. Mohammad Basyuni S.Hut., M.Si., Ph.D. Onrizal S.Hut, M.Si, Ph.D					
Language	Indonesia / English					
Relation to curriculum	Compulsory / elective / specialisation Names of other study programmes with which the module is shared					
Teaching methods	Lecture and discussion: 150 minute, 14 Lecturer = 35 hour Structured Activities: 180 minute, 14 activities = 42 hour Self Learning (Individual/Group Project): 450 minute, 14 week = 105 hour Middle exam: 100 minute = 1.6 hour Final exam: 100 minute = 1,6 hour					
Workload (incl. contact hours, self-study hours)	Activity	Lecture and Discussion	Structured Activities	Self Learning (Individual / Group Project)	Exam	Total
	Hours	35	42	105	3.2	185
Credit points	3 semester credit unit (SCU) equivalent 6.64 ECTS					
Required prerequisites for joining the module	none					
Recommended prerequisites for joining the module	none					
Module objectives/intended learning outcomes	<p>PLO 4 Having understanding of the theories and advancements in the forestry industry basic science, cultivation, management, technology, and conservation.</p> <p>PLO 6 Capable of making appropriate decisions based on standard procedures and data, in communication, supervision and evaluation of work in forestry field. efforts at various levels (genetic, species and ecosystem)</p> <p>PLO 9 Having skill to innovate forest cultivation, including biotechnology and other silvicultural activities in forest rehabilitation and reforestation effort.</p>					
Content	<p>Study materials (teaching materials):</p> <ol style="list-style-type: none"> 1. Introduction 2. Environmental and economic perspectives of mangroves and peat swamps 3. Vegetation linkages to biogeographic processes and patterns of mangrove forests and peat swamps 4. Adaptation 5. Physico-chemical factors and forest performance in wetlands 6. Biotic interactions and wetland forest performance 7. Structure and classification of wetland forests 					

	8. Biochemical cycles in forested wetlands 9. Forested wetland ecosystems in the era of climate change 10. Forest loss in wetlands: geographic patterns and implications for livelihoods 11. Assessment techniques, ecosystem design and management strategies 12. Forest carbon productivity and dynamics in wetlands 13. Forested wetland restoration 14. Forest macroecology in wetlands																								
Examination forms	<ul style="list-style-type: none"> • Quiz: Short questions related to the lecture subject (topic) given to students at the beginning or end of the lecture. • Assignment: Assignments to deepen the lecture topics given to students after several lectures. • Project Based: Problem-based individual or group assignments to strengthen skills related to learning topics in several lectures. • Case Study: Individual or group assignments based on case study to strengthen skills related to learning topics in several lectures. • Midle Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in the first to seventh lectures. • Final Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in lectures after half a semester until the end of the semester. 																								
Study and examination requirements	<ul style="list-style-type: none"> - Minimum lecture attendance is 80%. - Weighting composition for the final grade is quiz (5%), Assignment (5%), Project Based (25%), Case Study (25%). Midle Exam (20%), and Final Exam (20%). - Final grade is defined as: <table border="1"> <thead> <tr> <th>Score</th> <th>Grade</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>≥ 80</td> <td>A</td> <td>4</td> </tr> <tr> <td>75 - < 80</td> <td>B+</td> <td>3,5</td> </tr> <tr> <td>70 - < 75</td> <td>B</td> <td>3</td> </tr> <tr> <td>65 - < 70</td> <td>C+</td> <td>2,5</td> </tr> <tr> <td>60 - < 65</td> <td>C</td> <td>2</td> </tr> <tr> <td>50 - < 60</td> <td>D</td> <td>1</td> </tr> <tr> <td>< 50</td> <td>E</td> <td>0</td> </tr> </tbody> </table>	Score	Grade	Value	≥ 80	A	4	75 - < 80	B+	3,5	70 - < 75	B	3	65 - < 70	C+	2,5	60 - < 65	C	2	50 - < 60	D	1	< 50	E	0
Score	Grade	Value																							
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Learning media	Class room, TV Projector, In Focus, Power Point.																								
Reading List	<ul style="list-style-type: none"> - Alongi, D. M. (2009). <i>The Energetics of Mangrove Forests</i>. Springer. - Alongi, D. M. (2012). Carbon sequestration in mangrove forests. <i>Carbon Management</i>, 3(3), 313–322. - Peat and Mangrove Restoration Agency (BRGM). (2023). <i>Technical Guidelines for Peat and Mangrove Ecosystem Restoration</i>. Jakarta: BRGM RI. - Bengen, D. G. (2010). <i>Coastal and Marine Ecosystems and Resources and Their Management</i>. Bogor: Center for Coastal and Marine Resources Studies, IPB. - Donato, D. C., Kauffman, J. B., Murdiyarso, D., Kurnianto, S., Stidham, M., & Kanninen, M. (2011). Mangroves among the most carbon-rich forests in the tropics. <i>Nature Geoscience</i>, 4(5), 293–297. 																								

	<ul style="list-style-type: none"> - Duke, N. C. (2017). Mangrove floristics and biogeography revisited. <i>Hydrobiologia</i>, 803(1), 7–27. - Kauffman, J. B., & Donato, D. C. (2012). <i>Protocols for the Measurement, Monitoring and Reporting of Structure, Biomass and Carbon Stocks in Mangrove Forests</i>. Bogor: CIFOR. - Limin, S. H., & Rieley, J. O. (2001). <i>Sustainable Management of Tropical Peat Swamp Forests in Indonesia</i>. Palangka Raya: University of Palangka Raya. - Murdiyarso, D., & Purbopuspito, J. (2019). <i>Ecology and Rehabilitation of Mangroves in Indonesia</i>. Bogor: CIFOR. - Page, S. E., Rieley, J. O., & Banks, C. J. (2011). Global and regional importance of the tropical peatland carbon pool. <i>Global Change Biology</i>, 17(2), 798–818. - Rieley, J. O., & Page, S. E. (Eds.). (2016). <i>Tropical Peatland Ecosystems</i>. Springer. - Sasmito, S. D., Taillardat, P., Clendenning, J. N., Cameron, C., Friess, D. A., & Murdiyarso, D. (2020). Effect of land-use change on mangrove blue carbon: A global meta-analysis. <i>Global Change Biology</i>, 26(8), 4291–4302. - Suryadiputra, I. N. N., Dohong, A., Wibisono, I. T. C., Lubis, I. R., & Suryadiputra, N. (2005). <i>Guide to Peatland Ecosystem Rehabilitation and Conservation</i>. Bogor: Wetlands International Indonesia Programme. - Wetlands International Indonesia. (2018). <i>Peat Swamp Ecosystem Restoration Guide</i>. Bogor: Wetlands International Indonesia. - Yule, C. M., & Gomez, L. N. (2009). Leaf litter decomposition in a tropical peat swamp forest in Peninsular Malaysia. <i>Wetlands Ecology and Management</i>, 17(3), 231–241.
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Module designation	Advance of Agroforestry					
Subtitle	Agroforestri Lanjutan					
Code	IKH 2 614					
The year in which the module is taught						
Person responsible for the module	Prof. Dr. Ir. Yunasfi M.Si.					
Lecturer	Prof. Dr. Budi Utomo SP., MP. Prof. Dr. Ir. Abdul Rauf MP Onrizal S.Hut, M.Si, Ph.D					
Language	Indonesia / English					
Relation to curriculum	Compulsory / elective / specialisation Names of other study programmes with which the module is shared					
Teaching methods	Lecture and discussion: 150 minute, 14 Lecturer = 35 hour Structured Activities: 180 minute, 14 activities = 42 hour Self Learning (Individual/Group Project): 450 minute, 14 week = 105 hour Midle exam: 100 minute = 1.6 hour Final exam: 100 minute = 1,6 hour					
Workload (incl. contact hours, self-study hours)	Activity	Lecture and Discussion	Structured Activites	Self Learning (Individual / Group Project)	Exam	Total
	Hours	35	42	105	3.2	185
Credit points	3 semester credit unit (SCU) equivalen 6.64 ECTS					
Required prerequisites for joining the module	none					
Recommended prerequisites for joining the module	none					
Module objectives/intended learning outcomes	<p>PLO 4 Having understanding of the theories and advancements in the forestry industry basic science, cultivation, management, technology, and conservation.</p> <p>PLO 6 Capable of making appropriate decisions based on standard procedures and data, in communication, supervision and evaluation of work in forestry field. fforts at various levels (genetic, species and ecosystem)</p> <p>PLO 9 Having skill to innovate forest cultivation, including biotechnology and other silvicultural activities in forest rehabilitation and reforestation effort.</p>					
Content	<p>Study materials (teaching materials):</p> <ol style="list-style-type: none"> 1. Introduction to advanced agroforestry, the role and urgency of agroforestry in forestry 2. History and evolution of agroforestry systems in the world and Indonesia 3. Classification based on function, structure, and purpose 4. Combination patterns of forestry, agriculture, livestock, and fisheries 5. Ecological and economic principles in agroforestry combinations 6. Cost-benefit analysis, contribution to the community economy 					

	<p>7. The role of the community, cultural values, and social norms</p> <p>8. Evaluation of understanding weeks 1–7</p> <p>9. Case studies of local wisdom (Indonesia and international)</p> <p>10. Types of MPTS, selection criteria, and ecological benefits</p> <p>11. Ecology of interactions between biophysical components</p> <p>12. Productivity, soil fertility, and biodiversity</p> <p>13. The role of government agencies, NGOs, and local communities</p> <p>14. National and international policies</p> <p>15. Design of agroforestry systems based on analysis results</p> <p>16. Evaluation of all learning outcomes</p>																								
Examination forms	<ul style="list-style-type: none"> • Quiz: Short questions related to the lecture subject (topic) given to students at the beginning or end of the lecture. • Assignment: Assignments to deepen the lecture topics given to students after several lectures. • Project Based: Problem-based individual or group assignments to strengthen skills related to learning topics in several lectures. • Case Study: Individual or group assignments based on case study to strengthen skills related to learning topics in several lectures. • Midle Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in the first to seventh lectures. • Final Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in lectures after half a semester until the end of the semester. 																								
Study and examination requirements	<ul style="list-style-type: none"> - Minimum lecture attendance is 80%. - Weighting composition for the final grade is quiz (5%), Assignment (5%), Project Based (25%), Case Study (25%). Midle Exam (20%), and Final Exam (20%). - Final grade is defined as: <table border="1"> <thead> <tr> <th>Score</th> <th>Grade</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>≥ 80</td> <td>A</td> <td>4</td> </tr> <tr> <td>75 - < 80</td> <td>B+</td> <td>3,5</td> </tr> <tr> <td>70 - < 75</td> <td>B</td> <td>3</td> </tr> <tr> <td>65 - < 70</td> <td>C+</td> <td>2,5</td> </tr> <tr> <td>60 - < 65</td> <td>C</td> <td>2</td> </tr> <tr> <td>50 - < 60</td> <td>D</td> <td>1</td> </tr> <tr> <td>< 50</td> <td>E</td> <td>0</td> </tr> </tbody> </table>	Score	Grade	Value	≥ 80	A	4	75 - < 80	B+	3,5	70 - < 75	B	3	65 - < 70	C+	2,5	60 - < 65	C	2	50 - < 60	D	1	< 50	E	0
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Learning media	Class room, TV Projector, In Focus, Power Point.																								
Reading List	<ol style="list-style-type: none"> 1. Agroforestry Anecdotal to Modern Science. Springer. 2017 2. Institutions and Policies in Agroforestry Development. Tony Djogo, Sunaryo, Didik Suharjito, Martua Sirait. World Agroforestry Centre (ICRAF) Bogor. 2013. 3. Promising Agroforestry Tree Species in India O.P. Chaturvedi, A. K. Handa, A.R. Uthapa, K.B. Sridhar, Naresh Kumar, S.B. Chavan and Javed Rivzi. 2017. 4. Functions and Roles of Agroforestry . Widiatmoko, Kurniatun, Hariah, Didik Suhardjito, Mustofa Agung, World Agroforestry Center (ICRAF) Bogor. 																								

	<ol style="list-style-type: none">5. Toward Agroforestry Design An Ecological Approach. P.K. R. Nair. 2008.6. Agroforestry Techniques. Abu Bakar, M. Lahjie. UPN Veteran. Jakarta. 2020.
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Module designation	Rehabilitation and Reclamation of Former Mines and Degraded Land					
Subtitle	Rehabilitasi dan Reklamasi Lahan Tambang Bekas dan Lahan yang Rusak					
Code						
The year in which the module is taught						
Person responsible for the module	Prof. Dr. Budi Utomo, SP., MP.					
Lecturer						
Language	Indonesia / English					
Relation to curriculum	Compulsory / elective / specialisation Names of other study programmes with which the module is shared					
Teaching methods	Lecture and discussion: 150 minute, 14 Lecturer = 35 hour Structured Activities: 180 minute, 14 activities = 42 hour Self Learning (Individual/Group Project): 450 minute, 14 week = 105 hour Middle exam: 100 minute = 1.6 hour Final exam: 100 minute = 1,6 hour					
Workload (incl. contact hours, self-study hours)	Activity	Lecture and Discussion	Structured Activites	Self Learning (Individual / Group Project)	Exam	Total
	Hours	35	42	105	3.2	185
Credit points	3 semester credit unit (SCU) equivalen 6.64 ECTS					
Required prerequisites for joining the module	None					
Recommended prerequisites for joining the module	None					
Module objectives/intended learning outcomes	<p>PLO 4 Having understanding of the theories and advancements in the forestry industry basic science, cultivation, management, technology, and conservation.</p> <p>PLO 5 Capable of demonstrating independent and team work, quality and measurable performance, able to apply various methods of science and technology in forestry issue identification and solving.</p> <p>PLO 9 Having skill to innovate forest cultivation, including biotechnology and other silvicultural activities in forest rehabilitation and reforestation effort.</p>					
Content	<ol style="list-style-type: none"> 1. Concept of rehabilitation and reclamation of ex-mining and degraded land 2. Degradation of non-mining land 3. Land degradation by human activities 4. Degradation of mining land and its impact on the physical properties of the soil 5. Impact of mines on soil chemistry 6. Impact of mines on soil biological properties 7. Reclamation and rehabilitation techniques of ex-mining land 8. Rehabilitation techniques for degraded land on non-mining land on peatlands 9. Techniques for rehabilitation of degraded land from former eruptive mountains and sloped land 					

	<p>10. Techniques for rehabilitating degraded land from former mangrove clearing</p> <p>11. Grassland, desert and shrub degraded land rehabilitation techniques</p> <p>12. Rehabilitation techniques using mechanical and chemical means</p> <p>13. Rehabilitation techniques using biological means (bioremediation and phytoremediation)</p>																								
Examination forms	<ul style="list-style-type: none"> • Quiz: Short questions related to the lecture subject (topic) given to students at the beginning or end of the lecture. • Assignment: Assignments to deepen the lecture topics given to students after several lectures. • Project Based: Problem-based individual or group assignments to strengthen skills related to learning topics in several lectures. • Case Study: Individual or group assignments based on case study to strengthen skills related to learning topics in several lectures. • Midle Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in the first to seventh lectures. • Final Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in lectures after half a semester until the end of the semester. 																								
Study and examination requirements	<ul style="list-style-type: none"> - Minimum lecture attendance is 80%. - Weighting composition for the final grade is quiz (5%), Assignment (5%), Project Based (25%), Case Study (25%), Midle Exam (20%), and Final Exam (20%). - Final grade is defined as: <table border="1" style="margin-left: 40px;"> <thead> <tr> <th>Score</th> <th>Grade</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>≥ 80</td> <td>A</td> <td>4</td> </tr> <tr> <td>75 - < 80</td> <td>B+</td> <td>3,5</td> </tr> <tr> <td>70 - < 75</td> <td>B</td> <td>3</td> </tr> <tr> <td>65 - < 70</td> <td>C+</td> <td>2,5</td> </tr> <tr> <td>60 - < 65</td> <td>C</td> <td>2</td> </tr> <tr> <td>50 - < 60</td> <td>D</td> <td>1</td> </tr> <tr> <td>< 50</td> <td>E</td> <td>0</td> </tr> </tbody> </table>	Score	Grade	Value	≥ 80	A	4	75 - < 80	B+	3,5	70 - < 75	B	3	65 - < 70	C+	2,5	60 - < 65	C	2	50 - < 60	D	1	< 50	E	0
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Learning media	Class room, TV Projector, In Focus, Power Point																								
Reading List	<ol style="list-style-type: none"> 1. Perrow MR, et al. 2002. Handbook of ecology restoration. Volume 1. Principle of restoration. Cambridge University. York 2. Jordan, C.F. Nutrient cycling in tropical forest ecosystem. McGraw-Hill. York. 																								

Forest Management

Module designation	Eco Hydrology					
Subtitle	Eko-Hidrologi					
Code	IKH 2 615					
The year in which the module is taught						
Person responsible for the module	Dr. Ir. Bejo Slamet S.Hut, M.Si, IPM					
Lecturer						
Language	Indonesia / English					
Relation to curriculum	Compulsory / elective / specialisation Names of other study programmes with which the module is shared					
Teaching methods	Lecture and discussion: 150 minute, 14 Lecturer = 35 hour Structured Activities: 180 minute, 14 activities = 42 hour Self Learning (Individual/Group Project): 450 minute, 14 week = 105 hour Middle exam: 100 minute = 1.6 hour Final exam: 100 minute = 1,6 hour					
Workload (incl. contact hours, self-study hours)	Activity	Lecture and Discussion	Structured Activites	Self Learning (Individual / Group Project)	Exam	Total
	Hours	35	42	105	3.2	185
Credit points	3 semester credit unit (SCU) equivalen 6.64 ECTS					
Required prerequisites for joining the module	none					
Recommended prerequisites for joining the module	none					
Module objectives/intended learning outcomes	<p>PLO 4 Having understanding of the theories and advancements in the forestry industry basic science, cultivation, management, technology, and conservation.</p> <p>PLO 5 Capable of demonstrating independent and team work, quality and measurable performance, able to apply various methods of science and technology in forestry issue identification and solving.</p> <p>PLO 8 Having skill to enhance the sustainable forest resource management, including watershed management, forest assessment, socio-economics, communication, as well as adapting to developments through various technological approaches: GIS, drones and info</p>					
Content	<p>Study materials (teaching materials):</p> <ol style="list-style-type: none"> 1. Introduction to Ecohydrology and its scope 2. Basic concepts of the hydrological cycle and water balance 3. The role of vegetation and forests in infiltration, vapotranspiration, and surface runoff 4. The relationship between soil, topography, and rainfall in forest hydrological systems 5. Ecohydrology and the function of forest ecosystems in water regulation 6. Measurement of hydrological components in the field (rainfall, runoff, soil moisture) 					

	<p>7. Analysis of hydrological data and interpretation of observation results</p> <p>8. Midterm Exam</p> <p>9. Land use change and its impact on watershed hydrology</p> <p>10. Eco-hydrological models (SWAT, HEC-HMS, etc.)</p> <p>11. Eco-hydrology-based ecosystem restoration</p> <p>12. Eco-hydrology-based watershed management</p> <p>13. Eco-hydrology-based climate change adaptation and mitigation</p> <p>14. Case study: Eco-hydrology analysis of watersheds in Indonesia</p> <p>15. Integration of eco-hydrology concepts in forestry policy</p> <p>16. Final Exam and Learning Reflection</p>																								
Examination forms	<ul style="list-style-type: none"> • Quiz: Short questions related to the lecture subject (topic) given to students at the beginning or end of the lecture. • Assignment: Assignments to deepen the lecture topics given to students after several lectures. • Project Based: Problem-based individual or group assignments to strengthen skills related to learning topics in several lectures. • Case Study: Individual or group assignments based on case study to strengthen skills related to learning topics in several lectures. • Midle Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in the first to seventh lectures. • Final Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in lectures after half a semester until the end of the semester. 																								
Study and examination requirements	<ul style="list-style-type: none"> - Minimum lecture attendance is 80%. - Weighting composition for the final grade is quiz (5%), Assignment (5%), Project Based (25%), Case Study (25%), Midle Exam (20%), and Final Exam (20%). - Final grade is defined as: <table border="1" style="margin-left: 40px;"> <thead> <tr> <th>Score</th> <th>Grade</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>≥ 80</td> <td>A</td> <td>4</td> </tr> <tr> <td>75 - < 80</td> <td>B+</td> <td>3,5</td> </tr> <tr> <td>70 - < 75</td> <td>B</td> <td>3</td> </tr> <tr> <td>65 - < 70</td> <td>C+</td> <td>2,5</td> </tr> <tr> <td>60 - < 65</td> <td>C</td> <td>2</td> </tr> <tr> <td>50 - < 60</td> <td>D</td> <td>1</td> </tr> <tr> <td>< 50</td> <td>E</td> <td>0</td> </tr> </tbody> </table>	Score	Grade	Value	≥ 80	A	4	75 - < 80	B+	3,5	70 - < 75	B	3	65 - < 70	C+	2,5	60 - < 65	C	2	50 - < 60	D	1	< 50	E	0
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Learning media	Class room, TV Projector, In Focus, Power Point																								
Reading List	<ol style="list-style-type: none"> 1. Bonell, M., & Bruijnzeel, L. A. (2005). <i>Forests, Water and People in the Humid Tropics</i>. Cambridge University Press. 2. Asdak, C. (2018). <i>Hydrology and Watershed Management</i>. Gadjah Mada University Press. 3. Suryatmojo, H. (2020). <i>Eco-hydrology in Watershed Management</i>. UGM Press. 																								

Module designation	Forest Resource Management Policy					
Subtitle	Kebijakan Pengelolaan Sumberdaya Hutan					
Code	IKH 2 616					
The year in which the module is taught						
Person responsible for the module	Dr. Oding Affandi S.Hut., MP.					
Lecturer	Prof. Rahmawaty S.Hut., M.Si., Ph.D. Prof. Dr. Agus Purwoko S.Hut., M.Si. Dr. Ir. Bejo Slamet S.Hut, M.Si, IPM					
Language	Indonesia / English					
Relation to curriculum	Compulsory / elective / specialisation Names of other study programmes with which the module is shared					
Teaching methods	Lecture and discussion: 150 minute, 14 Lecturer = 35 hour Structured Activities: 180 minute, 14 activities = 42 hour Self Learning (Individual/Group Project): 450 minute, 14 week = 105 hour Middle exam: 100 minute = 1.6 hour Final exam: 100 minute = 1,6 hour					
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Credit points	3 semester credit unit (SCU) equivalen 6.64 ECTS					
Required prerequisites for joining the module	None					
Recommended prerequisites for joining the module	None					
Module objectives/intended learning outcomes	<p>PLO 4 Having understanding of the theories and advancements in the forestry industry basic science, cultivation, management, technology, and conservation.</p> <p>PLO 5 Capable of demonstrating independent and team work, quality and measurable performance, able to apply various methods of science and technology in forestry issue identification and solving.</p> <p>PLO 8 Having skill to enhance the sustainable forest resource management, including watershed management, forest assessment, socio-economics, communication, as well as adapting to developments through various technological approaches: GIS, drones and info</p>					
Content	<p>Study Material:</p> <ol style="list-style-type: none"> 1. Definition and scope of study 2. History of the development and role of the forestry sector in national development 3. Public policy in forest resource management and the environment 4. The role of forest resources in regional development and neighbouring communities 5. Forest industry development policy 6. Policy on utilisation and management of non-timber forest products 7. Forest service utilisation and management policy 					

	8. Forest area management and structuring policies 9. Forest and spatial planning 10. Agrarian reform, its implementation and implications in forest management 11. Development system approach and decentralisation in the forestry sector 12. Global forest resource issues (carbon trading, global climate and global warming) 13. Forestry governance and governance theory																								
Examination forms	<ul style="list-style-type: none"> • Quiz: Short questions related to the lecture subject (topic) given to students at the beginning or end of the lecture. • Assignment: Assignments to deepen the lecture topics given to students after several lectures. • Project Based: Problem-based individual or group assignments to strengthen skills related to learning topics in several lectures. • Case Study: Individual or group assignments based on case study to strengthen skills related to learning topics in several lectures. • Middle Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in the first to seventh lectures. • Final Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in lectures after half a semester until the end of the semester. 																								
Study and examination requirements	<ul style="list-style-type: none"> - Minimum lecture attendance is 80%. - Weighting composition for the final grade is quiz (5%), Assignment (5%), Project Based (25%), Case Study (25%), Middle Exam (20%), and Final Exam (20%). - Final grade is defined as: <table border="1" style="margin-left: 40px;"> <thead> <tr> <th>Score</th> <th>Grade</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>≥ 80</td> <td>A</td> <td>4</td> </tr> <tr> <td>75 - < 80</td> <td>B+</td> <td>3,5</td> </tr> <tr> <td>70 - < 75</td> <td>B</td> <td>3</td> </tr> <tr> <td>65 - < 70</td> <td>C+</td> <td>2,5</td> </tr> <tr> <td>60 - < 65</td> <td>C</td> <td>2</td> </tr> <tr> <td>50 - < 60</td> <td>D</td> <td>1</td> </tr> <tr> <td>< 50</td> <td>E</td> <td>0</td> </tr> </tbody> </table>	Score	Grade	Value	≥ 80	A	4	75 - < 80	B+	3,5	70 - < 75	B	3	65 - < 70	C+	2,5	60 - < 65	C	2	50 - < 60	D	1	< 50	E	0
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Learning media	Class room, TV Projector, In Focus, Power Point																								
Reading List	<ol style="list-style-type: none"> 1. Adams, W. M. & H. A. (2018). <i>Green Development: Environment and Sustainability in a Developing World</i>. Routledge. 2. Berkes, F. (2017). <i>Governance of Common-Pool Resources: Collective Action and the Evolution of Social Norms</i>. Cambridge University Press. 3. Brown, G. & K. R. (2020). <i>Forest Policy Analysis: A Guide to the Science and Practice</i>. Wiley-Blackwell. 4. Chopra, K. & A. P. (2019). <i>Sustainable Forest Management: A Global Perspective</i>. Springer. 5. Kumar, A. & P. R. (2021). <i>Forest Governance and Policy: A Comprehensive Overview</i>. Academic Press. 																								

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| | <ol style="list-style-type: none">6. López, R. & M. J. (2022). <i>Policy Frameworks for Sustainable Forest Management</i>. Woodhead Publishing.7. Mäkelä, H. & R. S. (2020). <i>Forest Policy and Economics: A Global Perspective</i>. Routledge.8. Pérez, J. & C. M. (2018). <i>Forest Resources and Environmental Policy: A Comparative Approach</i>. Springer.9. Ribot, J. C. & N. L. (2015). <i>Democratic Decentralization and Rural Development: A Comparative Perspective</i>. Cambridge University Press.10. Zhang, D. & L. H. (2021). <i>Climate Change and Forest Policy: Strategies for Adaptation and Mitigation</i>. Elsevier. |
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Module designation	International Forestry					
Subtitle	Kehutanan Internasional					
Code	IKH 2 617					
The year in which the module is taught						
Person responsible for the module	Dr. Ir. Bejo Slamet S.Hut, M.Si, IPM					
Lecturer	Dr. Anita Zaitunah S.Hut., M.Sc. Dr. Oding Affandi S.Hut., MP. Prof. Ir. Siti Latifah S.Hut, M.Si, Ph.D, IPU					
Language	Indonesia / English					
Relation to curriculum	Compulsory / elective / specialisation Names of other study programmes with which the module is shared					
Teaching methods	Lecture and discussion: 150 minute, 14 Lecturer = 35 hour Structured Activities: 180 minute, 14 activities = 42 hour Self Learning (Individual/Group Project): 450 minute, 14 week = 105 hour Middle exam: 100 minute = 1.6 hour Final exam: 100 minute = 1,6 hour					
Workload (incl. contact hours, self-study hours)	Activity	Lecture and Discussion	Structured Activities	Self Learning (Individual / Group Project)	Exam	Total
	Hours	35	42	105	3.2	185
Credit points	3 semester credit unit (SCU) equivalent 6.64 ECTS					
Required prerequisites for joining the module	None					
Recommended prerequisites for joining the module	None					
Module objectives/intended learning outcomes	<p>PLO 4 Having understanding of the theories and advancements in the forestry industry basic science, cultivation, management, technology, and conservation.</p> <p>PLO 5 Capable of demonstrating independent and team work, quality and measurable performance, able to apply various methods of science and technology in forestry issue identification and solving.</p> <p>PLO 8 Having skill to enhance the sustainable forest resource management, including watershed management, forest assessment, socio-economics, communication, as well as adapting to developments through various technological approaches: GIS, drones and info</p>					
Content	<p>Study Material:</p> <ol style="list-style-type: none"> 1. Introduction 2. Global Issues in Forestry and the Environment 3. Development and Distribution of Global Forests 4. Development of Global Forest Area 5. Development of Demand for Global Forest Ecosystem Goods and Services 6. Indonesia's Role in International Negotiations on Forestry and the Environment 					

	<p>7. Comparison of Forest Management in Various Countries</p> <p>8. Midterm Exam</p> <p>9. Comparison of Forest Management in Various Countries</p> <p>10. Comparison of Forestry Institutions in Various Countries</p> <p>11. International Agreements in the Field of Forestry and the Environment</p> <p>12. International Agreements in the Field of Forestry and the Environment</p> <p>13. Global Initiatives in Global Forest Management</p> <p>14. Global Initiatives in Global Forest Management</p> <p>15. Utilization of International Forestry Information in National Forestry Policy</p> <p>16. Final Exam</p>																								
Examination forms	<ul style="list-style-type: none"> • Quiz: Short questions related to the lecture subject (topic) given to students at the beginning or end of the lecture. • Assignment: Assignments to deepen the lecture topics given to students after several lectures. • Project Based: Problem-based individual or group assignments to strengthen skills related to learning topics in several lectures. • Case Study: Individual or group assignments based on case study to strengthen skills related to learning topics in several lectures. • Midle Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in the first to seventh lectures. • Final Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in lectures after half a semester until the end of the semester. 																								
Study and examination requirements	<ul style="list-style-type: none"> - Minimum lecture attendance is 80%. - Weighting composition for the final grade is quiz (5%), Assignment (5%), Project Based (25%), Case Study (25%), Midle Exam (20%), and Final Exam (20%). - Final grade is defined as: <table border="1" style="margin-left: 40px;"> <thead> <tr> <th>Score</th> <th>Grade</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>≥ 80</td> <td>A</td> <td>4</td> </tr> <tr> <td>75 - < 80</td> <td>B+</td> <td>3,5</td> </tr> <tr> <td>70 - < 75</td> <td>B</td> <td>3</td> </tr> <tr> <td>65 - < 70</td> <td>C+</td> <td>2,5</td> </tr> <tr> <td>60 - < 65</td> <td>C</td> <td>2</td> </tr> <tr> <td>50 - < 60</td> <td>D</td> <td>1</td> </tr> <tr> <td>< 50</td> <td>E</td> <td>0</td> </tr> </tbody> </table>	Score	Grade	Value	≥ 80	A	4	75 - < 80	B+	3,5	70 - < 75	B	3	65 - < 70	C+	2,5	60 - < 65	C	2	50 - < 60	D	1	< 50	E	0
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Learning media	Class room, TV Projector, In Focus, Power Point																								
Reading List	<ol style="list-style-type: none"> 1. F.A.O. 1996. State of the World's Forest (1996). FAO of the UN, Rome. 2.2001. State of the World's Forest (2001). FAO of the UN, Rome. 3.2006. State of the World's Forest (2006). FAO of the UN, Rome. 4. 2020. Global Forest Resources Assessment 2020 – Key findings. Rome 																								

	<ol style="list-style-type: none"> 5. Gardner, T. and R. Engelman. 1999. Forest Future : population, consumption, and wood resources. Population Action International, Washington D.C. 6. Ramakrishna, K. and G.M. Woodwell (editors). 1993. World Forests for the Future: their use and conservation. Yale University Press, New Haven and London. 7. Sharma, N.P. (editor). 1992. Managing the World's Forests. Kendall/Hunt Publishing Co., Iowa. 8. Colfer CJP. 2005. The Complex Forests: Communities, Uncertainties, & Adaptive Collaborative Management. Washington DC.: Resource For the Future. 370p 9. Ayre G, Callway R (eds.). 2005. Governance for Sustainable Development: A foundation for the future. London: Earthscan. 216p. 10. Frieden J, Pastor-Jr M, Tomz M (eds.). 2000. Modern Political Economy and Latin America: Theory and practice. Boulder, Colorado: Westview Press. 348p. 11. Kowero G, Campbell BM, Sumaila UR (eds.). 2003. Policies and Governance in Woodlands of Southern Africa. Bogor: CIFOR. 438p. 12. Justianto, A. et al. 2007. Global Forestry Instruments. Ministry of Forestry, Jakarta 13. Planning Agency, Ministry of Forestry. 2004. National Forest Programme. Cooperation between the Ministry of Forestry of the Republic of Indonesia and GTZ-SMCP-Germany, Jakarta 14. The Ministry of Forestry Republic of Indonesia. 2007. REDDI: Reducing Emissions from Deforestation Forest Degradation in Indonesia. MoF R.I., Jakarta
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Module designation	Forest Ecosystem Assessment					
Subtitle	Penilaian Ekosistem Hutan					
Code	IKH 2 618					
The year in which the module is taught						
Person responsible for the module	Prof. Dr. Agus Purwoko S.Hut., M.Si.					
Lecturer	Dr. Anita Zaitunah S.Hut., M.Sc. Dr. Nurdin Sulistiyono S.Hut., M.Si. Prof. Dr. Arida Susilowati S.Hut., M.Si					
Language	Indonesia / English					
Relation to curriculum	Compulsory / elective / specialisation Names of other study programmes with which the module is shared					
Teaching methods	Lecture and discussion: 150 minute, 14 Lecturer = 35 hour Structured Activities: 180 minute, 14 activities = 42 hour Self Learning (Individual/Group Project): 450 minute, 14 week = 105 hour Middle exam: 100 minute = 1.6 hour Final exam: 100 minute = 1,6 hour					
Workload (incl. contact hours, self-study hours)	Activity	Lecture and Discussion	Structured Activities	Self Learning (Individual / Group Project)	Exam	Total
	Hours	35	42	105	3.2	185
Credit points	3 semester credit unit (SCU) equivalent 6.64 ECTS					
Required prerequisites for joining the module	None					
Recommended prerequisites for joining the module	None					
Module objectives/intended learning outcomes	<p>PLO 4 Having understanding of the theories and advancements in the forestry industry basic science, cultivation, management, technology, and conservation.</p> <p>PLO 6 Capable of making appropriate decisions based on standard procedures and data, in communication, supervision and evaluation of work in forestry field. Efforts at various levels (genetic, species and ecosystem)</p> <p>PLO 8 Having skill to enhance the sustainable forest resource management, including watershed management, forest assessment, socio-economics, communication, as well as adapting to developments through various technological approaches: GIS, drones and info</p>					
Content	<ol style="list-style-type: none"> 1. Introduction: The concept and urgency of forest ecosystem assessment 2. Components of forest ecosystems 3. Principles and approaches to ecosystem assessment 4. Forest ecosystem assessment indicators 5. Methods for assessing ecosystem conditions 6. Assessment of ecosystem services 7. Economic valuation of forest ecosystems 					

	8. Midterm exam 9. Analysis of forest ecosystem degradation 10. Restoration and rehabilitation of forest ecosystems 11. Spatial approaches and modeling 12. Social and institutional assessment 13. Integration of ecosystem assessment 14. Case studies of forest ecosystem assessment in Indonesia 15. Preparation of forest ecosystem assessment reports 16. Final Exam																								
Examination forms	<ul style="list-style-type: none"> • Quiz: Short questions related to the lecture subject (topic) given to students at the beginning or end of the lecture. • Assignment: Assignments to deepen the lecture topics given to students after several lectures. • Project Based: Problem-based individual or group assignments to strengthen skills related to learning topics in several lectures. • Case Study: Individual or group assignments based on case study to strengthen skills related to learning topics in several lectures. • Midle Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in the first to seventh lectures. • Final Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in lectures after half a semester until the end of the semester. 																								
Study and examination requirements	<ul style="list-style-type: none"> - Minimum lecture attendance is 80%. - Weighting composition for the final grade is quiz (5%), Assignment (5%), Project Based (25%), Case Study (25%). Midle Exam (20%), and Final Exam (20%). - Final grade is defined as: <table border="1"> <thead> <tr> <th>Score</th> <th>Grade</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>≥ 80</td> <td>A</td> <td>4</td> </tr> <tr> <td>75 - < 80</td> <td>B+</td> <td>3,5</td> </tr> <tr> <td>70 - < 75</td> <td>B</td> <td>3</td> </tr> <tr> <td>65 - < 70</td> <td>C+</td> <td>2,5</td> </tr> <tr> <td>60 - < 65</td> <td>C</td> <td>2</td> </tr> <tr> <td>50 - < 60</td> <td>D</td> <td>1</td> </tr> <tr> <td>< 50</td> <td>E</td> <td>0</td> </tr> </tbody> </table> 	Score	Grade	Value	≥ 80	A	4	75 - < 80	B+	3,5	70 - < 75	B	3	65 - < 70	C+	2,5	60 - < 65	C	2	50 - < 60	D	1	< 50	E	0
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Learning media	Class room, TV Projector, In Focus, Power Point																								
Reading List	<ol style="list-style-type: none"> 1. Costanza, R., de Groot, R., Sutton, P., van der Ploeg, S., Anderson, S. J., Kubiszewski, I., Farber, S., & Turner, R. K. (2014). Changes in the Global Value of Ecosystem Services. <i>Global Environmental Change</i>, 26, 152–158. 2. Daily, G. C. (Ed.). (1997). <i>Nature's Services: Societal Dependence on Natural Ecosystems</i>. Island Press, Washington D.C. 3. de Groot, R. S., Wilson, M. A., & Boumans, R. M. J. (2002). A Typology for the Classification, Description and Valuation of Ecosystem Functions, Goods and Services. <i>Ecological Economics</i>, 41(3), 393–408. 4. FAO. (2020). <i>Framework for Ecosystem Restoration Monitoring</i>. Food and Agriculture Organization of the United Nations, Rome. 																								

	<ol style="list-style-type: none"> 5. Millennium Ecosystem Assessment (MEA). (2005). <i>Ecosystems and Human Well-being: Synthesis</i>. Island Press, Washington D.C. 6. Odum, E. P., & Barrett, G. W. (2005). <i>Fundamentals of Ecology</i> (5th ed.). Thomson Brooks/Cole, Belmont. 7. Tietenberg, T. & Lewis, L. (2018). <i>Environmental and Natural Resource Economics</i> (11th ed.). Pearson Education Limited. 8. Turner, R. K., Pearce, D., & Bateman, I. (1994). <i>Environmental Economics: An Elementary Introduction</i>. Harvester Wheatsheaf, London. 9. Walters, C. (1986). <i>Adaptive Management of Renewable Resources</i>. Macmillan Publishing Company, New York. 10. Ministry of Environment and Forestry (KLHK). (2020). <i>Guidelines for Assessing the Condition of Forest and Land Ecosystems in Indonesia</i>. Directorate General of Forestry Planning and Environmental Management, Jakarta.
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Module designation	Advanced Forest Products Harvesting					
Subtitle	Pemanenan Hasil Hutan Lanjutan					
Code	IKH 2 619					
The year in which the module is taught						
Person responsible for the module	Prof. Dr. Ir. Muhdi S.Hut., M.Si.					
Lecturer	Dr. Samsuri S.Hut., M.Si. Dr. Ridwanti Batubara S.Hut., MP. Prof. Ir. Siti Latifah S.Hut, M.Si, Ph.D, IPU Dr. Ir OK Hasnanda Syahputra MP					
Language	Indonesia / English					
Relation to curriculum	Compulsory / elective / specialisation Names of other study programmes with which the module is shared					
Teaching methods	Lecture and discussion: 150 minute, 14 Lecturer = 35 hour Structured Activities: 180 minute, 14 activities = 42 hour Self Learning (Individual/Group Project): 450 minute, 14 week = 105 hour Midle exam: 100 minute = 1.6 hour Final exam: 100 minute = 1,6 hour					
Workload (incl. contact hours, self-study hours)	Activity	Lecture and Discussion	Structured Activites	Self Learning (Individual / Group Project)	Exam	Total
	Hours	35	42	105	3.2	185
Credit points	3 semester credit unit (SCU) equivalen 6.64 ECTS					
Required prerequisites for joining the module	None					
Recommended prerequisites for joining the module	None					
Module objectives/intended learning outcomes	<p>PLO 4 Having understanding of the theories and advancements in the forestry industry basic science, cultivation, management, technology, and conservation.</p> <p>PLO 5 Capable of demonstrating independent and team work, quality and measurable performance, able to apply various methods of science and technology in forestry issue identification and solving.</p> <p>PLO 8 Having skill to enhance the sustainable forest resource management, including watershed management, forest assessment, socio-economics, communication, as well as adapting to developments through various technological approaches: GIS, drones and info</p>					
Content	<ol style="list-style-type: none"> 1. Course contract, introduction, scope, benefits, and forest harvesting policies 2. Forest harvesting processes and stages 3. Forest harvesting planning aspects 4. Forest area clearing 5. Timber harvesting systems 6. Tools and machinery used in timber harvesting 7. Work productivity and work time measurement techniques 					

	8. Midterm exam 9. Environmentally friendly timber harvesting 10. Timber harvesting logistics chain 11. Forest product management and certification 12. The importance of Occupational Safety and Health (OSH) in harvesting 13. Harvesting of non-timber forest products: sap and resin 14. Harvesting of non-timber forest products: leaves, fruits, seeds, bark 15. The impact of forest product harvesting and its control 16. Final Exam																								
Examination forms	<ul style="list-style-type: none"> • Quiz: Short questions related to the lecture subject (topic) given to students at the beginning or end of the lecture. • Assignment: Assignments to deepen the lecture topics given to students after several lectures. • Project Based: Problem-based individual or group assignments to strengthen skills related to learning topics in several lectures. • Case Study: Individual or group assignments based on case study to strengthen skills related to learning topics in several lectures. • Midle Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in the first to seventh lectures. • Final Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in lectures after half a semester until the end of the semester. 																								
Study and examination requirements	<ul style="list-style-type: none"> - Minimum lecture attendance is 80%. - Weighting composition for the final grade is quiz (5%), Assignment (5%), Project Based (25%), Case Study (25%), Midle Exam (20%), and Final Exam (20%). - Final grade is defined as: <table border="1" style="margin-left: 40px;"> <thead> <tr> <th>Score</th> <th>Grade</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>≥ 80</td> <td>A</td> <td>4</td> </tr> <tr> <td>75 - < 80</td> <td>B+</td> <td>3,5</td> </tr> <tr> <td>70 - < 75</td> <td>B</td> <td>3</td> </tr> <tr> <td>65 - < 70</td> <td>C+</td> <td>2,5</td> </tr> <tr> <td>60 - < 65</td> <td>C</td> <td>2</td> </tr> <tr> <td>50 - < 60</td> <td>D</td> <td>1</td> </tr> <tr> <td>< 50</td> <td>E</td> <td>0</td> </tr> </tbody> </table>	Score	Grade	Value	≥ 80	A	4	75 - < 80	B+	3,5	70 - < 75	B	3	65 - < 70	C+	2,5	60 - < 65	C	2	50 - < 60	D	1	< 50	E	0
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Learning media	Class room, TV Projector, In Focus, Power Point																								
Reading List	<ol style="list-style-type: none"> 1. FAO. (2017). Reduced Impact Logging Guidelines for Tropical Forests. Food and Agriculture Organization, Rome. 2. Heinrich, R. (2019). Forest Harvesting and Transportation Engineering. Springer Nature, Switzerland. 3. Ministry of Environment and Forestry (KLHK). (2020). Technical Guidelines for Sustainable Forest Product Harvesting. Directorate General of Sustainable Production Forest Management, Jakarta. 4. McMahon, S., & Evanson, T. (2015). Forest Operations Management. Routledge, London. 5. Suhendang, E. (2018). Forest Harvesting Management. IPB Press, Bogor. 																								

	<ol style="list-style-type: none">6. Dulsalam, et al. (2019). Technology and Efficiency of Tropical Forest Product Harvesting. P3HH – Research and Development Agency of the Ministry of Environment and Forestry, Bogor.7. Elias, M., & Bismark, M. (2016). Non-Timber Forest Product Harvesting: Principles and Practices. LIPI Press, Jakarta.
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Module designation	Advance forest biometrics					
Subtitle	Biometrika Hutan Lanjutan					
Code	IKH 2 620					
The year in which the module is taught						
Person responsible for the module	Prof. Ir. Siti Latifah S.Hut, M.Si, Ph.D, IPU					
Lecturer	Dr. Nurdin Sulistiyono S.Hut., M.Si. Dr. Samsuri S.Hut., M.Si.					
Language	Indonesia / English					
Relation to curriculum	Compulsory / elective / specialisation Names of other study programmes with which the module is shared					
Teaching methods	Lecture and discussion: 150 minute, 14 Lecturer = 35 hour Structured Activities: 180 minute, 14 activities = 42 hour Self Learning (Individual/Group Project): 450 minute, 14 week = 105 hour Middle exam: 100 minute = 1.6 hour Final exam: 100 minute = 1,6 hour					
Workload (incl. contact hours, self-study hours)	Activity	Lecture and Discussion	Structured Activites	Self Learning (Individual / Group Project)	Exam	Total
	Hours	35	42	105	3.2	185
Credit points	3 semester credit unit (SCU) equivalen 6.64 ECTS					
Required prerequisites for joining the module	None					
Recommended prerequisites for joining the module	None					
Module objectives/intended learning outcomes	<p>PLO 4 Having understanding of the theories and advancements in the forestry industry basic science, cultivation, management, technology, and conservation.</p> <p>PLO 6 Capable of making appropriate decisions based on standard procedures and data, in communication, supervision and evaluation of work in forestry field. fforts at various levels (genetic, species and ecosystem)</p> <p>PLO 8 Having skill to enhance the sustainable forest resource management, including watershed management, forest assessment, socio-economics, communication, as well as adapting to developments through various technological approaches: GIS, drones and info</p>					
Content	<p>Study Material:</p> <ol style="list-style-type: none"> 1. Course contract, introduction, scope of advanced forest biometrics 2. Advanced inferential statistics in forestry 3. Multiple linear and non-linear regression 4. Forest growth and yield modeling 5. Growth curve analysis (Gompertz, Logistic, Chapman-Richards) 6. Non-linear regression analysis and mixed models 7. Forest sampling design and analysis 8. Midterm exam 					

	<p>9. Multivariate analysis (PCA, Cluster, Discriminant)</p> <p>10. Spatial modeling in forest biometrics</p> <p>11. Estimation of forest volume and biomass</p> <p>12. Validation and evaluation of biometric models</p> <p>13. Stand growth simulation and yield projection</p> <p>14. Integration of biometric models with forest information systems</p> <p>15. Preparation of forest biometric model reports</p> <p>16. Final Exam</p>																								
Examination forms	<ul style="list-style-type: none"> • Quiz: Short questions related to the lecture subject (topic) given to students at the beginning or end of the lecture. • Assignment: Assignments to deepen the lecture topics given to students after several lectures. • Project Based: Problem-based individual or group assignments to strengthen skills related to learning topics in several lectures. • Case Study: Individual or group assignments based on case study to strengthen skills related to learning topics in several lectures. • Midle Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in the first to seventh lectures. • Final Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in lectures after half a semester until the end of the semester. 																								
Study and examination requirements	<ul style="list-style-type: none"> - Minimum lecture attendance is 80%. - Weighting composition for the final grade is quiz (5%), Assignment (5%), Project Based (25%), Case Study (25%). Midle Exam (20%), and Final Exam (20%). - Final grade is defined as: <table border="1"> <thead> <tr> <th>Score</th> <th>Grade</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>≥ 80</td> <td>A</td> <td>4</td> </tr> <tr> <td>75 - < 80</td> <td>B+</td> <td>3,5</td> </tr> <tr> <td>70 - < 75</td> <td>B</td> <td>3</td> </tr> <tr> <td>65 - < 70</td> <td>C+</td> <td>2,5</td> </tr> <tr> <td>60 - < 65</td> <td>C</td> <td>2</td> </tr> <tr> <td>50 - < 60</td> <td>D</td> <td>1</td> </tr> <tr> <td>< 50</td> <td>E</td> <td>0</td> </tr> </tbody> </table>	Score	Grade	Value	≥ 80	A	4	75 - < 80	B+	3,5	70 - < 75	B	3	65 - < 70	C+	2,5	60 - < 65	C	2	50 - < 60	D	1	< 50	E	0
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Learning media	Class room, TV Projector, In Focus, Power Point																								
Reading List	<ol style="list-style-type: none"> 1. Avery, T. E., & Burkhart, H. E. (2015). Forest Measurement (6th ed.). McGraw-Hill Education. 2. Vanclay, J. K. (1994). Modeling Forest Growth and Yield: Applications in Mixed Tropical Forests. CAB International. 3. Husch, B., Beers, T. W., & Kershaw, J. A. (2012). Forest Measurement (4th ed.). Wiley-Blackwell. 4. Gregoire, T. G., & Valentine, H. T. (2008). Sampling Strategies for Natural Resources and the Environment. Chapman & Hall/CRC. 5. Burkhart, H. E., & Tomé, M. (2012). Tree and Forest Modeling. Springer, Dordrecht. 6. Soerianegara, I., & Indrawan, A. (2016). Indonesian Forest Ecology. IPB Press, Bogor. 																								

	7. Ministry of Environment and Forestry (KLHK). (2020). Guidelines for Estimating Indonesian Forest Biomass and Carbon. Jakarta.
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Module designation	GIS for Forest Resource Management					
Subtitle	SIG untuk Pengelolaan Sumberdaya Hutan					
Code	IKH 2 621					
The year in which the module is taught						
Person responsible for the module	Dr. Anita Zaitunah S.Hut., M.Sc					
Lecturer	Dr. Samsuri S.Hut., M.Si. Dr. Ir. Bejo Slamet S.Hut, M.Si, IPM Assoc. Prof. Thomas Groen					
Language	Indonesia / English					
Relation to curriculum	Compulsory / elective / specialisation Names of other study programmes with which the module is shared					
Teaching methods	Lecture and discussion: 150 minute, 14 Lecturer = 35 hour Structured Activities: 180 minute, 14 activities = 42 hour Self Learning (Individual/Group Project): 450 minute, 14 week = 105 hour Middle exam: 100 minute = 1.6 hour Final exam: 100 minute = 1,6 hour					
Workload (incl. contact hours, self-study hours)	Activity	Lecture and Discussion	Structured Activities	Self Learning (Individual / Group Project)	Exam	Total
	Hours	35	42	105	3.2	185
Credit points	3 semester credit unit (SCU) equivalent 6.64 ECTS					
Required prerequisites for joining the module	None					
Recommended prerequisites for joining the module	None					
Module objectives/intended learning outcomes	<p>PLO 4 Having understanding of the theories and advancements in the forestry industry basic science, cultivation, management, technology, and conservation.</p> <p>PLO 6 Capable of making appropriate decisions based on standard procedures and data, in communication, supervision and evaluation of work in forestry field. Efforts at various levels (genetic, species and ecosystem)</p> <p>PLO 8 Having skill to enhance the sustainable forest resource management, including watershed management, forest assessment, socio-economics, communication, as well as adapting to developments through various technological approaches: GIS, drones and info</p>					
Content	<p>Study Material:</p> <ol style="list-style-type: none"> 1. Lecture Contract; Boundaries and Concepts of Geographic Information Systems 2. Definition of GIS, application of GIS in various fields 3. History and development of GIS as a science 4. System concepts, geographic information system concepts and computer-based information systems 					

	<ol style="list-style-type: none"> 5. Basic concepts, components and capabilities of GIS 6. Database concept, database design methodology in GIS 7. Concept of database system, database management, relational database model in GIS 8. Examples of GIS Applications in the real world 9. Geodesy and its use in GIS applications 10. The concept of spatiality in handling data and information in GIS 11. Definitions, concepts of Remote Sensing and its Relation to GIS 12. Definition of Model in GIS 13. Concept and model design in natural resource and forest management 14. Case Study of GIS Application in Forest and Environmental Management Activities 15. Case Study of GIS Application in problem solving in forest and environment management 																								
Examination forms	<ul style="list-style-type: none"> • Quiz: Short questions related to the lecture subject (topic) given to students at the beginning or end of the lecture. • Assignment: Assignments to deepen the lecture topics given to students after several lectures. • Project Based: Problem-based individual or group assignments to strengthen skills related to learning topics in several lectures. • Case Study: Individual or group assignments based on case study to strengthen skills related to learning topics in several lectures. • Midle Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in the first to seventh lectures. • Final Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in lectures after half a semester until the end of the semester. 																								
Study and examination requirements	<ul style="list-style-type: none"> - Minimum lecture attendance is 80%. - Weighting composition for the final grade is quiz (5%), Assignment (5%), Project Based (25%), Case Study (25%). Midle Exam (20%), and Final Exam (20%). - Final grade is defined as: <table border="1" style="margin-left: 40px;"> <thead> <tr> <th>Score</th> <th>Grade</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>≥ 80</td> <td>A</td> <td>4</td> </tr> <tr> <td>75 - < 80</td> <td>B+</td> <td>3,5</td> </tr> <tr> <td>70 - < 75</td> <td>B</td> <td>3</td> </tr> <tr> <td>65 - < 70</td> <td>C+</td> <td>2,5</td> </tr> <tr> <td>60 - < 65</td> <td>C</td> <td>2</td> </tr> <tr> <td>50 - < 60</td> <td>D</td> <td>1</td> </tr> <tr> <td>< 50</td> <td>E</td> <td>0</td> </tr> </tbody> </table>	Score	Grade	Value	≥ 80	A	4	75 - < 80	B+	3,5	70 - < 75	B	3	65 - < 70	C+	2,5	60 - < 65	C	2	50 - < 60	D	1	< 50	E	0
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Learning media	Class room, TV Projector, In Focus, Power Point																								
Reading List	<ol style="list-style-type: none"> 1. Understanding Geographic Information System The Arc/Info Method. ESRI Inc, Redland, California USA. [ESRI] Environmental System Research Institute. 1992. 2. Basic Concepts of Geographic Information Systems. Author: Eddy Prahasta. Informatika Bandung Publisher. Bandung. 2001. 3. Geographic Information System: ArcView Tutorial. Author: Eddy Prahasta. Informatika Bandung Publisher. Bandung. 2002. 																								

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| | <ol style="list-style-type: none">4. Geographic Information System Applications for Forestry. Author: I Nengah Surati Jaya. Faculty of Forestry, IPB. Bogor. 2002.5. GIS Design and Application. Authors: Denny Chater, Irma Agtrisari. PT. Elex Media Komputindo. Jakarta. 2003 |
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Module designation	Advanced Forest Planning					
Subtitle	Perencanaan Hutan Lanjutan					
Code	IKH 2 622					
The year in which the module is taught						
Person responsible for the module	Prof. Rahmawaty S.Hut., M.Si., Ph.D.					
Lecturer	Prof. Ir. Siti Latifah S.Hut, M.Si, Ph.D, IPU Dr. Ir OK Hasnanda Syahputra MP					
Language	Indonesia / English					
Relation to curriculum	Compulsory / elective / specialisation Names of other study programmes with which the module is shared					
Teaching methods	Lecture and discussion: 150 minute, 14 Lecturer = 35 hour Structured Activities: 180 minute, 14 activities = 42 hour Self Learning (Individual/Group Project): 450 minute, 14 week = 105 hour Middle exam: 100 minute = 1.6 hour Final exam: 100 minute = 1,6 hour					
Workload (incl. contact hours, self-study hours)	Activity	Lecture and Discussion	Structured Activites	Self Learning (Individual / Group Project)	Exam	Total
	Hours	35	42	105	3.2	185
Credit points	3 semester credit unit (SCU) equivalen 6.64 ECTS					
Required prerequisites for joining the module	None					
Recommended prerequisites for joining the module	None					
Module objectives/intended learning outcomes	<p>PLO 4 Having understanding of the theories and advancements in the forestry industry basic science, cultivation, management, technology, and conservation.</p> <p>PLO 7 Capable of arranging scientific research, compile the scientific and non-scientific reports in the form of thesis and prevent the plagiarism.</p> <p>PLO 8 Having skill to enhance the sustainable forest resource management, including watershed management, forest assessment, socio-economics, communication, as well as adapting to developments through various technological approaches: GIS, drones and info</p>					
Content	<p>Study material:</p> <ol style="list-style-type: none"> 1. General definitions and objectives of planning, definitions and objectives of forest planning science 2. Plans based on management areas, time frames, and plan functions 3. Definition and concept of the Analytic Hierarchy Process (AHP), Application of the Analytic Hierarchy Process (AHP) 4. Scope of forest planning science, Position of forest science in forestry science, Role of forest planning science in supporting forest management planning 					

	<ol style="list-style-type: none"> 5. Concepts of ecosystem-based forest management, principles of forest management as part of natural resource management for sustainable development, forest planning that supports ecosystem-based forest management 6. Forest inventory, forest area confirmation, forest area utilization, establishment of forest management units 7. Network Planning 8. Midterm Exam 9. Decision Making in Risky Situations 10. Meaning of Linear Programming, General Form of LP Problems 11. Meaning and Formulation of General Transportation Problems, Modified Distribution Method (MODI) 12. Minimax and Maximin Strategies 13. Notation and Symbols in Tree Diagrams, How to Draw Decision Tree Diagrams 14. Guidelines and Instructions for Creating Decision Tree Diagrams 15. Capita Selecta Forest Planning 16. Final Exam 																								
Examination forms	<ul style="list-style-type: none"> • Quiz: Short questions related to the lecture subject (topic) given to students at the beginning or end of the lecture. • Assignment: Assignments to deepen the lecture topics given to students after several lectures. • Project Based: Problem-based individual or group assignments to strengthen skills related to learning topics in several lectures. • Case Study: Individual or group assignments based on case study to strengthen skills related to learning topics in several lectures. • Midle Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in the first to seventh lectures. • Final Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in lectures after half a semester until the end of the semester. 																								
Study and examination requirements	<ul style="list-style-type: none"> - Minimum lecture attendance is 80%. - Weighting composition for the final grade is quiz (5%), Assignment (5%), Project Based (25%), Case Study (25%). Midle Exam (20%), and Final Exam (20%). - Final grade is defined as: <table border="1"> <thead> <tr> <th>Score</th> <th>Grade</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>> 80</td> <td>A</td> <td>4</td> </tr> <tr> <td>75 - < 80</td> <td>B+</td> <td>3,5</td> </tr> <tr> <td>70 - < 75</td> <td>B</td> <td>3</td> </tr> <tr> <td>65 - < 70</td> <td>C+</td> <td>2,5</td> </tr> <tr> <td>60 - < 65</td> <td>C</td> <td>2</td> </tr> <tr> <td>50 - < 60</td> <td>D</td> <td>1</td> </tr> <tr> <td>< 50</td> <td>E</td> <td>0</td> </tr> </tbody> </table> 	Score	Grade	Value	> 80	A	4	75 - < 80	B+	3,5	70 - < 75	B	3	65 - < 70	C+	2,5	60 - < 65	C	2	50 - < 60	D	1	< 50	E	0
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50 - < 60	D	1																							
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Learning media	Class room, TV Projector, In Focus, Power Point																								
Reading List	1. Forest Management and Planning, Second Edition, addresses contemporary forest management planning issues, providing a concise,																								

	<p>focused resource for those in forest management. 2017. Second Edition. Academic Press.</p> <ol style="list-style-type: none"> 2. Pete Bettinger, Warnell School of Forestry and Natural Resources, University of Georgia, Athens, GA, United States 3. Kevin Boston, Department of Forestry and Wildland Sciences, Humboldt State University, Arcata, CA, United States 4. Jacek P. Siry, Warnell School of Forestry and Natural Resources, University of Georgia, Athens, GA, United States 5. Donald L. Grebner, Department of Forestry, Mississippi State University, Mississippi State, MS, United States 6. Forest Management 4th Edition. by Lawrence S Davis (Author), K. Norman Johnson (Author), Pete Bettinger (Author), Theodore Howard (Author)
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Module designation	Forestry Politics					
Subtitle	Politik Kehutanan					
Code	IKH 2 623					
The year in which the module is taught						
Person responsible for the module	Dr. Oding Affandi S.Hut., MP.					
Lecturer						
Language	Indonesia / English					
Relation to curriculum	Compulsory / elective / specialisation Names of other study programmes with which the module is shared					
Teaching methods	Lecture and discussion: 150 minute, 14 Lecturer = 35 hour Structured Activities: 180 minute, 14 activities = 42 hour Self Learning (Individual/Group Project): 450 minute, 14 week = 105 hour Middle exam: 100 minute = 1.6 hour Final exam: 100 minute = 1,6 hour					
Workload (incl. contact hours, self-study hours)	Activity	Lecture and Discussion	Structured Activites	Self Learning (Individual / Group Project)	Exam	Total
	Hours	35	42	105	3.2	185
Credit points	3 semester credit unit (SCU) equivalen 6.64 ECTS					
Required prerequisites for joining the module	None					
Recommended prerequisites for joining the module	None					
Module objectives/intended learning outcomes	<p>PLO 4 Having understanding of the theories and advancements in the forestry industry basic science, cultivation, management, technology, and conservation.</p> <p>PLO 5 Capable of demonstrating independent and team work, quality and measurable performance, able to apply various methods of science and technology in forestry issue identification and solving.</p> <p>PLO 8 Having skill to enhance the sustainable forest resource management, including watershed management, forest assessment, socio-economics, communication, as well as adapting to developments through various technological approaches: GIS, drones and info</p>					
Content	<p>Study material:</p> <ol style="list-style-type: none"> 1. Course contract, introduction and scope of forestry policy 2. Theory of natural resource and environmental policy 3. History and dynamics of Indonesian forestry policy 4. Actors and interests in forestry policy 5. Governance and decentralization in forestry 6. Conflict and negotiation over forest resources 7. Public policy analysis in the forestry sector 8. Midterm exam 9. Global forestry policy: REDD+, the Paris Agreement, and carbon trading 					

	<p>10. Indigenous and local community forestry policy</p> <p>11. The role of NGOs and the private sector in forestry policy</p> <p>12. Gender and social justice in forest policy</p> <p>13. Corruption and transparency in forestry politics</p> <p>14. Community participation models in forestry politics</p> <p>15. Analysis of current forestry policies (Job Creation Law, Social Forestry, etc.)</p> <p>16. Final Exam</p>																								
Examination forms	<ul style="list-style-type: none"> • Quiz: Short questions related to the lecture subject (topic) given to students at the beginning or end of the lecture. • Assignment: Assignments to deepen the lecture topics given to students after several lectures. • Project Based: Problem-based individual or group assignments to strengthen skills related to learning topics in several lectures. • Case Study: Individual or group assignments based on case study to strengthen skills related to learning topics in several lectures. • Midle Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in the first to seventh lectures. • Final Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in lectures after half a semester until the end of the semester. 																								
Study and examination requirements	<ul style="list-style-type: none"> - Minimum lecture attendance is 80%. - Weighting composition for the final grade is quiz (5%), Assignment (5%), Project Based (25%), Case Study (25%). Midle Exam (20%), and Final Exam (20%). - Final grade is defined as: <table border="1"> <thead> <tr> <th>Score</th> <th>Grade</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>≥ 80</td> <td>A</td> <td>4</td> </tr> <tr> <td>75 - < 80</td> <td>B+</td> <td>3,5</td> </tr> <tr> <td>70 - < 75</td> <td>B</td> <td>3</td> </tr> <tr> <td>65 - < 70</td> <td>C+</td> <td>2,5</td> </tr> <tr> <td>60 - < 65</td> <td>C</td> <td>2</td> </tr> <tr> <td>50 - < 60</td> <td>D</td> <td>1</td> </tr> <tr> <td>< 50</td> <td>E</td> <td>0</td> </tr> </tbody> </table>	Score	Grade	Value	≥ 80	A	4	75 - < 80	B+	3,5	70 - < 75	B	3	65 - < 70	C+	2,5	60 - < 65	C	2	50 - < 60	D	1	< 50	E	0
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Learning media	Class room, TV Projector, In Focus, Power Point																								
Reading List	<ol style="list-style-type: none"> 1. Peluso, N. L. (1992). Hutan Kaya, Masyarakat Miskin: Pengendalian Sumber Daya dan Perlawanan di Jawa. University of California Press. 2. Bryant, R. L., & Bailey, S. (1997). Ekologi Politik Dunia Ketiga. Routledge. 3. McCarthy, J. F. (2004). Berubah Menjadi Abu-abu: Desentralisasi dan Munculnya Konfigurasi Sosial-Hukum yang Volatil di Kalimantan Tengah, Indonesia. <i>World Development</i>, 32(7). 4. Kartodihardjo, H. (2017). Politik Kehutanan: Menggugat Dominasi Negara dalam Pengelolaan Hutan. Pustaka LATIN, Bogor. 5. Maryudi, A., & Myers, R. (2018). Reformasi Kebijakan dan Politik Sektor Kehutanan di Indonesia. <i>Forest Policy and Economics</i>, 91, 1–4. 																								

Module designation	Digital Image Analysis for Forest Resources Management					
Subtitle	Analisis Citra Digital untuk Pengolahan SDH					
Code	IKH 2 624					
The year in which the module is taught						
Person responsible for the module	Dr. Anita Zaitunah S.Hut., M.Sc.					
Lecturer						
Language	Indonesia / English					
Relation to curriculum	Compulsory / elective / specialisation Names of other study programmes with which the module is shared					
Teaching methods	Lecture and discussion: 150 minute, 14 Lecturer = 35 hour Structured Activities: 180 minute, 14 activities = 42 hour Self Learning (Individual/Group Project): 450 minute, 14 week = 105 hour Middle exam: 100 minute = 1.6 hour Final exam: 100 minute = 1,6 hour					
Workload (incl. contact hours, self-study hours)	Activity	Lecture and Discussion	Structured Activites	Self Learning (Individual / Group Project)	Exam	Total
	Hours	35	42	105	3.2	185
Credit points	3 semester credit unit (SCU) equivalen 6.64 ECTS					
Required prerequisites for joining the module	none					
Recommended prerequisites for joining the module	none					
Module objectives/intended learning outcomes	<p>PLO 4 Having understanding of the theories and advancements in the forestry industry basic science, cultivation, management, technology, and conservation.</p> <p>PLO 6 Capable of making appropriate decisions based on standard procedures and data, in communication, supervision and evaluation of work in forestry field. fforts at various levels (genetic, species and ecosystem)</p> <p>PLO 8 Having skill to enhance the sustainable forest resource management, including watershed management, forest assessment, socio-economics, communication, as well as adapting to developments through various technological approaches: GIS, drones and info</p>					
Content	<ol style="list-style-type: none"> 1. Course contract, introduction to remote sensing and digital imagery 2. Spectral characteristics of forest objects and image data sources (Landsat, Sentinel, UAV, LiDAR) 3. Components and stages of digital image analysis 4. Image pre-processing: geometric and radiometric correction 5. Image transformation and band composites 6. Image classification analysis (supervised & unsupervised) 7. Evaluation of classification image accuracy 8. Midterm exam 9. Forest cover change analysis (change detection analysis) 					

	<p>10. Image-based estimation of forest biomass and degradation</p> <p>11. Integration of remote sensing data with GIS</p> <p>12. High-resolution image analysis (UAV and LiDAR)</p> <p>13. Utilization of radar images (SAR, Sentinel-1) for forestry</p> <p>14. Application of machine learning in image analysis</p> <p>15. Preparation of forest image analysis reports</p> <p>16. Final Exam</p>																								
Examination forms	<ul style="list-style-type: none"> • Quiz: Short questions related to the lecture subject (topic) given to students at the beginning or end of the lecture. • Assignment: Assignments to deepen the lecture topics given to students after several lectures. • Project Based: Problem-based individual or group assignments to strengthen skills related to learning topics in several lectures. • Case Study: Individual or group assignments based on case study to strengthen skills related to learning topics in several lectures. • Midle Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in the first to seventh lectures. • Final Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in lectures after half a semester until the end of the semester. 																								
Study and examination requirements	<ul style="list-style-type: none"> - Minimum lecture attendance is 80%. - Weighting composition for the final grade is quiz (5%), Assignment (5%), Project Based (25%), Case Study (25%). Midle Exam (20%), and Final Exam (20%). - Final grade is defined as: <table border="1" style="margin-left: 40px;"> <thead> <tr> <th>Score</th> <th>Grade</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>≥ 80</td> <td>A</td> <td>4</td> </tr> <tr> <td>75 - < 80</td> <td>B+</td> <td>3,5</td> </tr> <tr> <td>70 - < 75</td> <td>B</td> <td>3</td> </tr> <tr> <td>65 - < 70</td> <td>C+</td> <td>2,5</td> </tr> <tr> <td>60 - < 65</td> <td>C</td> <td>2</td> </tr> <tr> <td>50 - < 60</td> <td>D</td> <td>1</td> </tr> <tr> <td>< 50</td> <td>E</td> <td>0</td> </tr> </tbody> </table>	Score	Grade	Value	≥ 80	A	4	75 - < 80	B+	3,5	70 - < 75	B	3	65 - < 70	C+	2,5	60 - < 65	C	2	50 - < 60	D	1	< 50	E	0
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Learning media	Class room, TV Projector, In Focus, Power Point																								
Reading List	<ol style="list-style-type: none"> 1. Lillesand, T., Kiefer, R. W., & Chipman, J. (2015). Remote Sensing and Image Interpretation (7th ed.). Wiley. 2. Jensen, J. R. (2016). Introductory Digital Image Processing: A Remote Sensing Perspective (4th ed.). Pearson. 3. Campbell, J. B., & Wynne, R. H. (2011). Introduction to Remote Sensing (5th ed.). Guilford Press. 4. Richards, J. A., & Jia, X. (2020). Remote Sensing Digital Image Analysis. Springer. 5. Congalton, R. G., & Green, K. (2019). Assessing the Accuracy of Remotely Sensed Data: Principles and Practices (3rd ed.). CRC Press. 																								

Module designation	Modelling for Forestry and Environment					
Subtitle	Permodelan untuk Kehutanan Lingkungan					
Code	IKH 2 625					
The year in which the module is taught						
Person responsible for the module	Dr. Nurdin Sulistiyono S.Hut., M.Si.					
Lecturer						
Language	Indonesia / English					
Relation to curriculum	Compulsory / elective / specialisation Names of other study programmes with which the module is shared					
Teaching methods	Lecture and discussion: 150 minute, 14 Lecturer = 35 hour Structured Activities: 180 minute, 14 activities = 42 hour Self Learning (Individual/Group Project): 450 minute, 14 week = 105 hour Middle exam: 100 minute = 1.6 hour Final exam: 100 minute = 1,6 hour					
Workload (incl. contact hours, self-study hours)	Activity	Lecture and Discussion	Structured Activites	Self Learning (Individual / Group Project)	Exam	Total
	Hours	35	42	105	3.2	185
Credit points	3 semester credit unit (SCU) equivalen 6.64 ECTS					
Required prerequisites for joining the module	none					
Recommended prerequisites for joining the module	none					
Module objectives/intended learning outcomes	<p>PLO 4 Having understanding of the theories and advancements in the forestry industry basic science, cultivation, management, technology, and conservation.</p> <p>PLO 6 Capable of making appropriate decisions based on standard procedures and data, in communication, supervision and evaluation of work in forestry field. fforts at various levels (genetic, species and ecosystem)</p> <p>PLO 8 Having skill to enhance the sustainable forest resource management, including watershed management, forest assessment, socio-economics, communication, as well as adapting to developments through various technological approaches: GIS, drones and info</p>					
Content	<ol style="list-style-type: none"> 1. Course contract and introduction to systems & modeling 2. System components: variables, parameters, and relationships between components 3. Types of models (deterministic, stochastic, empirical, simulational) 4. Model development steps: conceptualization, formulation, validation 5. Forest growth and yield modeling 6. Carbon and biomass dynamics modeling 7. Forest hydrology modeling (flow, erosion, runoff) 8. Midterm exam 					

	<ul style="list-style-type: none"> 9. Human-environment interaction modeling 10. Model-based forestry policy simulation 11. Sensitivity and uncertainty analysis in models 12. Spatial and landscape ecology modeling 13. Stock–flow dynamic modeling 14. Agent-based modeling 15. Forestry and environmental modeling project development 16. Final exam. 																								
Examination forms	<ul style="list-style-type: none"> • Quiz: Short questions related to the lecture subject (topic) given to students at the beginning or end of the lecture. • Assignment: Assignments to deepen the lecture topics given to students after several lectures. • Project Based: Problem-based individual or group assignments to strengthen skills related to learning topics in several lectures. • Case Study: Individual or group assignments based on case study to strengthen skills related to learning topics in several lectures. • Midle Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in the first to seventh lectures. • Final Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in lectures after half a semester until the end of the semester. 																								
Study and examination requirements	<ul style="list-style-type: none"> - Minimum lecture attendance is 80%. - Weighting composition for the final grade is quiz (5%), Assignment (5%), Project Based (25%), Case Study (25%). Midle Exam (20%), and Final Exam (20%). - Final grade is defined as: <table border="1" style="margin-left: 40px;"> <thead> <tr> <th>Score</th> <th>Grade</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>≥ 80</td> <td>A</td> <td>4</td> </tr> <tr> <td>75 - < 80</td> <td>B+</td> <td>3,5</td> </tr> <tr> <td>70 - < 75</td> <td>B</td> <td>3</td> </tr> <tr> <td>65 - < 70</td> <td>C+</td> <td>2,5</td> </tr> <tr> <td>60 - < 65</td> <td>C</td> <td>2</td> </tr> <tr> <td>50 - < 60</td> <td>D</td> <td>1</td> </tr> <tr> <td>< 50</td> <td>E</td> <td>0</td> </tr> </tbody> </table>	Score	Grade	Value	≥ 80	A	4	75 - < 80	B+	3,5	70 - < 75	B	3	65 - < 70	C+	2,5	60 - < 65	C	2	50 - < 60	D	1	< 50	E	0
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Learning media	Class room, TV Projector, In Focus, Power Point																								
Reading List	<ol style="list-style-type: none"> 1. Bossel, H. (2007). Systems and Models: Complexity, Dynamics, Evolution, Sustainability. Springer. 2. Ford, A. (2010). Modeling the Environment. Island Press. 3. Odum, H. T. (1994). Ecological and General Systems: An Introduction to Systems Ecology. University Press of Colorado. 4. Meadows, D. H., & Wright, D. (2008). Thinking in Systems: A Primer. Chelsea Green Publishing. 5. Sterman, J. D. (2000). Business Dynamics: Systems Thinking and Modeling for a Complex World. McGraw-Hill. 																								

Module designation	Forestry Tenure Conflict Resolution					
Subtitle	Penyelesaian Sengketa Hak Penggunaan Hutan					
Code	IKH 1 646					
The year in which the module is taught						
Person responsible for the module	Dr. Oding Affandi S.Hut., MP.					
Lecturer	Dr. Ir OK Hasnanda Syahputra MP					
Language	Indonesia / English					
Relation to curriculum	Compulsory / elective / specialisation Names of other study programmes with which the module is shared					
Teaching methods	Lecture and discussion: 150 minute, 14 Lecturer = 35 hour Structured Activities: 180 minute, 14 activities = 42 hour Self Learning (Individual/Group Project): 450 minute, 14 week = 105 hour Middle exam: 100 minute = 1.6 hour Final exam: 100 minute = 1,6 hour					
Workload (incl. contact hours, self-study hours)	Activity	Lecture and Discussion	Structured Activites	Self Learning (Individual / Group Project)	Exam	Total
	Hours	35	42	105	3.2	185
Credit points	3 semester credit unit (SCU) equivalen 6.64 ECTS					
Required prerequisites for joining the module	None					
Recommended prerequisites for joining the module	None					
Module objectives/intended learning outcomes	<p>PLO 4 Having understanding of the theories and advancements in the forestry industry basic science, cultivation, management, technology, and conservation.</p> <p>PLO 6 Capable of making appropriate decisions based on standard procedures and data, in communication, supervision and evaluation of work in forestry field. fforts at various levels (genetic, species and ecosystem)</p> <p>PLO 8 Having skill to enhance the sustainable forest resource management, including watershed management, forest assessment, socio-economics, communication, as well as adapting to developments through various technological approaches: GIS, drones and info</p>					
Content	<ol style="list-style-type: none"> 1. Introduction to Forestry Tenure Conflicts 2. Factors Causing Tenurial Conflict 3. Conflict Resolution Theory 4. Tenurial Conflict Analysis 5. Conflict Resolution Method I 6. Conflict Resolution Method II 7. Tenure Policy in Indonesia 8. Case Study on Forestry Tenure Conflict I 9. Midterm Exam 10. Participatory Approaches in Conflict Resolution 11. Implementation of FPIC (Free, Prior, and Informed Consent) 					

	<p>12. Multi-Stakeholder Mechanisms in Conflict Resolution 13. Forestry Tenure Conflict Case Study II 14. The Role of Technology in Conflict Resolution 15. Evaluation and Recommendation on Conflict Resolution 16. End of Semester Exam</p>																								
Examination forms	<ul style="list-style-type: none"> • Assignment: Assignments to deepen the lecture topics given to students after several lectures. • Project Based: Problem-based individual or group assignments to strengthen skills related to learning topics in several lectures. • Case Study: Individual or group assignments based on case study to strengthen skills related to learning topics in several lectures. • Midle Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in the first to seventh lectures. • Final Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in lectures after half a semester until the end of the semester. 																								
Study and examination requirements	<ul style="list-style-type: none"> - Minimum lecture attendance is 80%. - Attendance and Participation: 10%, Assignments and Case Studies: 30%, Midterm Exam : 25%, End of Semester Exam : 35% - Final grade is defined as: <table border="1"> <thead> <tr> <th>Score</th> <th>Grade</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>> 80</td> <td>A</td> <td>4</td> </tr> <tr> <td>75 - < 80</td> <td>B+</td> <td>3,5</td> </tr> <tr> <td>70 - < 75</td> <td>B</td> <td>3</td> </tr> <tr> <td>65 - < 70</td> <td>C+</td> <td>2,5</td> </tr> <tr> <td>60 - < 65</td> <td>C</td> <td>2</td> </tr> <tr> <td>50 - < 60</td> <td>D</td> <td>1</td> </tr> <tr> <td>< 50</td> <td>E</td> <td>0</td> </tr> </tbody> </table>	Score	Grade	Value	> 80	A	4	75 - < 80	B+	3,5	70 - < 75	B	3	65 - < 70	C+	2,5	60 - < 65	C	2	50 - < 60	D	1	< 50	E	0
Score	Grade	Value																							
> 80	A	4																							
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70 - < 75	B	3																							
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60 - < 65	C	2																							
50 - < 60	D	1																							
< 50	E	0																							
Learning media	Class room, TV Projector, In Focus, Power Point																								
Reading List	<ol style="list-style-type: none"> 1. Larson, A. M., et al. (2013). Tenure in REDD: Start-point or afterthought? <i>Forests</i> 4(1): 91-113. 2. Ostrom, E. (1990). <i>Governing the Commons: The Evolution of Institutions for Collective Action</i>. Cambridge University Press. 3. Fisher, R. & Ury, W. (1981). <i>Getting to Yes: Negotiating Agreement Without Giving In</i>. Penguin Books. 4. Glasl, F. (1999). <i>Confronting Conflict</i>. Hawthorn Press. 5. Moore, C. W. (2014). <i>The Mediation Process: Practical Strategies for Resolving Conflict</i>. Jossey-Bass. 6. Menkel-Meadow, C. (2012). <i>Negotiation: Processes for Problem Solving</i>. Wolters Kluwer. 7. Fay, C., & Sirait, M. (2005). <i>Tenure Policy Framework in Indonesia</i>. World Agroforestry Center. 8. Field study materials 9. Colfer, C. J. P. (2005). <i>The Complex Forest: Communities, Uncertainty, and Adaptive Collaborative Management</i>. Resources for the Future. 10. Mahanty, S., et al. (2009). <i>Socially Inclusive Forestry Management</i>. Earthscan. 																								

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| | <ol style="list-style-type: none">11. Brouwer, H. & Woodhill, J. (2016). <i>The MSP Guide: How to Design and Facilitate Multi-Stakeholder Partnerships</i>. Wageningen University.12. Field study materials13. Sieber, R. E. (2006). Public Participation Geographic Information Systems (PPGIS). <i>Annals of the American Association of Geographers</i>. |
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Module designation	Forestry Economics and Business					
Subtitle	Ekonomi dan Bisnis Kehutanan					
Code						
The year in which the module is taught						
Person responsible for the module	Prof. Dr. Agus Purwoko S.Hut., M.Si.					
Lecturer	Prof. Dr. Budi Utomo, SP., MP. Dr. Oding Affandi S.Hut., MP.					
Language	Indonesia / English					
Relation to curriculum	Compulsory / elective / specialisation Names of other study programmes with which the module is shared					
Teaching methods	Lecture and discussion: 150 minute, 14 Lecturer = 35 hour Structured Activities: 180 minute, 14 activities = 42 hour Self Learning (Individual/Group Project): 450 minute, 14 week = 105 hour Middle exam: 100 minute = 1.6 hour Final exam: 100 minute = 1,6 hour					
Workload (incl. contact hours, self-study hours)	Activity	Lecture and Discussion	Structured Activites	Self Learning (Individual / Group Project)	Exam	Total
	Hours	35	42	105	3.2	185
Credit points	3 semester credit unit (SCU) equivalen 6.64 ECTS					
Required prerequisites for joining the module	None					
Recommended prerequisites for joining the module	None					
Module objectives/intended learning outcomes	<p>PLO 4 Having understanding of the theories and advancements in the forestry industry basic science, cultivation, management, technology, and conservation.</p> <p>PLO 5 Capable of demonstrating independent and team work, quality and measurable performance, able to apply various methods of science and technology in forestry issue identification and solving.</p> <p>PLO 8 Having skill to enhance the sustainable forest resource management, including watershed management, forest assessment, socio-economics, communication, as well as adapting to developments through various technological approaches: GIS, drones and info</p>					
Content	<ol style="list-style-type: none"> 1. Introduction to Forestry Economics and Business 2. Basic Concepts of Microeconomics and Macroeconomics in Forestry 3. Basic Concepts of Microeconomics and Macroeconomics in Forestry 4. Forestry Products and Services Market 5. Potential and Feasibility of Forestry Business 6. MID-SEMESTER EXAMS 7. Financial Management of Forestry Companies 8. Marketing of Forestry Products and Services 					

	<p>9. Sustainability Issues in Forestry Business</p> <p>10. FINAL SEMESTER EXAMS</p>																								
Examination forms	<ul style="list-style-type: none"> • Quiz: Short questions related to the lecture subject (topic) given to students at the beginning or end of the lecture. • Assignment: Assignments to deepen the lecture topics given to students after several lectures. • Project Based: Problem-based individual or group assignments to strengthen skills related to learning topics in several lectures. • Case Study: Individual or group assignments based on case study to strengthen skills related to learning topics in several lectures. • Midle Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in the first to seventh lectures. • Final Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in lectures after half a semester until the end of the semester. 																								
Study and examination requirements	<ul style="list-style-type: none"> - Minimum lecture attendance is 80%. - Weighting composition for the final grade is quiz (5%), Assignment (10%), Project Based (25%), Case Study (25%), Midle Exam (15%), and Final Exam (20%). - Final grade is defined as: <table border="1"> <thead> <tr> <th>Score</th> <th>Grade</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>> 80</td> <td>A</td> <td>4</td> </tr> <tr> <td>75 - < 80</td> <td>B+</td> <td>3,5</td> </tr> <tr> <td>70 - < 75</td> <td>B</td> <td>3</td> </tr> <tr> <td>65 - < 70</td> <td>C+</td> <td>2,5</td> </tr> <tr> <td>60 - < 65</td> <td>C</td> <td>2</td> </tr> <tr> <td>50 - < 60</td> <td>D</td> <td>1</td> </tr> <tr> <td>< 50</td> <td>E</td> <td>0</td> </tr> </tbody> </table> 	Score	Grade	Value	> 80	A	4	75 - < 80	B+	3,5	70 - < 75	B	3	65 - < 70	C+	2,5	60 - < 65	C	2	50 - < 60	D	1	< 50	E	0
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Learning media	Class room, TV Projector, In Focus, Power Point																								
Reading List	<ol style="list-style-type: none"> 1. Affianto, A., & Riyanto, S. (2023). Introduction to Forest Resources Economics. Prenada Media. 2. Alam, S., & Supratman, M. A. K. (2009). Forest Resource Economics. Textbooks. Forestry Policy and Entrepreneurship Laboratory. Hasanuddin University. 3. Sudrajat, A., Fajri, M. E. N., Jati, F. S., & Djuanda, G. (2023). Application of Environmental Management Accounting: A Basic Component of Business Strategy to Maintain Ecosystems. Tahta Media Publisher. 4. Sudrajat, A., Maulana, I., Sukma, S. G., & Djuanda, G. (2024). OPERATIONAL RISKS AND FINANCIAL RISKS IN NON-TIMBER FOREST PRODUCTS. Tahta Media Publisher. 5. Linardo, M. (2018). Marketing management. Cikudanews. 6. Martoyo, A., Susilawati, E., Kusumawardhani, N., Dawis, A. M., Novalia, N., Fransisca, Y., ... & Nurlaila, Q. (2022). Business Management. Tohar Media. 7. Maulidah, S. (2012). Introduction to Agribusiness Management. Universitas Brawijaya Press. 																								

	<ol style="list-style-type: none">8. Pongtuluran, Y. (2015). Natural resource and environmental management. Publisher Andi.9. Purba, B., Rahmadana, M. F., Patiung, M., Leilasariyanti, Y., Amruddin, A., Mukrim, M. I., ... & Iswahyudi, I. (2023). Introduction to Natural Resources and Environment Economics. Medan (North Sumatra): Our Writing Foundation.
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Forest Product Technology

Module designation	Wood protection and preservation					
Subtitle	Perlindungan dan Pengawetan Kayu					
Code	IKH 2 626					
The year in which the module is taught						
Person responsible for the module	Dr. Iwan Risnasari S.Hut., M.Si.					
Lecturer						
Language	Indonesia / English					
Relation to curriculum	Compulsory / elective / specialisation					
Teaching methods	Lecture and discussion: 150 minute, 14 Lecturer = 35 hour Structured Activities: 180 minute, 14 activities = 42 hour Self Learning (Individual/Group Project): 450 minute, 14 week = 105 hour Middle exam: 100 minute = 1.6 hour Final exam: 100 minute = 1,6 hour					
Workload (incl. contact hours, self-study hours)	Activity	Lecture and Discussion	Structured Activities	Self Learning (Individual / Group Project)	Exam	Total
	Hours	35	42	105	3.2	185
Credit points	3 semester credit unit (SCU) equivalen 6.64 ECTS					
Required prerequisites for joining the module	None					
Recommended prerequisites for joining the module	None					
Module objectives/intended learning outcomes	<p>PLO 4 Having understanding of the theories and advancements in the forestry industry basic science, cultivation, management, technology, and conservation.</p> <p>PLO 6 Capable of making appropriate decisions based on standard procedures and data, in communication, supervision and evaluation of work in forestry field. fforts at various levels (genetic, species and ecosystem)</p> <p>PLO 10 Having skill to improve and to inovate timber and non-timber forest product technology, as well as value enhancement and business feasibility analysis of forest products.</p>					
Content	<ol style="list-style-type: none"> 1. Course contract, introduction and scope of wood protection 2. Basic properties and natural durability of wood 3. Factors that damage wood (decay fungi, termites, powderpost beetles) 4. Abiotic damage: weather, humidity, and fire 5. Basic principles of wood preservation 6. Wood preservation methods (soaking, pressure, vacuum, diffusion) 7. Conventional and modern wood preservatives 8. Midterm exam 9. Surface treatment techniques (coating, finishing) 10. Wood protection against fire and humidity 11. Testing the durability and effectiveness of preservatives 12. Environmental impact of chemical preservatives 					

	<p>13. Natural preservatives (bio-preservatives)</p> <p>14. National and international standards for wood preservation (SNI, AWPA, ISO)</p> <p>15. Sustainable wood protection strategies</p> <p>16. Final Exam</p>																								
Examination forms	<ul style="list-style-type: none"> • Quiz: Short questions related to the lecture subject (topic) given to students at the beginning or end of the lecture. • Assignment: Assignments to deepen the lecture topics given to students after several lectures. • Project Based: Problem-based individual or group assignments to strengthen skills related to learning topics in several lectures. • Case Study: Individual or group assignments based on case study to strengthen skills related to learning topics in several lectures. • Midle Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in the first to seventh lectures. • Final Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in lectures after half a semester until the end of the semester. 																								
Study and examination requirements	<ul style="list-style-type: none"> - Minimum lecture attendance is 80%. - Weighting composition for the final grade is quiz (5%), Assignment (5%), Project Based (25%), Case Study (25%), Midle Exam (20%), and Final Exam (20%). - Final grade is defined as: <table border="1" style="margin-left: 40px;"> <thead> <tr> <th>Score</th> <th>Grade</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>≥ 80</td> <td>A</td> <td>4</td> </tr> <tr> <td>75 - < 80</td> <td>B+</td> <td>3,5</td> </tr> <tr> <td>70 - < 75</td> <td>B</td> <td>3</td> </tr> <tr> <td>65 - < 70</td> <td>C+</td> <td>2,5</td> </tr> <tr> <td>60 - < 65</td> <td>C</td> <td>2</td> </tr> <tr> <td>50 - < 60</td> <td>D</td> <td>1</td> </tr> <tr> <td>< 50</td> <td>E</td> <td>0</td> </tr> </tbody> </table>	Score	Grade	Value	≥ 80	A	4	75 - < 80	B+	3,5	70 - < 75	B	3	65 - < 70	C+	2,5	60 - < 65	C	2	50 - < 60	D	1	< 50	E	0
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< 50	E	0																							
Learning media	Class room, TV Projector, In Focus, Power Point																								
Reading List	<ol style="list-style-type: none"> 1. Eaton, R. A., & Hale, M. D. C. (1993). Wood: Decay, Pests and Protection. Chapman & Hall. 2. Highley, T. L., & Illman, B. L. (2001). Fungal Degradation of Wood: Advances in Our Changing World. Forest Products Society. 3. Hill, C. A. S. (2006). Wood Modification: Chemical, Thermal and Other Processes. Wiley. 4. Zabel, R. A., & Morrell, J. J. (2020). Wood Microbiology: Decay and Its Prevention. Academic Press. 5. Rowell, R. M. (2012). Handbook of Wood Chemistry and Wood Composites. CRC Press. 																								

Module designation	Improved Wood Quality					
Subtitle	Peningkatan Kualitas Kayu					
Code	IKH 2 627					
The year in which the module is taught						
Person responsible for the module	Prof. Dr. Rudi Hartono S.Hut., M.Si.					
Lecturer	Dr. Ir. Tito Sucipto S.Hut., M.Si., IPU Dr. Evalina Herawati S.Hut., M.Si. Dr. Ridwanti Batubara S.Hut., MP.					
Language	Indonesia / English					
Relation to curriculum	Compulsory / elective / specialisation Names of other study programmes with which the module is shared					
Teaching methods	Lecture and discussion: 150 minute, 14 Lecturer = 35 hour Structured Activities: 180 minute, 14 activities = 42 hour Self Learning (Individual/Group Project): 450 minute, 14 week = 105 hour Midle exam: 100 minute = 1.6 hour Final exam: 100 minute = 1,6 hour					
Workload (incl. contact hours, self-study hours)	Activity	Lecture and Discussion	Structured Activites	Self Learning (Individual / Group Project)	Exam	Total
	Hours	35	42	105	3.2	185
Credit points	3 semester credit unit (SCU) equivalen 6.64 ECTS					
Required prerequisites for joining the module	none					
Recommended prerequisites for joining the module	none					
Module objectives/intended learning outcomes	PLO 4 Having understanding of the theories and advancements in the forestry industry basic science, cultivation, management, technology, and conservation. PLO 10 Having skill to improve and to inovate timber and non-timber forest product technology, as well as value enhancement and business feasibility analysis of forest products.					
Content	<ol style="list-style-type: none"> 1. Course contract, introduction 2. Physical modification of wood 3. Chemical modification of wood 4. Wood densification + Problem-based learning 5. Drying of wood products 6. Preservation of wood products 7. Wood preservation methods + (Assignments/Quizzes) 8. Midterm exam 9. Wood Laminating 10. Wood Laminating 11. Wood Engineering 12. Wood Engineering (Assignments/Quizzes) 13. Wood Finishing 14. Wood Coating 					

	<p>15. Case Method 16. Final Exam</p>																								
Examination forms	<ul style="list-style-type: none"> • Quiz: Short questions related to the lecture subject (topic) given to students at the beginning or end of the lecture. • Assignment: Assignments to deepen the lecture topics given to students after several lectures. • Project Based: Problem-based individual or group assignments to strengthen skills related to learning topics in several lectures. • Case Study: Individual or group assignments based on case study to strengthen skills related to learning topics in several lectures. • Midle Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in the first to seventh lectures. • Final Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in lectures after half a semester until the end of the semester. 																								
Study and examination requirements	<ul style="list-style-type: none"> - Minimum lecture attendance is 80%. - Weighting composition for the final grade is quiz (5%), Assignment (5%), Project Based (25%), Case Study (25%). Midle Exam (20%), and Final Exam (20%). - Final grade is defined as: <table border="1" style="margin-left: 40px;"> <thead> <tr> <th>Score</th> <th>Grade</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>≥ 80</td> <td>A</td> <td>4</td> </tr> <tr> <td>75 - < 80</td> <td>B+</td> <td>3,5</td> </tr> <tr> <td>70 - < 75</td> <td>B</td> <td>3</td> </tr> <tr> <td>65 - < 70</td> <td>C+</td> <td>2,5</td> </tr> <tr> <td>60 - < 65</td> <td>C</td> <td>2</td> </tr> <tr> <td>50 - < 60</td> <td>D</td> <td>1</td> </tr> <tr> <td>< 50</td> <td>E</td> <td>0</td> </tr> </tbody> </table>	Score	Grade	Value	≥ 80	A	4	75 - < 80	B+	3,5	70 - < 75	B	3	65 - < 70	C+	2,5	60 - < 65	C	2	50 - < 60	D	1	< 50	E	0
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Learning media	Class room, TV Projector, In Focus, Power Point																								
Reading List	<ol style="list-style-type: none"> 1. Bowyer, J. L., Shmulsky, R., & Haygreen, J. G. (2007). Forest Products and Wood Science: An Introduction (5th ed.). Ames, Iowa: Blackwell Publishing. 2. Haygreen, J. G., & Bowyer, J. L. (1996). Forest Products and Wood Science: An Introduction to Structure, Processes, and Products. Yogyakarta: Gadjah Mada University Press. 3. Kollmann, F. F. P., & Côté, W. A. (1984). Principles of Wood Science and Technology: Solid Wood. Berlin: Springer-Verlag. 4. Panshin, A. J., & de Zeeuw, C. (1980). Textbook of Wood Technology: Structure, Identification, Properties, and Uses of the Commercial Woods of the United States and Canada. New York: McGraw-Hill. 5. Sumarni, G., & Hidayat, W. (2020). Improving wood quality with thermal modification technology. Journal of Tropical Wood Science and Technology, 18(2), 105–116. 6. Martawijaya, A., Kartasujana, I., Mandang, Y. I., Prawira, S. A., & Kadir, K. (2005). Atlas of Indonesian Wood Volume II. Bogor: 																								

	<p>Center for Forest Product Research and Development, Forestry Research and Development Agency.</p> <ol style="list-style-type: none"> 7. Sulistyowati, E., & Dwianto, W. (2019). Technology for improving the quality of fast-growing wood using compression and heating methods. <i>Journal of Forest Product Research</i>, 37(3), 183–193. 8. Hill, C. A. S. (2006). <i>Wood Modification: Chemical, Thermal and Other Processes</i>. Chichester: John Wiley & Sons.
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Module designation	Wood Gluing					
Subtitle	Perekatan Kayu					
Code	IKH 2 628					
The year in which the module is taught						
Person responsible for the module	Arif Nuryawan S.Hut., M.Si., Ph.D					
Lecturer	Dr. Ir. Tito Sucipto S.Hut., M.Si., IPU Prof. Dr. Rudi Hartono S.Hut., M.Si					
Language	Indonesia / English					
Relation to curriculum	Compulsory / elective / specialisation Names of other study programmes with which the module is shared					
Teaching methods	Lecture and discussion: 150 minute, 14 Lecturer = 35 hour Structured Activities: 180 minute, 14 activities = 42 hour Self Learning (Individual/Group Project): 450 minute, 14 week = 105 hour Midle exam: 100 minute = 1.6 hour Final exam: 100 minute = 1,6 hour					
Workload (incl. contact hours, self-study hours)	Activity	Lecture and Discussion	Structured Activites	Self Learning (Individual / Group Project)	Exam	Total
	Hours	35	42	105	3.2	185
Credit points	3 semester credit unit (SCU) equivalen 6.64 ECTS					
Required prerequisites for joining the module	none					
Recommended prerequisites for joining the module	none					
Module objectives/intended learning outcomes	<p>PLO 4 Having understanding of the theories and advancements in the forestry industry basic science, cultivation, management, technology, and conservation.</p> <p>PLO 6 Capable of making appropriate decisions based on standard procedures and data, in communication, supervision and evaluation of work in forestry field. fforts at various levels (genetic, species and ecosystem)</p> <p>PLO 10 Having skill to improve and to inovate timber and non-timber forest product technology, as well as value enhancement and business feasibility analysis of forest products.</p>					
Content	<ol style="list-style-type: none"> 1. Introduction to wood bonding and its relationship to other fields of science 2. Fundamentals of polymers and polymerization processes 3. Basic principles of bonding and adhesive-substrate interaction mechanisms 4. Testing adhesive properties 5. Wood anatomy and its influence on bonding 6. Solid wood bonding and glulam case studies 7. Testing wood bonding strength 8. Midterm exam 9. Classification of natural, semi-synthetic, and synthetic adhesives 10. Synthesis of natural and semi-synthetic adhesives 					

	<p>11. Synthesis of synthetic adhesives 12. Application of adhesives on particleboard and fiberboard 13. Microscopic testing of wood bonding 14. Spectroscopic and thermal testing 15. Environmental impact and recycling of wood adhesives 16. Final Exam</p>																								
Examination forms	<ul style="list-style-type: none"> • Quiz: Short questions related to the lecture subject (topic) given to students at the beginning or end of the lecture. • Assignment: Assignments to deepen the lecture topics given to students after several lectures. • Project Based: Problem-based individual or group assignments to strengthen skills related to learning topics in several lectures. • Case Study: Individual or group assignments based on case study to strengthen skills related to learning topics in several lectures. • Midle Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in the first to seventh lectures. • Final Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in lectures after half a semester until the end of the semester. 																								
Study and examination requirements	<ul style="list-style-type: none"> - Minimum lecture attendance is 80%. - Weighting composition for the final grade is quiz (5%), Assignment (5%), Project Based (25%), Case Study (25%). Midle Exam (20%), and Final Exam (20%). - Final grade is defined as: <table border="1" style="margin-left: 40px;"> <thead> <tr> <th>Score</th> <th>Grade</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>≥ 80</td> <td>A</td> <td>4</td> </tr> <tr> <td>75 - < 80</td> <td>B+</td> <td>3,5</td> </tr> <tr> <td>70 - < 75</td> <td>B</td> <td>3</td> </tr> <tr> <td>65 - < 70</td> <td>C+</td> <td>2,5</td> </tr> <tr> <td>60 - < 65</td> <td>C</td> <td>2</td> </tr> <tr> <td>50 - < 60</td> <td>D</td> <td>1</td> </tr> <tr> <td>< 50</td> <td>E</td> <td>0</td> </tr> </tbody> </table>	Score	Grade	Value	≥ 80	A	4	75 - < 80	B+	3,5	70 - < 75	B	3	65 - < 70	C+	2,5	60 - < 65	C	2	50 - < 60	D	1	< 50	E	0
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Learning media	Class room, TV Projector, In Focus, Power Point																								
Reading List	<ol style="list-style-type: none"> 1. Anonymous. 2016. Abstract Biocomp2016. The 13th Pacific Rim Bio-based Composites Symposium Biobased composites for a sustainable future. Chile. 2. Gazeley KF, Wake WC. 1990. Natural Rubber Adhesives. In Handbook of Adhesion (I Skeist, ed.). Van Nostrand Reinhold, New York (Chapter 9). 3. Hatakeyama T, Quinn FX. 1999. Thermal Analysis Fundamentals and Applications to Polymer Science 2nd Ed, John Wiley and Sons Ltd, England. 4. Humprey PE (ed). 2002. Proceedings of the 6th Pacific Rim Bio-based Composites Symposium and Workshop on the Chemical Modification of Cellulosic. Volume 1 and 2. Portland. Oregon, USA. 																								

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| | <ol style="list-style-type: none"> 5. IUFRO SilvaVoc Terminology Project. 2005. Multilingual Pocket Glossary of Forest Terms and Definitions. IUFRO Headquarters Secretariat, Austria. 6. Jaffe HL, Rosenblum FM. 1990. Poly(Vinyl Alcohol) for Adhesives. In Handbook of Adhesives (Skeist I, ed.). Van Nostrand Reinhold, New York (pp. 401-407). 7. Jaffe HL, Rosenblum FM, Daniels W. 1990. Polyvinyl Acetate Emulsions for Adhesives. In Handbook of Adhesives (Skeist I, ed.). Van Nostrand Reinhold, New York (pp. 381-400).29 8. Marra AA. 1992. Technology of Wood Bonding Principles in Practice. Van Nostrand Reinhold, New York. Introduction, Chapter 1, Chapter 2 (pp. VII-33), (pp. 8-10) 9. Meat AR. 1990. Epoxy Resin Adhesives. In Handbook of Adhesives (Skeist I, ed.). Van Nostrand Reinhold, New York (pp. 347-358). 10. Norstrom E, Demircan D, Fogelstrom L, Khabbaz F, Malmstrom E. 2018. Green binders for wood adhesives. In Applied Adhesive Bonding in Science and Technology (Ozer H, ed.). Intechopen, Croatia, Chapter 4. 11. Nuryawan A, Park BD, Singh AP. 2014. Penetration of urea-formaldehyde resins with different formaldehyde/urea mole ratios into softwood tissues. Wood Science and Technology 48:889-902. 12. Nuryawan A. 2016. Textbook on Particle Board and Fiberboard Technology. USU Press 13. Nuryawan A. 2018. Chapter 7. Wood Bonding Technology Integrating Wood and Other Fields of Science. In Several Thoughts of USU Faculty of Forestry Doctors in Facing Challenges and Innovations in the Forestry Sector in the Era of the Industrial Revolution 4.0 (pp. 46-51) |
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Module designation	Utilization of Chemical Components of Forest Products					
Subtitle	Pemanfaatan Komponen Kimia Hasil Hutan					
Code	IKH 2 629					
The year in which the module is taught						
Person responsible for the module	Dr. Ir. Luthfi Hakim S.Hut., M.Si., IPM					
Lecturer	Dr. Ridwanti Batubara S.Hut., MP. Dr. Iwan Risnasari S.Hut., M.Si.					
Language	Indonesia / English					
Relation to curriculum	Compulsory / elective / specialisation Names of other study programmes with which the module is shared					
Teaching methods	Lecture and discussion: 150 minute, 14 Lecturer = 35 hour Structured Activities: 180 minute, 14 activities = 42 hour Self Learning (Individual/Group Project): 450 minute, 14 week = 105 hour Midle exam: 100 minute = 1.6 hour Final exam: 100 minute = 1,6 hour					
Workload (incl. contact hours, self-study hours)	Activity	Lecture and Discussion	Structured Activites	Self Learning (Individual / Group Project)	Exam	Total
	Hours	35	42	105	3.2	185
Credit points	3 semester credit unit (SCU) equivalen 6.64 ECTS					
Required prerequisites for joining the module	none					
Recommended prerequisites for joining the module	none					
Module objectives/intended learning outcomes	<p>PLO 2 Demonstrating a law abiding and discipline, ethical, independently responsible, entrepreneurial spirit</p> <p>PLO 4 Having understanding of the theories and advancements in the forestry industry basic science, cultivation, management, technology, and conservation.</p> <p>PLO 10 Having skill to improve and to inovate timber and non-timber forest product technology, as well as value enhancement and business feasibility analysis of forest products.</p>					
Content	<ol style="list-style-type: none"> 1. Chemical components of forest products: Introduction, Course contract, Learning objectives, Definition of wood chemistry and lignocellulosic materials, Course scope, and course objectives 2. Cellulose Components: wood cell components, main elements of wood, classification of cell wall components, quantification of cell components, definition of cellulose, chemical structure of cellulose, bonds in cellulose, reducing and non-reducing groups, hydrogen bonds, cellulose supramolecules, crystallinity, determination of cellulose 3. Hemicellulose Components: definition of hemicellulose, sugars that make up hemicellulose, types of hemicellulose, hemicellulose content, determination of hemicellulose, uses of hemicellulose 					

	<ol style="list-style-type: none"> 4. Lignin Components: definition of lignin, structure of lignin, types of lignin, lignin content, determination of lignin, overview of the uses of lignin 5. Extractives: definition of extractives, mechanism of extractive formation, types of extractive substances, structure of extractives, types of extractives, extractive content, determination of extractives, overview of the uses of extractives. 6. Cellulose utilization I: methods of obtaining cellulose from forest products, both wood and non-wood; types of wood and non-wood forest products that contain cellulose and are commonly used; cellulose as a raw material for pulp and paper; cellulose as a raw material for composite boards; the influence of cellulose as a raw material for composites, pulp, and paper. 7. Cellulose Utilization II (cellulose derivatives): Definition of cellulose derivatives, methods for producing cellulose derivatives, benefits that can be obtained from cellulose derivatives. 8. Midterm Exam 9. Cellulose Utilization III (Yarn and Rayon): Definition of yarn and rayon, requirements for cellulose to be used as yarn and rayon, methods for producing yarn and rayon, benefits that can be obtained from yarn and rayon. 10. Utilization of hemicellulose: Technology for the development of hemicellulose utilization, hydrolysis methods, alkali treatment, hydrothermal treatment, xylitol technology, biofuel, and bioethanol from hemicellulose 11. Utilization of forest-derived chemicals as dyes: Definition of dyes, sources of dyes, methods for determining C*Lab and GRB colors, utilization of natural dyes in crafts and the textile industry 12. Utilization of lignin: Lignin isolation technology, lignin as an adhesive, bio-oil, 13. Extractive utilization 1: Extractive isolation technology, solvents used to dissolve extracts, extraction methods, phytochemistry, polyphenols, 14. Extractive Utilization 2 (as beverage/tea ingredients): requirements for forest chemical ingredients that can be used as beverages, chemical content of agarwood leaves, chemical content of jeruju leaves 15. Utilization of Extractives 3: Chemical extracts from forest products as medicines, requirements for forest chemical products that can be used as medicines, methods for identifying forest chemical products that can be used as medicines 16. Final exam
Examination forms	<ul style="list-style-type: none"> • Quiz: Short questions related to the lecture subject (topic) given to students at the beginning or end of the lecture. • Assignment: Assignments to deepen the lecture topics given to students after several lectures. • Project Based: Problem-based individual or group assignments to strengthen skills related to learning topics in several lectures. • Case Study: Individual or group assignments based on case study to strengthen skills related to learning topics in several lectures.

	<ul style="list-style-type: none"> • Midle Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in the first to seventh lectures. • Final Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in lectures after half a semester until the end of the semester. 																								
Study and examination requirements	<ul style="list-style-type: none"> - Minimum lecture attendance is 80%. - Weighting composition for the final grade is quiz (5%), Assignment (5%), Project Based (25%), Case Study (25%), Midle Exam (20%), and Final Exam (20%). - Final grade is defined as: <table border="1"> <thead> <tr> <th>Score</th> <th>Grade</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>≥ 80</td> <td>A</td> <td>4</td> </tr> <tr> <td>75 - < 80</td> <td>B+</td> <td>3,5</td> </tr> <tr> <td>70 - < 75</td> <td>B</td> <td>3</td> </tr> <tr> <td>65 - < 70</td> <td>C+</td> <td>2,5</td> </tr> <tr> <td>60 - < 65</td> <td>C</td> <td>2</td> </tr> <tr> <td>50 - < 60</td> <td>D</td> <td>1</td> </tr> <tr> <td>< 50</td> <td>E</td> <td>0</td> </tr> </tbody> </table> 	Score	Grade	Value	≥ 80	A	4	75 - < 80	B+	3,5	70 - < 75	B	3	65 - < 70	C+	2,5	60 - < 65	C	2	50 - < 60	D	1	< 50	E	0
Score	Grade	Value																							
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70 - < 75	B	3																							
65 - < 70	C+	2,5																							
60 - < 65	C	2																							
50 - < 60	D	1																							
< 50	E	0																							
Learning media	Class room, TV Projector, In Focus, Power Point																								
Reading List	<ol style="list-style-type: none"> 1. Bourne, M. C. & L. M. (2018). <i>Chemistry of Wood and Wood Products</i>. Wiley-Blackwell. 2. Dewi, R. & H. S. (2020). <i>Bioactive Compounds from Forest Products: Extraction and Applications</i>. Springer. 3. Huang, Y. & T. L. (2019). <i>Forest Products Chemistry: Fundamentals and Applications</i>. CRC Press. 4. Kumar, A. & P. R. (2021). <i>Natural Products from Forest Resources: Chemistry and Applications</i>. Elsevier. 5. Mäkelä, H. & R. S. (2020). <i>Utilization of Forest Biomass: Chemistry and Technology</i>. Routledge. 6. Pérez, J. & C. M. (2019). <i>Chemical Constituents of Wood and Their Applications in Industry</i>. Woodhead Publishing. 7. Rao, P. & P. S. (2022). <i>Sustainable Utilization of Forest Resources: Chemical Perspectives</i>. Academic Press. 8. Zhao, Y. & L. H. (2020). <i>Extraction and Characterization of Natural Compounds from Forest Products</i>. Springer. 																								

Module designation	Pulp and paper science					
Subtitle	Ilmu Pulp dan Kertas					
Code	IKH 2 630					
The year in which the module is taught						
Person responsible for the module	Dr. Iwan Risnasari S.Hut., M.Si.					
Lecturer						
Language	Indonesia / English					
Relation to curriculum	Compulsory / elective / specialisation Names of other study programmes with which the module is shared					
Teaching methods	Lecture and discussion: 150 minute, 14 Lecturer = 35 hour Structured Activities: 180 minute, 14 activities = 42 hour Self Learning (Individual/Group Project): 450 minute, 14 week = 105 hour Midle exam: 100 minute = 1.6 hour Final exam: 100 minute = 1,6 hour					
Workload (incl. contact hours, self-study hours)	Activity	Lecture and Discussion	Structured Activites	Self Learning (Individual / Group Project)	Exam	Total
	Hours	35	42	105	3.2	185
Credit points	3 semester credit unit (SCU) equivalen 6.64 ECTS					
Required prerequisites for joining the module	none					
Recommended prerequisites for joining the module	none					
Module objectives/intended learning outcomes	<p>PLO 4 Having understanding of the theories and advancements in the forestry industry basic science, cultivation, management, technology, and conservation.</p> <p>PLO 6 Capable of making appropriate decisions based on standard procedures and data, in communication, supervision and evaluation of work in forestry field. fforts at various levels (genetic, species and ecosystem)</p> <p>PLO 10 Having skill to improve and to inovate timber and non-timber forest product technology, as well as value enhancement and business feasibility analysis of forest products.</p>					
Content	<ol style="list-style-type: none"> 1. Course contract and introduction to pulp and paper science 2. Basic properties of lignocellulosic raw materials 3. Selection of pulp raw materials 4. Mechanical and semi-chemical pulp manufacturing processes 5. Chemical pulp manufacturing processes: kraft and sulfite 6. Pulp bleaching processes (bleaching) 7. Environmentally friendly pulping technology (ECF, TCF, Bio-pulping) 8. Midterm exam 9. Paper sheet formation and additives 10. Characterization of pulp and paper properties 11. Pulp and paper quality testing 12. Paper recycling process (recycling process) 					

	<p>13. Pulp and paper industry waste and its processing</p> <p>14. Energy and production process efficiency</p> <p>15. Innovation and prospects for the development of bio-based materials</p> <p>16. Final Exam</p>																								
Examination forms	<ul style="list-style-type: none"> • Quiz: Short questions related to the lecture subject (topic) given to students at the beginning or end of the lecture. • Assignment: Assignments to deepen the lecture topics given to students after several lectures. • Project Based: Problem-based individual or group assignments to strengthen skills related to learning topics in several lectures. • Case Study: Individual or group assignments based on case study to strengthen skills related to learning topics in several lectures. • Midle Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in the first to seventh lectures. • Final Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in lectures after half a semester until the end of the semester. 																								
Study and examination requirements	<ul style="list-style-type: none"> - Minimum lecture attendance is 80%. - Weighting composition for the final grade is quiz (5%), Assignment (5%), Project Based (25%), Case Study (25%), Midle Exam (20%), and Final Exam (20%). - Final grade is defined as: <table border="1"> <thead> <tr> <th>Score</th> <th>Grade</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>≥ 80</td> <td>A</td> <td>4</td> </tr> <tr> <td>75 - < 80</td> <td>B+</td> <td>3,5</td> </tr> <tr> <td>70 - < 75</td> <td>B</td> <td>3</td> </tr> <tr> <td>65 - < 70</td> <td>C+</td> <td>2,5</td> </tr> <tr> <td>60 - < 65</td> <td>C</td> <td>2</td> </tr> <tr> <td>50 - < 60</td> <td>D</td> <td>1</td> </tr> <tr> <td>< 50</td> <td>E</td> <td>0</td> </tr> </tbody> </table>	Score	Grade	Value	≥ 80	A	4	75 - < 80	B+	3,5	70 - < 75	B	3	65 - < 70	C+	2,5	60 - < 65	C	2	50 - < 60	D	1	< 50	E	0
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Learning media	Class room, TV Projector, In Focus, Power Point																								
Reading List	<ol style="list-style-type: none"> 1. Gullichsen, J., & Fogelholm, C. J. (2000). Chemical Pulping. Papermaking Science and Technology, Book 6A. Fapet Oy. 2. Smook, G. A. (2016). Handbook for Pulp & Paper Technologists (5th ed.). TAPPI Press. 3. Biermann, C. J. (1996). Handbook of Pulping and Papermaking (2nd ed.). Academic Press. 4. Casey, J. P. (1980). Pulp and Paper: Chemistry and Chemical Technology. Wiley-Interscience. 5. Sixta, H. (Ed.). (2006). Handbook of Pulp. Wiley-VCH. 																								

Module designation	Wood Mechanism					
Subtitle	Ketenikan Kayu					
Code	IKH 2 631					
The year in which the module is taught						
Person responsible for the module	Prof. Dr. Rudi Hartono S.Hut., M.Si.					
Lecturer						
Language	Indonesia / English					
Relation to curriculum	Compulsory / elective / specialisation Names of other study programmes with which the module is shared					
Teaching methods	Lecture and discussion: 150 minute, 14 Lecturer = 35 hour Structured Activities: 180 minute, 14 activities = 42 hour Self Learning (Individual/Group Project): 450 minute, 14 week = 105 hour Middle exam: 100 minute = 1.6 hour Final exam: 100 minute = 1,6 hour					
Workload (incl. contact hours, self-study hours)	Activity	Lecture and Discussion	Structured Activites	Self Learning (Individual / Group Project)	Exam	Total
	Hours	35	42	105	3.2	185
Credit points	3 semester credit unit (SCU) equivalen 6.64 ECTS					
Required prerequisites for joining the module	none					
Recommended prerequisites for joining the module	none					
Module objectives/intended learning outcomes	<p>PLO 4 Having understanding of the theories and advancements in the forestry industry basic science, cultivation, management, technology, and conservation.</p> <p>PLO 6 Capable of making appropriate decisions based on standard procedures and data, in communication, supervision and evaluation of work in forestry field. fforts at various levels (genetic, species and ecosystem)</p> <p>PLO 10 Having skill to improve and to inovate timber and non-timber forest product technology, as well as value enhancement and business feasibility analysis of forest products.</p>					
Content	<ol style="list-style-type: none"> 1. Course contract and introduction to wood science 2. Physical and mechanical properties of wood that affect technical processes 3. Logging and roundwood handling technology 4. Wood sawing technology 5. Wood drying technology 6. Control of wood defects caused by technical processes 7. Wood bonding and joining technology 8. Midterm Exam 9. Wood machining and energy efficiency 10. Wood finishing and protection technology 11. Wood structural engineering technology 12. Wood strength testing 					

	<p>13. Utilization of wood industry waste and by-products 14. Sustainable wood drying systems 15. Wood drying system design project 16. Final Exam</p>																								
Examination forms	<ul style="list-style-type: none"> • Quiz: Short questions related to the lecture subject (topic) given to students at the beginning or end of the lecture. • Assignment: Assignments to deepen the lecture topics given to students after several lectures. • Project Based: Problem-based individual or group assignments to strengthen skills related to learning topics in several lectures. • Case Study: Individual or group assignments based on case study to strengthen skills related to learning topics in several lectures. • Midle Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in the first to seventh lectures. • Final Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in lectures after half a semester until the end of the semester. 																								
Study and examination requirements	<ul style="list-style-type: none"> - Minimum lecture attendance is 80%. - Weighting composition for the final grade is quiz (5%), Assignment (5%), Project Based (25%), Case Study (25%). Midle Exam (20%), and Final Exam (20%). - Final grade is defined as: <table border="1" style="margin-left: 40px;"> <thead> <tr> <th>Score</th> <th>Grade</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>≥ 80</td> <td>A</td> <td>4</td> </tr> <tr> <td>75 - < 80</td> <td>B+</td> <td>3,5</td> </tr> <tr> <td>70 - < 75</td> <td>B</td> <td>3</td> </tr> <tr> <td>65 - < 70</td> <td>C+</td> <td>2,5</td> </tr> <tr> <td>60 - < 65</td> <td>C</td> <td>2</td> </tr> <tr> <td>50 - < 60</td> <td>D</td> <td>1</td> </tr> <tr> <td>< 50</td> <td>E</td> <td>0</td> </tr> </tbody> </table>	Score	Grade	Value	≥ 80	A	4	75 - < 80	B+	3,5	70 - < 75	B	3	65 - < 70	C+	2,5	60 - < 65	C	2	50 - < 60	D	1	< 50	E	0
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Learning media	Class room, TV Projector, In Focus, Power Point																								
Reading List	<ol style="list-style-type: none"> 1. Bowyer, J. L., Shmulsky, R., & Haygreen, J. G. (2007). Forest Products and Wood Science: An Introduction (5th ed.). Wiley-Blackwell. 2. Forest Products Laboratory. (2010). Wood Handbook: Wood as an Engineering Material. USDA Forest Service, FPL-GTR-190. 3. Kretschmann, D. E. (2010). Mechanical Properties of Wood. FPL-GTR-190, USDA Forest Service. 4. Hadi, Y. S. (2017). Properties and Uses of Indonesian Wood. IPB Press. 5. Desch, H. E., & Dinwoodie, J. M. (1996). Wood: Structure, Properties, Conversion, and Use. Palgrave Macmillan. 																								

Module designation	Optimization of Forest Products Industry					
Subtitle	Optimasi Industri Hasil Hutan					
Code	IKH 2 632					
The year in which the module is taught						
Person responsible for the module	Dr. Ir. Tito Sucipto S.Hut., M.Si.					
Lecturer	Prof. Dr. Ir. Muhdi S.Hut., M.Si Prof. Dr. Agus Purwoko S.Hut., M.Si.					
Language	Indonesia / English					
Relation to curriculum	Compulsory / elective / specialisation Names of other study programmes with which the module is shared					
Teaching methods	Lecture and discussion: 150 minute, 14 Lecturer = 35 hour Structured Activities: 180 minute, 14 activities = 42 hour Self Learning (Individual/Group Project): 450 minute, 14 week = 105 hour Midle exam: 100 minute = 1.6 hour Final exam: 100 minute = 1,6 hour					
Workload (incl. contact hours, self-study hours)	Activity	Lecture and Discussion	Structured Activites	Self Learning (Individual / Group Project)	Exam	Total
	Hours	35	42	105	3.2	185
Credit points	3 semester credit unit (SCU) equivalen 6.64 ECTS					
Required prerequisites for joining the module	None					
Recommended prerequisites for joining the module	None					
Module objectives/intended learning outcomes	<p>PLO 4 Having understanding of the theories and advancements in the forestry industry basic science, cultivation, management, technology, and conservation.</p> <p>PLO 5 Capable of demonstrating independent and team work, quality and measurable performance, able to apply various methods of science and technology in forestry issue identification and solving.</p> <p>PLO 10 Having skill to improve and to inovate timber and non-timber forest product technology, as well as value enhancement and business feasibility analysis of forest products.</p>					
Content	<ol style="list-style-type: none"> 1. Understanding forest product industry optimization; and Supply chain management 2. Strategic capacity management; and Human resource management 3. Training; Leadership; and Teamwork 4. Hierarchy of production decisions 5. Process management; and Process improvement 6. Production management; and Production distribution 7. Benchmarking 8. Midterm exam 9. Research; and Development 10. Production systems; Quality control; and Project scheduling 					

	<p>11. Principles of optimization theory for decision making; and Matrix-determinant theory,</p> <p>12. Big M; Shadow price; Canonical-slack variable-artificial variable; and Post-optimalist</p> <p>13. Graphical analysis; Standard form of linear programming (static model, single objective); and Transportation model</p> <p>14. Optimization models for forest resource management; and Introduction to computer software packages</p> <p>15. Preparation of RAB; and Industrial cash flow</p> <p>16. Final Exam</p>																								
Examination forms	<ul style="list-style-type: none"> • Quiz: Short questions related to the lecture subject (topic) given to students at the beginning or end of the lecture. • Assignment: Assignments to deepen the lecture topics given to students after several lectures. • Project Based: Problem-based individual or group assignments to strengthen skills related to learning topics in several lectures. • Case Study: Individual or group assignments based on case study to strengthen skills related to learning topics in several lectures. • Midle Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in the first to seventh lectures. • Final Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in lectures after half a semester until the end of the semester. 																								
Study and examination requirements	<ul style="list-style-type: none"> - Minimum lecture attendance is 80%. - Weighting composition for the final grade is quiz (5%), Assignment (5%), Project Based (25%), Case Study (25%). Midle Exam (20%), and Final Exam (20%). - Final grade is defined as: <table border="1" style="margin-left: 40px;"> <thead> <tr> <th>Score</th> <th>Grade</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>≥ 80</td> <td>A</td> <td>4</td> </tr> <tr> <td>75 - < 80</td> <td>B+</td> <td>3,5</td> </tr> <tr> <td>70 - < 75</td> <td>B</td> <td>3</td> </tr> <tr> <td>65 - < 70</td> <td>C+</td> <td>2,5</td> </tr> <tr> <td>60 - < 65</td> <td>C</td> <td>2</td> </tr> <tr> <td>50 - < 60</td> <td>D</td> <td>1</td> </tr> <tr> <td>< 50</td> <td>E</td> <td>0</td> </tr> </tbody> </table>	Score	Grade	Value	≥ 80	A	4	75 - < 80	B+	3,5	70 - < 75	B	3	65 - < 70	C+	2,5	60 - < 65	C	2	50 - < 60	D	1	< 50	E	0
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Learning media	Class room, TV Projector, In Focus, Power Point																								
Reading List	<ol style="list-style-type: none"> 1. Baskaran, R. & S. R. S. (2019). <i>Forest Products and Sustainability: A Comprehensive Approach</i>. Springer. 2. Bourke, T. A. & W. J. (2017). <i>Sustainable Forest Management: From Principles to Practice</i>. Wiley-Blackwell. 3. Kumar, R. & R. K. (2020). <i>Optimization Techniques in Forestry: Theory and Applications</i>. CRC Press. 4. López, A. & M. J. (2018). <i>Innovations in Wood Processing: A Global Perspective</i>. Woodhead Publishing. 5. Mäkelä, H. & R. S. (2021). <i>Forest Operations and Management: A Global Perspective</i>. Routledge. 																								

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| | <ol style="list-style-type: none"> 6. Pérez, J. & C. M. (2020). <i>Supply Chain Management in the Forestry Sector: Challenges and Solutions</i>. Springer. 7. Rao, P. & P. S. (2019). <i>Economic Analysis of Forest Products: A Practical Guide</i>. Academic Press. 8. Sullivan, D. & M. T. (2022). <i>Forest Economics and Policy: A Comprehensive Overview</i>. Cambridge University Press. 9. Zhao, Y. & L. H. (2021). <i>Technological Innovations in Wood Processing and Utilization</i>. Elsevier. 10. Zubair, M. & A. S. (2018). <i>Sustainable Practices in the Timber Industry: A Case Study Approach</i>. Springer 11. Bungiorno. J; Gilles, Keith.J. 1987. <i>Forest Management and Economic : A Primer in Quantitative Methods</i>. Mac Millan Publishing Company, New York. 12. _____.2003. <i>Decision Methods for Forest Resource Management</i> 13. Dykstra, Denis P.1984. <i>Mathematical Programming for Natural Resources Management</i>. Mc. Graww-Hill Book Company, New York. |
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Module designation	Fiber and Composite Technology					
Subtitle	Teknologi Serat Dan Komposit					
Code	IKH 2 633					
The year in which the module is taught						
Person responsible for the module	Prof. Dr. Apri Heri Iswanto S.Hut., M.Si.					
Lecturer	Dr. Iwan Risnasari S.Hut., M.Si. Dr. Ir. Luthfi Hakim S.Hut., M.Si., IPM Arif Nuryawan S.Hut., M.Si., Ph.D					
Language	Indonesia / English					
Relation to curriculum	Compulsory / elective / specialisation Names of other study programmes with which the module is shared					
Teaching methods	Lecture and discussion: 150 minute, 14 Lecturer = 35 hour Structured Activities: 180 minute, 14 activities = 42 hour Self Learning (Individual/Group Project): 450 minute, 14 week = 105 hour Middle exam: 100 minute = 1.6 hour Final exam: 100 minute = 1,6 hour					
Workload (incl. contact hours, self-study hours)	Activity	Lecture and Discussion	Structured Activities	Self Learning (Individual / Group Project)	Exam	Total
	Hours	35	42	105	3.2	185
Credit points	3 semester credit unit (SCU) equivalen 6.64 ECTS					
Required prerequisites for joining the module	None					
Recommended prerequisites for joining the module	None					
Module objectives/intended learning outcomes	<p>PLO 4 Having understanding of the theories and advancements in the forestry industry basic science, cultivation, management, technology, and conservation.</p> <p>PLO 6 Capable of making appropriate decisions based on standard procedures and data, in communication, supervision and evaluation of work in forestry field. fforts at various levels (genetic, species and ecosystem)</p> <p>PLO 10 Having skill to improve and to inovate timber and non-timber forest product technology, as well as value enhancement and business feasibility analysis of forest products.</p>					
Content	<ol style="list-style-type: none"> 1. Introduction to Fiber and Composite Technology (TSK) 2. General Processing of Board 3. Lignocellulose, Adhesive, and Additive as Raw Materials 4. Physical, Mechanical, and Durability Properties of Boards 5. Synthetic and Natural Adhesives, Bonding Techniques 6. Introduction to Nanocomposites 7. Fiber and Recycling Technology 8. Midterm Exam 9. Fiberboard Technology 10. Particleboard Technology 11. Concepts and Applications of WPC 					

	<p>12. Mineral Board Technology 13. Structure and Manufacturing Processes 14. Laminated Board Technology and Fiber Orientation 15. Structural Innovations in CLT for Wooden Buildings 16. Final Exam</p>																								
Examination forms	<ul style="list-style-type: none"> • Quiz: Short questions related to the lecture subject (topic) given to students at the beginning or end of the lecture. • Assignment: Assignments to deepen the lecture topics given to students after several lectures. • Project Based: Problem-based individual or group assignments to strengthen skills related to learning topics in several lectures. • Case Study: Individual or group assignments based on case study to strengthen skills related to learning topics in several lectures. • Midle Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in the first to seventh lectures. • Final Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in lectures after half a semester until the end of the semester. 																								
Study and examination requirements	<ul style="list-style-type: none"> - Minimum lecture attendance is 80%. - Weighting composition for the final grade is quiz (5%), Assignment (15%), Project Based (25%), Case Study (25%). Midle Exam (15%), and Final Exam (15%). - Final grade is defined as: <table border="1"> <thead> <tr> <th>Score</th> <th>Grade</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>≥ 80</td> <td>A</td> <td>4</td> </tr> <tr> <td>75 - < 80</td> <td>B+</td> <td>3,5</td> </tr> <tr> <td>70 - < 75</td> <td>B</td> <td>3</td> </tr> <tr> <td>65 - < 70</td> <td>C+</td> <td>2,5</td> </tr> <tr> <td>60 - < 65</td> <td>C</td> <td>2</td> </tr> <tr> <td>50 - < 60</td> <td>D</td> <td>1</td> </tr> <tr> <td>< 50</td> <td>E</td> <td>0</td> </tr> </tbody> </table>	Score	Grade	Value	≥ 80	A	4	75 - < 80	B+	3,5	70 - < 75	B	3	65 - < 70	C+	2,5	60 - < 65	C	2	50 - < 60	D	1	< 50	E	0
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Learning media	Class room, TV Projector, In Focus, Power Point																								
Reading List	<ol style="list-style-type: none"> 1. Maloney, T.M. (1993). Modern Particleboard and Dry-Process Fiberboard Manufacturing. 2. Youngquist, J.A. (1999). Wood-based Composites and Panel Products. 3. Rowell, R.M. (2005). Handbook of Wood Chemistry and Wood Composites. 4. Callister, W.D. (2018). Materials Science and Engineering. 5. Ashby, M. & Jones, D. (2013). Engineering Materials 2. 6. Jawaid, M., & Abdul Khalil, H.P.S. (2017). Cellulose-Reinforced Polymer Composites. 																								

Module designation	Biomass to Energy Conversion					
Subtitle	Konversi Biomassa Untuk Energi					
Code	IKH 2 634					
The year in which the module is taught						
Person responsible for the module	Arif Nuryawan S.Hut., M.Si., Ph.D					
Lecturer	Dr. Iwan Risnasari S.Hut., M.Si. Dr. Ir. Luthfi Hakim S.Hut., M.Si., IPM Dr. Ir. Tito Sucipto S.Hut., M.Si., IPU					
Language	Indonesia / English					
Relation to curriculum	Compulsory / elective / specialisation Names of other study programmes with which the module is shared					
Teaching methods	Lecture and discussion: 150 minute, 14 Lecturer = 35 hour Structured Activities: 180 minute, 14 activities = 42 hour Self Learning (Individual/Group Project): 450 minute, 14 week = 105 hour Middle exam: 100 minute = 1.6 hour Final exam: 100 minute = 1,6 hour					
Workload (incl. contact hours, self-study hours)	Activity	Lecture and Discussion	Structured Activites	Self Learning (Individual / Group Project)	Exam	Total
	Hours	35	42	105	3.2	185
Credit points	3 semester credit unit (SCU) equivalen 6.64 ECTS					
Required prerequisites for joining the module	none					
Recommended prerequisites for joining the module	none					
Module objectives/intended learning outcomes	<p>PLO 4 Having understanding of the theories and advancements in the forestry industry basic science, cultivation, management, technology, and conservation.</p> <p>PLO 6 Capable of making appropriate decisions based on standard procedures and data, in communication, supervision and evaluation of work in forestry field. fforts at various levels (genetic, species and ecosystem)</p> <p>PLO 7 Capable of arranging scientific research, compile the scientific and non-scientific reports in the form of thesis and prevent the plagiarism.</p> <p>PLO 10 Having skill to improve and to inovate timber and non-timber forest product technology, as well as value enhancement and business feasibility analysis of forest products.</p>					
Content	<ol style="list-style-type: none"> 1. Definition of biomass, properties of biomass, types of biomass, and biomass conversion 2. Biochemical methods and thermochemical methods 3. Review of wood components, Conversion of wood into carbohydrates, Ten main products of carbohydrate conversion, Carbohydrate conversion products for sugar, Pre-treatment of biomass converted to carbohydrates by physical, physicochemical, and chemical means. Sugar/carbohydrate industrial biorefinery 					

	<ol style="list-style-type: none"> 4. Understanding aerobic digestion and anaerobic digestion, Examples of aerobic digestion in forestry, Examples of anaerobic digestion in forestry, Advantages of anaerobic digestion, Stages in anaerobic digestion, Developing research 5. Understanding fermentation, Factors affecting the success of fermentation, Advantages and disadvantages of fermentation, Developing research on fermentation 6. Definition of enzymatic hydrolysis, Mechanism of enzymatic hydrolysis, Use of catalysts, Classification of enzymes: endo (intracellular) and exo (extracellular), Functions of enzymes in hemicellulose hydrolysis 7. Complete vs. incomplete combustion, Combustion reactions, Combustion mechanisms, Combustion that produces energy (heat, light, electricity), Emerging research 8. Definition of pyrolysis, Stages of the pyrolysis mechanism, Pyrolysis diagrams/charts, Products produced from the pyrolysis process, Emerging research 9. Definition of gasification and syngas, Four gasification processes, Potential bio-products produced from the gasification process, Impact/effects of gasification on the environment (air pollution) 10. Definition of liquefaction, Liquefaction chart/process, Products produced by the liquefaction process, including bio-granules, Applications of biomass liquefaction, Ongoing research 11. Definition of torrefaction, Torrefaction of several types of biomass (softwood, hardwood, bamboo, and other lignocellulosic materials such as palm oil waste), Factors affecting the torrefaction process, Mass yield vs. energy yield, Developing research 12. Energy from biomass versus renewable energy from other sources, Several definitions: biochar, valorization, biorefinery, biofuel, remediation, green chemicals, zero waste, non-pollutants, biomaterials, bio-polymers, Characterization of elements from biochar and biofuel, Environmental impact
Examination forms	<ul style="list-style-type: none"> • Quiz: Short questions related to the lecture subject (topic) given to students at the beginning or end of the lecture. • Assignment: Assignments to deepen the lecture topics given to students after several lectures. • Project Based: Problem-based individual or group assignments to strengthen skills related to learning topics in several lectures. • Case Study: Individual or group assignments based on case study to strengthen skills related to learning topics in several lectures. • Midle Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in the first to seventh lectures. • Final Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in lectures after half a semester until the end of the semester.
Study and examination requirements	<ul style="list-style-type: none"> - Minimum lecture attendance is 80%.

	<p>- Weighting composition for the final grade is quiz (5%), Assignment (5%), Project Based (25%), Case Study (25%). Midle Exam (20%), and Final Exam (20%).</p> <p>- Final grade is defined as:</p> <table border="1"> <thead> <tr> <th>Score</th> <th>Grade</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>≥ 80</td> <td>A</td> <td>4</td> </tr> <tr> <td>75 - < 80</td> <td>B+</td> <td>3,5</td> </tr> <tr> <td>70 - < 75</td> <td>B</td> <td>3</td> </tr> <tr> <td>65 - < 70</td> <td>C+</td> <td>2,5</td> </tr> <tr> <td>60 - < 65</td> <td>C</td> <td>2</td> </tr> <tr> <td>50 - < 60</td> <td>D</td> <td>1</td> </tr> <tr> <td>< 50</td> <td>E</td> <td>0</td> </tr> </tbody> </table>	Score	Grade	Value	≥ 80	A	4	75 - < 80	B+	3,5	70 - < 75	B	3	65 - < 70	C+	2,5	60 - < 65	C	2	50 - < 60	D	1	< 50	E	0
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Learning media	Class room, TV Projector, In Focus, Power Point																								
Reading List	<ol style="list-style-type: none"> 1. Anthony Anukam, Ali Mohammadi , Muhammad Naqvi and Karin Granström. 2019. A Review of the Chemistry of Anaerobic Digestion: Methods of Accelerating and Optimizing Process Efficiency. Processes 2019, 7, 504; doi:10.3390/pr7080504 www.mdpi.com/journal/processes 2. Antonio Tursi. 2019. A review on biomass: importance, chemistry, classification, and conversion. Biofuel Research Journal 22: 962-979 3. Ayhan Demirbas, Volkan Coban, Osman Taylan & Mohammed Kabli (2017): Aerobic digestion of sewage sludge for waste treatment, Energy Sources, Part A: Recovery, Utilization, and Environmental Effects, DOI: 10.1080/15567036.2017.1289282 4. E. Magel, W. Einig and R. Hampp. 2000. Carbohydrates in trees. Carbohydrate Reserves in Plants - Synthesis and Regulation A.K. Gupta and N. Kaur (Editors) © 2000 Elsevier Science B. V. All rights reserved. 5. Haznan Abimanyu and Sunit Hendrana (Eds). 2014. Biomass Conversion for Alternative Energy in Indonesia: A Review of Resources, Technology, Management, and Policy. Jakarta: LIPI Press. 6. Hui Pan. 2011. Synthesis of polymers from organic solvent liquefied biomass: A review. Renewable and Sustainable Energy Reviews 15: 3454- 3463. 7. Juan Castilla-Archilla, Vincent O’Flaherty, and Piet N. L. Lens. 2019. Biorefineries: Industrial Innovation and Tendencies. © Springer Nature Switzerland AG 2019 3 J.-R. Bastidas-Oyanedel, J. E. Schmidt (eds.), Biorefinery https://doi.org/10.1007/978-3-030-10961-5_1 8. Lakshmi Machineni. 2019. Lignocellulosic biofuel production: review of alternatives. Biomass Conversion and Biorefinery https://doi.org/10.1007/s13399-019-00445-x 9. Maria Puig-Arnavat, Tobias Pape Thomsen, Giulia Ravenni, Lasse Røngaard Clausen, Zsuzsa Sarossy, and Jesper Ahrenfeldt. 2019. Pyrolysis and Gasification of Lignocellulosic Biomass. © Springer Nature Switzerland AG 2019 79 J.-R. Bastidas-Oyanedel, J. E. Schmidt (eds.), Biorefinery, https://doi.org/10.1007/978-3-030-10961-5_4 																								

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| | <p>10. Michiel Dusselier, Mark Mascal, and Bert F. Sels. 2014. Top Chemical Opportunities from Carbohydrate Biomass: A Chemist's View of the Biorefinery. <i>Top Curr Chem</i> (2014) DOI: 10.1007/128_2014_544</p> <p>11. Niclas Scott Bentsen. 2020. Biomass for Biorefineries: Availability and Costs. © Springer Nature Switzerland AG 2019 37 J.-R. Bastidas-Oyanedel, J. E. Schmidt (eds.), <i>Biorefinery</i> https://doi.org/10.1007/978-3-030-10961-5_2</p> <p>12. Prasenjit Bhaumik and Paresh Laxmikant Dhepe. 2016. Conversion of Biomass into Sugars. Chapter 1. <i>RSC Green Chemistry No. 44 Biomass Sugars for Non-Fuel Applications</i> Edited by Dmitry Murzin and Olga Simakovar The Royal Society of Chemistry 2016. Published by the Royal Society of Chemistry, www.rsc.org</p> <p>13. Richard Ahorsu, Francesc Medina * and Magda Constantí. 2018. Significance and Challenges of Biomass as a Suitable Feedstock for Bioenergy and Biochemical Production: A Review. <i>Energies</i> 2018, 11, 3366; doi:10.3390/en11123366 www.mdpi.com/journal/energies</p> <p>14. Shaon Kumar Das^{1,2} & Goutam Kumar Ghosh² & Ravikant Avasthe. 2020. Valorizing biomass to engineered biochar and its impact on soil, plant, water, and microbial dynamics: a review. <i>Biomass Conversion and Biorefinery</i> https://doi.org/10.1007/s13399-020-00836-5</p> |
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Module designation	Advanced Non-Timber Forest Products					
Subtitle	Hasil Hutan Non Kayu Lanjutan					
Code	IKH 2 635					
The year in which the module is taught						
Person responsible for the module	Prof. Dr. Rudi Hartono S.Hut., M.Si.					
Lecturer	Dr. Iwan Risnasari S.Hut., M.Si. Arif Nuryawan S.Hut., M.Si., Ph.D Dr. Ir. Tito Sucipto S.Hut., M.Si., IPU					
Language	Indonesia / English					
Relation to curriculum	Compulsory / elective / specialisation Names of other study programmes with which the module is shared					
Teaching methods	Lecture and discussion: 150 minute, 14 Lecturer = 35 hour Structured Activities: 180 minute, 14 activities = 42 hour Self Learning (Individual/Group Project): 450 minute, 14 week = 105 hour Middle exam: 100 minute = 1.6 hour Final exam: 100 minute = 1,6 hour					
Workload (incl. contact hours, self-study hours)	Activity	Lecture and Discussion	Structured Activities	Self Learning (Individual / Group Project)	Exam	Total
	Hours	35	42	105	3.2	185
Credit points	3 semester credit unit (SCU) equivalen 6.64 ECTS					
Required prerequisites for joining the module	None					
Recommended prerequisites for joining the module	None					
Module objectives/intended learning outcomes	<p>PLO 4 Having understanding of the theories and advancements in the forestry industry basic science, cultivation, management, technology, and conservation.</p> <p>PLO 5 Capable of demonstrating independent and team work, quality and measurable performance, able to apply various methods of science and technology in forestry issue identification and solving.</p> <p>PLO 10 Having skill to improve and to inovate timber and non-timber forest product technology, as well as value enhancement and business feasibility analysis of forest products.</p>					
Content	<ol style="list-style-type: none"> 1. Contract Farming, Definition, Role, and Prospects of HHNK and Related Issues 2. Various Types of Animal-Based HHNK, Potential, Processing Technology 3. Definition of Medicinal Plants, Types of Medicinal Plants, Processing of Medicinal Plants 4. Types, Potential, and Distribution of Palm and Bamboo, Processing Technology, Characterization of Materials and Product Quality, Product Usage 5. Types (Charcoal, Briquettes), Processing Technology, Usage 					

	6. Midterm Exam 7. Types, potential, and distribution of non-timber forest products from the essential oil group, Processing technology, Characterization of materials and product quality, Product use 8. Types, potential, and distribution of non-timber forest products from the resin group, Processing technology, Characterization of materials and product quality, Product use 9. Types, potential, and distribution of resins and tannins, Processing technology, Characterization of materials and product quality, Product use 10. Types, potential, and distribution, Characterization of materials, Their use 11. Leading HHNK commodities at the regional and national levels, HHNK business opportunities 12. Final Exam																								
Examination forms	<ul style="list-style-type: none"> • Assignment: Assignments to deepen the lecture topics given to students after several lectures. • Project Based: Problem-based individual or group assignments to strengthen skills related to learning topics in several lectures. • Case Study: Individual or group assignments based on case study to strengthen skills related to learning topics in several lectures. • Midle Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in the first to seventh lectures. • Final Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in lectures after half a semester until the end of the semester. 																								
Study and examination requirements	<ul style="list-style-type: none"> - Minimum lecture attendance is 80%. - Weighting composition for the final grade is Assignment (5%), Project Based (30%), Case Study (30%). Midle Exam (15%), and Final Exam (20%). - Final grade is defined as: <table border="1" style="margin-left: 40px;"> <thead> <tr> <th>Score</th> <th>Grade</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>≥ 80</td> <td>A</td> <td>4</td> </tr> <tr> <td>75 - < 80</td> <td>B+</td> <td>3,5</td> </tr> <tr> <td>70 - < 75</td> <td>B</td> <td>3</td> </tr> <tr> <td>65 - < 70</td> <td>C+</td> <td>2,5</td> </tr> <tr> <td>60 - < 65</td> <td>C</td> <td>2</td> </tr> <tr> <td>50 - < 60</td> <td>D</td> <td>1</td> </tr> <tr> <td>< 50</td> <td>E</td> <td>0</td> </tr> </tbody> </table>	Score	Grade	Value	≥ 80	A	4	75 - < 80	B+	3,5	70 - < 75	B	3	65 - < 70	C+	2,5	60 - < 65	C	2	50 - < 60	D	1	< 50	E	0
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Learning media	Class room, TV Projector, In Focus, Power Point																								
Reading List	<ol style="list-style-type: none"> 1. Forest Products Research Center, 2000. Collection of Rattan and Bamboo Research Abstracts 2. Ministry of Forestry. Law No. 41 of 1999 concerning Forestry 3. Ministry of Forestry. 1999. Indonesian Forestry Guidelines. 1999. 4. Suminar S Achmadi. 1990. Wood Chemistry 5. Ernest Guenther, 2009. Essential Oils Wahyudi. 2013. Handbook of Non-Timber Forest Products 																								

Module designation	Forestry Waste Handling Engineering					
Subtitle	Rekayasa Penanganan Limbah Kehutanan					
Code	IKH 2 636					
The year in which the module is taught						
Person responsible for the module	Dr. Iwan Risnasari S.Hut., M.Si.					
Lecturer	Arif Nuryawan S.Hut., M.Si., Ph.D Dr. Ir. Luthfi Hakim S.Hut., M.Si., IPM Prof. Dr. Rudi Hartono S.Hut., M.Si.					
Language	Indonesia / English					
Relation to curriculum	Compulsory / elective / specialisation Names of other study programmes with which the module is shared					
Teaching methods	Lecture and discussion: 150 minute, 14 Lecturer = 35 hour Structured Activities: 180 minute, 14 activities = 42 hour Self Learning (Individual/Group Project): 450 minute, 14 week = 105 hour Middle exam: 100 minute = 1.6 hour Final exam: 100 minute = 1,6 hour					
Workload (incl. contact hours, self-study hours)	Activity	Lecture and Discussion	Structured Activities	Self Learning (Individual / Group Project)	Exam	Total
	Hours	35	42	105	3.2	185
Credit points	3 semester credit unit (SCU) equivalent 6.64 ECTS					
Required prerequisites for joining the module	none					
Recommended prerequisites for joining the module	none					
Module objectives/intended learning outcomes	<p>PLO 3 Having competency in research techniques, scientific analysis of study findings, and presentation of findings information technology.</p> <p>PLO 4 Having understanding of the theories and advancements in the forestry industry basic science, cultivation, management, technology, and conservation.</p> <p>PLO 10 Having skill to improve and to innovate timber and non-timber forest product technology, as well as value enhancement and business feasibility analysis of forest products.</p>					
Content	<ol style="list-style-type: none"> 1. Introduction, course contract, basic concepts of waste management 2. Types and potential of forest harvesting waste 3. Primary and secondary industrial waste 4. Waste reduction efforts in the forestry sector 5. Biocomposite concepts and wood waste applications 6. Natural dyes, crafts, and biochar 7. Empowerment of forest-adjacent communities 8. Midterm exam 9. Lignocellulosic waste and natural adhesives 10. Concepts of forestry industry integration and environmental impact assessment 					

	<p>11. Solid wood waste management 12. Liquid waste management in the forestry industry 13. Regulations, policies, and implementation challenges 14. Standardization and marketing of processed products 15. Principles and stages of Life Cycle Assessment 16. Final Exam</p>																								
Examination forms	<ul style="list-style-type: none"> • Quiz: Short questions related to the lecture subject (topic) given to students at the beginning or end of the lecture. • Assignment: Assignments to deepen the lecture topics given to students after several lectures. • Project Based: Problem-based individual or group assignments to strengthen skills related to learning topics in several lectures. • Case Study: Individual or group assignments based on case study to strengthen skills related to learning topics in several lectures. • Midle Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in the first to seventh lectures. • Final Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in lectures after half a semester until the end of the semester. 																								
Study and examination requirements	<ul style="list-style-type: none"> - Minimum lecture attendance is 80%. - Weighting composition for the final grade is quiz (5%), Assignment (5%), Project Based (25%), Case Study (25%), Midle Exam (20%), and Final Exam (20%). - Final grade is defined as: <table border="1" style="margin-left: 40px;"> <thead> <tr> <th>Score</th> <th>Grade</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>≥ 80</td> <td>A</td> <td>4</td> </tr> <tr> <td>75 - < 80</td> <td>B+</td> <td>3,5</td> </tr> <tr> <td>70 - < 75</td> <td>B</td> <td>3</td> </tr> <tr> <td>65 - < 70</td> <td>C+</td> <td>2,5</td> </tr> <tr> <td>60 - < 65</td> <td>C</td> <td>2</td> </tr> <tr> <td>50 - < 60</td> <td>D</td> <td>1</td> </tr> <tr> <td>< 50</td> <td>E</td> <td>0</td> </tr> </tbody> </table>	Score	Grade	Value	≥ 80	A	4	75 - < 80	B+	3,5	70 - < 75	B	3	65 - < 70	C+	2,5	60 - < 65	C	2	50 - < 60	D	1	< 50	E	0
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Learning media	Class room, TV Projector, In Focus, Power Point																								
Reading List	<ol style="list-style-type: none"> 1. James, H. Dooley (2008). Interfacing Forest Engineering with Bioenergy Production. 2. Gutierrez-Franco, E., et al. (2021). Multi-Objective Optimization to Support the Design of a Sustainable Supply Chain for Biofuels from Forest Waste. Sustainability. 3. Niyazi, U. K., & Çamurlu, E. (2022). Engineering Properties of Lightweight Mortars Containing Wood Waste Particles. 4. Nariye, B., et al. (2013). Use of Forestry Wastes for Biosorption of Dyes and Cr(VI). Journal of Chemistry. 5. Sudip, Pandey. (2022). Wood Waste Utilization and Associated Product Development. SN Applied Sciences. 																								

Forest Conservation

Module designation	Advanced Wildlife Management					
Subtitle	Pengelolaan Satwa Liar Lanjutan					
Code	IKH 2 637					
The year in which the module is taught						
Person responsible for the module	Dr. Ir Ma'rifatin Zahrah M.Si					
Lecturer	Pindi Patana S.Hut., M.Sc. Onrizal S.Hut, M.Si, Ph.D Dr. Nurdin Sulistiyono S.Hut., M.Si.					
Language	Indonesia / English					
Relation to curriculum	Compulsory / elective / specialisation Names of other study programmes with which the module is shared					
Teaching methods	Lecture and discussion: 150 minute, 14 Lecturer = 35 hour Structured Activities: 180 minute, 14 activities = 42 hour Self Learning (Individual/Group Project): 450 minute, 14 week = 105 hour Middle exam: 100 minute = 1.6 hour Final exam: 100 minute = 1,6 hour					
Workload (incl. contact hours, self-study hours)	Activity	Lecture and Discussion	Structured Activites	Self Learning (Individual / Group Project)	Exam	Total
	Hours	35	42	105	3.2	185
Credit points	3 semester credit unit (SCU) equivalen 6.64 ECTS					
Required prerequisites for joining the module	None					
Recommended prerequisites for joining the module	None					
Module objectives/intended learning outcomes	<p>PLO 4 Having understanding of the theories and advancements in the forestry industry basic science, cultivation, management, technology, and conservation.</p> <p>PLO 6 Capable of making appropriate decisions based on standard procedures and data, in communication, supervision and evaluation of work in forestry field. fforts at various levels (genetic, species and ecosystem)</p> <p>PLO 11 Having skill to elaborate the forest resources conservation efforts, including provide the solution alternatives, community collaborations, prioritizing a holistic approach (ecological, economic and socio-cultural) in forest resources conservation</p>					
Content	<p>Study materials (teaching materials):</p> <ol style="list-style-type: none"> 1. Lecture Contract and Description of lecture material 2. Concept of Wildlife Management: <ul style="list-style-type: none"> - Conservation objectives - Utilization objectives 3. Wildlife population dynamics: <ul style="list-style-type: none"> - Factors affecting population dynamics - Population growth model 					

	<ul style="list-style-type: none"> - Population regulation mechanism 4. Wildlife Inventory and Census: <ul style="list-style-type: none"> - IPA - IKA - Indirect methods (nest counts, feces, tracks) - Spatial distribution 5. Wildlife ecology <ul style="list-style-type: none"> - Habitat components - Ecological succession and habitat quality - Management of habitat components - Welfare factors - Creation of wildlife corridors 6. Population management: <ul style="list-style-type: none"> - Low population - Over population - Local extinction risk - Metapopulation management to prevent extinction 7. Adaptation: <ul style="list-style-type: none"> - Morphology - Physiology - Behavior Evolution: <ul style="list-style-type: none"> - Theory of evolution - Factors affecting evolution 8. Migratory animal management: <ul style="list-style-type: none"> - Wildlife movement - Types of migratory animals - International cooperation 9. Hunting animal population management: <ul style="list-style-type: none"> - calculation of hunting animal quotas - determination of hunting season 10. Wildlife Habitat Potential Assessment: <ul style="list-style-type: none"> - Analysis of habitat productivity - Analysis of wildlife population density - Analysis of habitat carrying capacity - Evaluation of habitat potential - Wildlife habitat suitability evaluation 11. Wildlife disturbance: <ul style="list-style-type: none"> - Factors causing disturbance - Disturbance analysis - Human-animal conflict mitigation 12. Wildlife EIA
Examination forms	<ul style="list-style-type: none"> • Quiz: Short questions related to the lecture subject (topic) given to students at the beginning or end of the lecture. • Assignment: Assignments to deepen the lecture topics given to students after several lectures. • Project Based: Problem-based individual or group assignments to strengthen skills related to learning topics in several lectures.

	<ul style="list-style-type: none"> • Case Study: Individual or group assignments based on case study to strengthen skills related to learning topics in several lectures. • Midle Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in the first to seventh lectures. • Final Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in lectures after half a semester until the end of the semester. 																								
Study and examination requirements	<ul style="list-style-type: none"> - Minimum lecture attendance is 80%. - Weighting composition for the final grade is quiz (5%), Assignment (5%), Project Based (25%), Case Study (25%). Midle Exam (20%), and Final Exam (20%). - Final grade is defined as: <table border="1"> <thead> <tr> <th>Score</th> <th>Grade</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>≥ 80</td> <td>A</td> <td>4</td> </tr> <tr> <td>75 - < 80</td> <td>B+</td> <td>3,5</td> </tr> <tr> <td>70 - < 75</td> <td>B</td> <td>3</td> </tr> <tr> <td>65 - < 70</td> <td>C+</td> <td>2,5</td> </tr> <tr> <td>60 - < 65</td> <td>C</td> <td>2</td> </tr> <tr> <td>50 - < 60</td> <td>D</td> <td>1</td> </tr> <tr> <td>< 50</td> <td>E</td> <td>0</td> </tr> </tbody> </table>	Score	Grade	Value	≥ 80	A	4	75 - < 80	B+	3,5	70 - < 75	B	3	65 - < 70	C+	2,5	60 - < 65	C	2	50 - < 60	D	1	< 50	E	0
Score	Grade	Value																							
≥ 80	A	4																							
75 - < 80	B+	3,5																							
70 - < 75	B	3																							
65 - < 70	C+	2,5																							
60 - < 65	C	2																							
50 - < 60	D	1																							
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Learning media	Class room, TV Projector, In Focus, Power Point																								
Reading List	<ol style="list-style-type: none"> 1. Alikodra, H.S. 1990. Wildlife Management. Volume I. Inter-University Center for Life Sciences, Bogor Agricultural University. Bogor. 2. Bailey, J.A. 1984. Principles of Wildlife Management. John Wiley & Sons. New York. 3. Bennett, A.F. 1990. Habitat corridors: their role in wildlife management and conservation. Department of Conservation and Environment, Victoria, Arthur Rylah Institute for Environmental Research. Melbourne. 4. Bennett, A.F. 2003. Linkages in the Landscape: The Role of Corridors and Connectivity in Wildlife Conservation. IUCN, Gland, Switzerland and Cambridge, UK. 5. Benbow, M. E., Tomberlin, J. K., & Tarone, A. M. (Eds.). (2015). Carrion ecology, evolution, and their applications. CRC press. 6. Koprowski, J. L., & Krausman, P. R. (Eds.). (2019). International Wildlife Management: Conservation Challenges in a Changing World. JHU Press. 7. Lopez, R. R., Morrison, M. L., & Parker, I. D. (2017). Applied wildlife habitat management. Texas A&M University Press. 8. Olea, P. P., Mateo-Tomás, P., & Sánchez-Zapata, J. A. (Eds.). (2019). Carrion Ecology and Management (Vol. 2). New York, NY: Springer. 																								

Module designation	Conservation Strategies and Human-Wildlife Conflict Mitigation Techniques					
Subtitle	Strategi Konservasi dan Teknik Mitigasi Konflik Manusia dan Satwa Liar					
Code	IKH 2 638					
The year in which the module is taught						
Person responsible for the module	Dr. Pindi Patana S.Hut., M.Sc.					
Lecturer						
Language	Indonesia / English					
Relation to curriculum	Compulsory / elective / specialisation Names of other study programmes with which the module is shared					
Teaching methods	Lecture and discussion: 150 minute, 14 Lecturer = 35 hour Structured Activities: 180 minute, 14 activities = 42 hour Self Learning (Individual/Group Project): 450 minute, 14 week = 105 hour Midle exam: 100 minute = 1.6 hour Final exam: 100 minute = 1,6 hour					
Workload (incl. contact hours, self-study hours)	Activity	Lecture and Discussion	Structured Activites	Self Learning (Individual / Group Project)	Exam	Total
	Hours	35	42	105	3.2	185
Credit points	3 semester credit unit (SCU) equivalen 6.64 ECTS					
Required prerequisites for joining the module	None					
Recommended prerequisites for joining the module	None					
Module objectives/intended learning outcomes	<p>PLO 4 Having understanding of the theories and advancements in the forestry industry basic science, cultivation, management, technology, and conservation.</p> <p>PLO 6 Capable of making appropriate decisions based on standard procedures and data, in communication, supervision and evaluation of work in forestry field. fforts at various levels (genetic, species and ecosystem)</p> <p>PLO 11 Having skill to elaborate the forest resources conservation efforts, including provide the solution alternatives, community collaborations, prioritizing a holistic approach (ecological, economic and socio-cultural) in forest resources conservation</p>					
Content	<ol style="list-style-type: none"> 1. Introduction to conservation; concepts of biodiversity; conservation objectives and principles 2. Law No. 5/1990, Government Regulation No. 7/1999, Government Regulation No. 108/2015, technical regulations on wildlife conservation 3. Concepts of ecosystems, habitat carrying capacity, and adaptive management 4. Conflicts with elephants, tigers, orangutans, sun bears, and other wildlife 5. Habitat fragmentation, land use change, poaching, wildlife behavior 6. Camera trap, transect, and behavioral observation methods 					

	<ol style="list-style-type: none"> 7. The role of communities, local institutions, and participatory conflict resolution 8. Midterm exam 9. Conflict prevention, management, and recovery models 10. Early warning systems, electric fences, bio-fencing, natural deterrents 11. Government, NGOs, academics, and communities 12. Spatial analysis of conflicts, GIS, mapping of conflict-prone areas 13. Evaluation of conflict mitigation success and adaptive conservation 14. Design of community-based mitigation models and policies 15. Development of mini projects based on actual case studies 16. Final exam 																								
Examination forms	<ul style="list-style-type: none"> • Quiz: Short questions related to the lecture subject (topic) given to students at the beginning or end of the lecture. • Assignment: Assignments to deepen the lecture topics given to students after several lectures. • Project Based: Problem-based individual or group assignments to strengthen skills related to learning topics in several lectures. • Case Study: Individual or group assignments based on case study to strengthen skills related to learning topics in several lectures. • Midle Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in the first to seventh lectures. • Final Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in lectures after half a semester until the end of the semester. 																								
Study and examination requirements	<ul style="list-style-type: none"> - Minimum lecture attendance is 80%. - Weighting composition for the final grade is quiz (5%), Assignment (5%), Project Based (25%), Case Study (25%), Midle Exam (20%), and Final Exam (20%). - Final grade is defined as: <table border="1" style="margin-left: 40px;"> <thead> <tr> <th>Score</th> <th>Grade</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>≥ 80</td> <td>A</td> <td>4</td> </tr> <tr> <td>75 - < 80</td> <td>B+</td> <td>3,5</td> </tr> <tr> <td>70 - < 75</td> <td>B</td> <td>3</td> </tr> <tr> <td>65 - < 70</td> <td>C+</td> <td>2,5</td> </tr> <tr> <td>60 - < 65</td> <td>C</td> <td>2</td> </tr> <tr> <td>50 - < 60</td> <td>D</td> <td>1</td> </tr> <tr> <td>< 50</td> <td>E</td> <td>0</td> </tr> </tbody> </table> 	Score	Grade	Value	≥ 80	A	4	75 - < 80	B+	3,5	70 - < 75	B	3	65 - < 70	C+	2,5	60 - < 65	C	2	50 - < 60	D	1	< 50	E	0
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Learning media	Class room, TV Projector, In Focus, Power Point																								
Reading List	<ol style="list-style-type: none"> 1. Treves, A., & Karanth, K.U. (2003). Human-Predator Conflict and Perspectives on Predator Management Worldwide. Conservation Biology. 2. Redpath, S. M., et al. (2013). Understanding and Managing Conservation Conflicts. Cambridge University Press. 3. Woodroffe, R., Thirgood, S., & Rabinowitz, A. (2005). Humans and Wildlife: Conflict or Coexistence? Cambridge University Press. 																								

	<ol style="list-style-type: none">4. WWF Indonesia. (2019). Guidelines for Mitigating Human-Wildlife Conflict in Indonesia.5. Director General of KSDAE KLHK. (2021). Technical Guidelines for Handling Wildlife Conflicts.6. Nyhus, P. (2016). Human-Wildlife Conflict and Coexistence. Annual Review of Environment and Resources.
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Module designation	Ecotourism Management and Conservation of Environmental Services					
Subtitle	Pengelolaan Ekowisata dan Konservasi Jasa Lingkungan					
Code	IKH 2 639					
The year in which the module is taught						
Person responsible for the module	Dr. Achmad Siddik Thoha S.Hut., M.Si.					
Lecturer	Dr. Ir Ma'rifatin Zahrah M.Si Dr. Nurdin Sulistiyono S.Hut., M.Si.					
Language	Indonesia / English					
Relation to curriculum	Compulsory / elective / specialisation Names of other study programmes with which the module is shared					
Teaching methods	Lecture and discussion: 150 minute, 14 Lecturer = 35 hour Structured Activities: 180 minute, 14 activities = 42 hour Self Learning (Individual/Group Project): 450 minute, 14 week = 105 hour Middle exam: 100 minute = 1.6 hour Final exam: 100 minute = 1,6 hour					
Workload (incl. contact hours, self-study hours)	Activity	Lecture and Discussion	Structured Activities	Self Learning (Individual / Group Project)	Exam	Total
	Hours	35	42	105	3.2	185
Credit points	3 semester credit unit (SCU) equivalen 6.64 ECTS					
Required prerequisites for joining the module	None					
Recommended prerequisites for joining the module	None					
Module objectives/intended learning outcomes	<p>PLO 4 Having understanding of the theories and advancements in the forestry industry basic science, cultivation, management, technology, and conservation.</p> <p>PLO 5 Capable of demonstrating independent and team work, quality and measurable performance, able to apply various methods of science and technology in forestry issue identification and solving.</p> <p>PLO 11 Having skill to elaborate the forest resources conservation efforts, including provide the solution alternatives, community collaborations, prioritizing a holistic approach (ecological, economic and socio-cultural) in forest resources conservation</p>					
Content	<ol style="list-style-type: none"> 1. Introduction, Concept of Environmental Services, Management of environmental services as a natural resource conservation strategy 2. Types and Potential of Environmental Services: <ul style="list-style-type: none"> - Types of Environmental Services - Environmental Services and Non-Timber Forest Products - Potential of Environmental Services 3. Benefits of Environmental Services: <ul style="list-style-type: none"> - Environment as a water regulator, preventing erosion and flooding - Oxygen provider - Reducing air pollutants 					

	<ul style="list-style-type: none"> - Maintaining soil fertility - Source of biodiversity - Benefits of ecotourism <ol style="list-style-type: none"> 4. Carbon Absorption Environmental Services <ul style="list-style-type: none"> - Forests as carbon absorbers - Carbon trading for global warming mitigation - Calculation of carbon environmental services 5. Hydrological Environmental Services <ul style="list-style-type: none"> - Water cycle - Watershed concept - Upstream-downstream water environmental service model 6. Methods and Models for Calculating Environmental Services <ul style="list-style-type: none"> - Economic valuation of environmental services - Willingness to pay - Travel Cost Method - Carbon Calculation 7. Nature Tourism Services <ul style="list-style-type: none"> - Tourism potential - Supply and demand for tourism services - Tourism industry - Environmental interpretation 8. Definition of Ecotourism, Elements of Ecotourism, Distinguishing features between ecotourism and other types of tourism 9. Environmental carrying capacity of ecotourism, Socio-economic and cultural carrying capacity of ecotourism 10. Ecotourism development strategies, SWOT analysis of ecotourism development, Setting priorities for ecotourism development 						
Examination forms	<ul style="list-style-type: none"> • Quiz: Short questions related to the lecture subject (topic) given to students at the beginning or end of the lecture. • Assignment: Assignments to deepen the lecture topics given to students after several lectures. • Project Based: Problem-based individual or group assignments to strengthen skills related to learning topics in several lectures. • Case Study: Individual or group assignments based on case study to strengthen skills related to learning topics in several lectures. • Midle Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in the first to seventh lectures. • Final Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in lectures after half a semester until the end of the semester. 						
Study and examination requirements	<ul style="list-style-type: none"> - Minimum lecture attendance is 80%. - Weighting composition for the final grade is quiz (5%), Assignment (5%), Project Based (25%), Case Study (25%). Midle Exam (20%), and Final Exam (20%). - Final grade is defined as: <table border="1"> <thead> <tr> <th>Score</th> <th>Grade</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>≥ 80</td> <td>A</td> <td>4</td> </tr> </tbody> </table> 	Score	Grade	Value	≥ 80	A	4
Score	Grade	Value					
≥ 80	A	4					

		75 - < 80	B+	3,5	
		70 - < 75	B	3	
		65 - < 70	C+	2,5	
		60 - < 65	C	2	
		50 - < 60	D	1	
		< 50	E	0	
Learning media	Class room, TV Projector, In Focus, Power Point				
Reading List	<ol style="list-style-type: none"> 1. Committee on Assessing and Valuing the Services of Aquatic and Related Terrestrial Ecosystems. 2004. Valuing Ecosystem Services: Toward Better Environmental Decision-Making water science and technology board. national research council of the national academies. The National Academies Press. Washington, D.C. 2. Cater, E. And G. Lowman, 1994. Ecotourism: A Sustainable Option. John Wiley and Sons. 3. Fandeli, C. and Muklison, (editors) 2002. Pengusahaan Ekowisata (Ecotourism Management). Pustaka Pelajar, Yogyakarta. 4. RUPES. 2005. Strategi Pengembangan Pembayaran dan Imbal Jasa Lingkungan di Indonesia (Strategies for Developing Environmental Payments and Services in Indonesia). 				

Module designation	Spatial Analysis of Forest Landscape Conservation					
Subtitle	Analisis Spasial Konservasi Lanskap Hutan					
Code	IKH 2 640					
The year in which the module is taught						
Person responsible for the module	Dr. Nurdin Sulistiyono S.Hut., M.Si.					
Lecturer	Dr. Achmad Siddik Thoha S.Hut., M.Si. Prof. Rahmawaty S.Hut., M.Si., Ph.D. Dr. Anita Zaitunah S.Hut., M.Sc.					
Language	Indonesia / English					
Relation to curriculum	Compulsory / elective / specialisation Names of other study programmes with which the module is shared					
Teaching methods	Lecture and discussion: 150 minute, 14 Lecturer = 35 hour Structured Activities: 180 minute, 14 activities = 42 hour Self Learning (Individual/Group Project): 450 minute, 14 week = 105 hour Midle exam: 100 minute = 1.6 hour Final exam: 100 minute = 1,6 hour					
Workload (incl. contact hours, self-study hours)	Activity	Lecture and Discussion	Structured Activites	Self Learning (Individual / Group Project)	Exam	Total
	Hours	35	42	105	3.2	185
Credit points	3 semester credit unit (SCU) equivalen 6.64 ECTS					
Required prerequisites for joining the module	None					
Recommended prerequisites for joining the module	None					
Module objectives/intended learning outcomes	<p>PLO 4 Having understanding of the theories and advancements in the forestry industry basic science, cultivation, management, technology, and conservation.</p> <p>PLO 5 Capable of demonstrating independent and team work, quality and measurable performance, able to apply various methods of science and technology in forestry issue identification and solving.</p> <p>PLO 7 Capable of arranging scientific research, compile the scientific and non-scientific reports in the form of thesis and prevent the plagiarism.</p> <p>PLO 11 Having skill to elaborate the forest resources conservation efforts, including provide the solution alternatives, community collaborations, prioritizing a holistic approach (ecological, economic and socio-cultural) in forest resources conservation</p>					
Content	<ol style="list-style-type: none"> Lecture contract and introduction to passive remote sensing sensors for landscape analysis Spectral Index Monitoring forest landscapes using active remote sensing (SAR) sensors 					

	<ol style="list-style-type: none"> 4. Detection, estimation and spatial modeling of Deforestation and Degradation of Forest landscapes 5. Dynamic spatial modeling of forest landscapes 6. Landscape metric and its application in landscape modeling 7. Spatial modeling of habitat preferences and animal corridors 8. Spatial Analysis of Ecotourism Landscape 9. Spatial Analysis of Mangrove Ecosystems 10. Spatial Analysis Using UAVs 11. Spatial Modeling of Disturbed Landscapes 12. Spatial Modeling Using MCA 13. Land Use Optimization in the Landscape 14. RAF Concept 																								
Examination forms	<ul style="list-style-type: none"> • Quiz: Short questions related to the lecture subject (topic) given to students at the beginning or end of the lecture. • Assignment: Assignments to deepen the lecture topics given to students after several lectures. • Project Based: Problem-based individual or group assignments to strengthen skills related to learning topics in several lectures. • Case Study: Individual or group assignments based on case study to strengthen skills related to learning topics in several lectures. • Middle Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in the first to seventh lectures. • Final Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in lectures after half a semester until the end of the semester. 																								
Study and examination requirements	<ul style="list-style-type: none"> - Minimum lecture attendance is 80%. - Weighting composition for the final grade is quiz (5%), Assignment (5%), Project Based (25%), Case Study (25%), Middle Exam (20%), and Final Exam (20%). - Final grade is defined as: <table border="1" style="margin-left: 40px;"> <thead> <tr> <th>Score</th> <th>Grade</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>≥ 80</td> <td>A</td> <td>4</td> </tr> <tr> <td>75 - < 80</td> <td>B+</td> <td>3,5</td> </tr> <tr> <td>70 - < 75</td> <td>B</td> <td>3</td> </tr> <tr> <td>65 - < 70</td> <td>C+</td> <td>2,5</td> </tr> <tr> <td>60 - < 65</td> <td>C</td> <td>2</td> </tr> <tr> <td>50 - < 60</td> <td>D</td> <td>1</td> </tr> <tr> <td>< 50</td> <td>E</td> <td>0</td> </tr> </tbody> </table>	Score	Grade	Value	≥ 80	A	4	75 - < 80	B+	3,5	70 - < 75	B	3	65 - < 70	C+	2,5	60 - < 65	C	2	50 - < 60	D	1	< 50	E	0
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Learning media	Class room, TV Projector, In Focus, Power Point																								
Reading List	<ol style="list-style-type: none"> 1. Basic Concepts of Geographic Information Systems. Author: Eddy Prahasta. 2001. Informatika Bandung Publishing House. Bandung. 2. Geographic Information System Applications for Forestry. Author: I Nengah Surati Jaya. 2002. Faculty of Forestry, IPB. Bogor. 3. Maguire, D and M.F. Goodchild. 1991. Geographical Information System: Principles and Application. Longman Scientific and Technical. New York 																								

	<ol style="list-style-type: none"> 4. Richards, J. A. 1993. Remote Digital Image Analysis: An Introduction. Springer Verlag. New York 5. Young, R.H., D.R. Green and S. Cousins. 1993. Landscape Ecology and GIS. Taylor and Francis. London 6. Remote Sensing, Satellite Image Analysis and Interpretation Methods. Indarto. 2016. Andi Publishers. 7. Radar Remote Sensing. Ardiansyah & Rokhmatuloh. 2016. LABSIG INDERAJA ISLIM Jakarta. 8. Mapping Using UAVs. Komang Sri Hartini et al. 2019. Ministry of Public Works and Public Housing.
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Module designation	Conservation of Rare Plants					
Subtitle	Konservasi Tumbuhan Langka					
Code	IKH 2 641					
The year in which the module is taught						
Person responsible for the module	Dr. Ir Ma'rifatin Zahrah M.Si					
Lecturer						
Language	Indonesia / English					
Relation to curriculum	Compulsory / elective / specialisation Names of other study programmes with which the module is shared					
Teaching methods	Lecture and discussion: 150 minute, 14 Lecturer = 35 hour Structured Activities: 180 minute, 14 activities = 42 hour Self Learning (Individual/Group Project): 450 minute, 14 week = 105 hour Middle exam: 100 minute = 1.6 hour Final exam: 100 minute = 1,6 hour					
Workload (incl. contact hours, self-study hours)	Activity	Lecture and Discussion	Structured Activites	Self Learning (Individual / Group Project)	Exam	Total
	Hours	35	42	105	3.2	185
Credit points	3 semester credit unit (SCU) equivalen 6.64 ECTS					
Required prerequisites for joining the module	None					
Recommended prerequisites for joining the module	None					
Module objectives/intended learning outcomes	<p>PLO 4 Having understanding of the theories and advancements in the forestry industry basic science, cultivation, management, technology, and conservation.</p> <p>PLO 5 Capable of demonstrating independent and team work, quality and measurable performance, able to apply various methods of science and technology in forestry issue identification and solving.</p> <p>PLO 11 Having skill to elaborate the forest resources conservation efforts, including provide the solution alternatives, community collaborations, prioritizing a holistic approach (ecological, economic and socio-cultural) in forest resources conservation</p>					
Content	<ol style="list-style-type: none"> 1. Introduction to rare plant conservation, definition and classification of rare plants 2. Indonesian plant biodiversity, IUCN Red List 3. Ecology, habitat degradation, exploitation, climate change 4. Inventory techniques, population monitoring 5. Conservation Law, CITES Convention, CBD 6. Conservation areas, national parks, nature reserves 7. Botanical gardens, gene banks, tissue culture 8. Midterm exam 9. Biotechnology, GIS, DNA barcoding 10. Community-based conservation 11. National and international case studies 					

	<p>12. Project design studies 13. Conservation research models 14. Simple research proposals 15. Mini results seminar 16. Final exam</p>																								
Examination forms	<ul style="list-style-type: none"> • Quiz: Short questions related to the lecture subject (topic) given to students at the beginning or end of the lecture. • Assignment: Assignments to deepen the lecture topics given to students after several lectures. • Project Based: Problem-based individual or group assignments to strengthen skills related to learning topics in several lectures. • Case Study: Individual or group assignments based on case study to strengthen skills related to learning topics in several lectures. • Midle Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in the first to seventh lectures. • Final Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in lectures after half a semester until the end of the semester. 																								
Study and examination requirements	<ul style="list-style-type: none"> - Minimum lecture attendance is 80%. - Weighting composition for the final grade is quiz (5%), Assignment (5%), Project Based (25%), Case Study (25%), Midle Exam (20%), and Final Exam (20%). - Final grade is defined as: <table border="1" style="margin-left: 40px;"> <thead> <tr> <th>Score</th> <th>Grade</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>≥ 80</td> <td>A</td> <td>4</td> </tr> <tr> <td>75 - < 80</td> <td>B+</td> <td>3,5</td> </tr> <tr> <td>70 - < 75</td> <td>B</td> <td>3</td> </tr> <tr> <td>65 - < 70</td> <td>C+</td> <td>2,5</td> </tr> <tr> <td>60 - < 65</td> <td>C</td> <td>2</td> </tr> <tr> <td>50 - < 60</td> <td>D</td> <td>1</td> </tr> <tr> <td>< 50</td> <td>E</td> <td>0</td> </tr> </tbody> </table>	Score	Grade	Value	≥ 80	A	4	75 - < 80	B+	3,5	70 - < 75	B	3	65 - < 70	C+	2,5	60 - < 65	C	2	50 - < 60	D	1	< 50	E	0
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Learning media	Class room, TV Projector, In Focus, Power Point																								
Reading List	<ol style="list-style-type: none"> 1. Primack, R. & Corlett, R. (2020). Tropical Rain Forests and Biodiversity Conservation. 2. Sodhi, N.S. & Ehrlich, P.R. (2019). Conservation Biology for All. 3. Suhardjono, P. (2017). Indonesian Plant Conservation. LIPI Botanical Garden Plant Conservation Center. 																								

Module designation	Ethnobotany					
Subtitle	Etnobotani					
Code	IKH 2 642					
The year in which the module is taught						
Person responsible for the module	Dr. Ir Ma'rifatin Zahrah M.Si					
Lecturer	Prof Dr. Arida Susilowati S.Hut., M.Si Dr. Alfian Gunawan Ahmad S.Hut., M.Si.					
Language	Indonesia / English					
Relation to curriculum	Compulsory / elective / specialisation Names of other study programmes with which the module is shared					
Teaching methods	Lecture and discussion: 150 minute, 14 Lecturer = 35 hour Structured Activities: 180 minute, 14 activities = 42 hour Self Learning (Individual/Group Project): 450 minute, 14 week = 105 hour Middle exam: 100 minute = 1.6 hour Final exam: 100 minute = 1,6 hour					
Workload (incl. contact hours, self-study hours)	Activity	Lecture and Discussion	Structured Activites	Self Learning (Individual / Group Project)	Exam	Total
	Hours	35	42	105	3.2	185
Credit points	3 semester credit unit (SCU) equivalen 6.64 ECTS					
Required prerequisites for joining the module	None					
Recommended prerequisites for joining the module	None					
Module objectives/intended learning outcomes	<p>PLO 4 Having understanding of the theories and advancements in the forestry industry basic science, cultivation, management, technology, and conservation.</p> <p>PLO 5 Capable of demonstrating independent and team work, quality and measurable performance, able to apply various methods of science and technology in forestry issue identification and solving.</p> <p>PLO 6 Capable of making appropriate decisions based on standard procedures and data, in communication, supervision and evaluation of work in forestry field. fforts at various levels (genetic, species and ecosystem)</p> <p>PLO 11 Having skill to elaborate the forest resources conservation efforts, including provide the solution alternatives, community collaborations, prioritizing a holistic approach (ecological, economic and socio-cultural) in forest resources conservation</p>					
Content	<p>1. Introduction:</p> <ul style="list-style-type: none"> - Course Contract - Course scope - Course objectives. - History of Ethnobotany <p>2. Knowledge of ethnobotany</p> <ul style="list-style-type: none"> - Definition of ethnobotany 					

	<ul style="list-style-type: none"> - Status of ethnobotanical knowledge in Indonesia - Scope of ethnobotany 3. Knowledge of ethnobotany: <ul style="list-style-type: none"> - Utilization of vegetable sources in Indonesia - The future of ethnobotany - Modern ethnobotany 4. Types of plants used in religious/adat ceremonies, traditional medicine and fitness/essential oils (Presentation 1) 5. Types of plants as pesticides and natural dyes, beauty (Presentation 2) 6. Bioprospection: <ul style="list-style-type: none"> - Definition of bioprospection - Indonesia's bioprospection potential - The role of bioprospection in biodiversity conservation 7. Ethnobotanical research methods and data 8. Fieldtrip 1 9. Presentation of field trip results 10. EthnoEcology <ul style="list-style-type: none"> - Limitations - The concept of ethnoecology - Forms of ethnoecology in various ethnicities 11. Ethnoecology assignment presentation, Ethnoecology research methods and data 12. Field Trip 2 																								
Examination forms	<ul style="list-style-type: none"> • Assignment: Assignments to deepen the lecture topics given to students after several lectures. • Project Based: Problem-based individual or group assignments to strengthen skills related to learning topics in several lectures. • Case Study: Individual or group assignments based on case study to strengthen skills related to learning topics in several lectures. • Midle Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in the first to seventh lectures. • Final Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in lectures after half a semester until the end of the semester. 																								
Study and examination requirements	<ul style="list-style-type: none"> - Minimum lecture attendance is 80%. - Weighting composition for the final grade is Assignment (15%), Project Based (30%), Case Study (25%). Midle Exam (15%), and Final Exam (15%). - Final grade is defined as: <table border="1" style="margin-left: 20px; border-collapse: collapse; width: 100%;"> <thead> <tr> <th style="text-align: center;">Score</th> <th style="text-align: center;">Grade</th> <th style="text-align: center;">Value</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">≥ 80</td> <td style="text-align: center;">A</td> <td style="text-align: center;">4</td> </tr> <tr> <td style="text-align: center;">75 - < 80</td> <td style="text-align: center;">B+</td> <td style="text-align: center;">3,5</td> </tr> <tr> <td style="text-align: center;">70 - < 75</td> <td style="text-align: center;">B</td> <td style="text-align: center;">3</td> </tr> <tr> <td style="text-align: center;">65 - < 70</td> <td style="text-align: center;">C+</td> <td style="text-align: center;">2,5</td> </tr> <tr> <td style="text-align: center;">60 - < 65</td> <td style="text-align: center;">C</td> <td style="text-align: center;">2</td> </tr> <tr> <td style="text-align: center;">50 - < 60</td> <td style="text-align: center;">D</td> <td style="text-align: center;">1</td> </tr> <tr> <td style="text-align: center;">< 50</td> <td style="text-align: center;">E</td> <td style="text-align: center;">0</td> </tr> </tbody> </table> 	Score	Grade	Value	≥ 80	A	4	75 - < 80	B+	3,5	70 - < 75	B	3	65 - < 70	C+	2,5	60 - < 65	C	2	50 - < 60	D	1	< 50	E	0
Score	Grade	Value																							
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70 - < 75	B	3																							
65 - < 70	C+	2,5																							
60 - < 65	C	2																							
50 - < 60	D	1																							
< 50	E	0																							

Learning media	Class room, TV Projector, In Focus, Power Point
Reading List	<ol style="list-style-type: none"> 1. Cotton, C. M. (1996). <i>Ethnobotany: Principles and Applications</i>. John Wiley & Sons. 2. Martin, G. J. (1995). <i>Ethnobotany: A Methods Manual</i>. Chapman & Hall. 3. Hernández, T. (2004). <i>Ethnobotany: The Future of Biodiversity</i>. In: <i>Biodiversity and Conservation</i> (pp. 123-138). Springer. 4. Jain, S. K. (1991). <i>Dictionary of Indian Folk Medicine and Ethnobotany</i>. Deep Publications. 5. Farnsworth, N. R., & Soejarto, D. D. (1991). <i>Global Importance of Medicinal Plants</i>. In: <i>Medicinal Plants: A Global Perspective</i> (pp. 25-51). World Health Organization. 6. Pardo-de-Santayana, M., et al. (2005). <i>Ethnobotany in the Mediterranean Area</i>. In: <i>Ethnobotany in the Mediterranean Region</i> (pp. 1-25). Springer.

Module designation	Disaster Mitigation Due to Climate Change					
Subtitle	Mitigasi Bencana Akibat Perubahan Iklim					
Code	IKH 2 643					
The year in which the module is taught						
Person responsible for the module	Dr. Achmad Siddik Thoha S.Hut., M.Si.					
Lecturer	Dr. Alfian Gunawan Ahmad S.Hut., M.Si. Dr. Nurdin Sulistiyono S.Hut., M.Si.					
Language	Indonesia / English					
Relation to curriculum	Compulsory / elective / specialisation Names of other study programmes with which the module is shared					
Teaching methods	Lecture and discussion: 150 minute, 14 Lecturer = 35 hour Structured Activities: 180 minute, 14 activities = 42 hour Self Learning (Individual/Group Project): 450 minute, 14 week = 105 hour Midle exam: 100 minute = 1.6 hour Final exam: 100 minute = 1,6 hour					
Workload (incl. contact hours, self-study hours)	Activity	Lecture and Discussion	Structured Activites	Self Learning (Individual / Group Project)	Exam	Total
	Hours	35	42	105	3.2	185
Credit points	3 semester credit unit (SCU) equivalen 6.64 ECTS					
Required prerequisites for joining the module	None					
Recommended prerequisites for joining the module	None					
Module objectives/intended learning outcomes	<p>PLO 4 Having understanding of the theories and advancements in the forestry industry basic science, cultivation, management, technology, and conservation.</p> <p>PLO 5 Capable of demonstrating independent and team work, quality and measurable performance, able to apply various methods of science and technology in forestry issue identification and solving.</p> <p>PLO 11 Having skill to elaborate the forest resources conservation efforts, including provide the solution alternatives, community collaborations, prioritizing a holistic approach (ecological, economic and socio-cultural) in forest resources conservation</p>					
Content	<ol style="list-style-type: none"> 1. Introduction, Course Contract and Course Material Coverage, Relationship between Climate Change and Disasters 2. Characteristics of Natural Disasters: Earthquakes, Volcanic Eruptions, Tsunamis 3. Characteristics of Hydrometeorological Disasters: Floods, Flash Floods, Landslides 4. Characteristics of Hydrometeorological Disasters: Forest and Land Fires and Droughts 5. Disaster Management and Early Warning Systems 6. Forest Ecosystem Services in Disaster Prevention and Protection 7. Disaster Mitigation through Forest Management 					

	<p>8. MID-SEMESTER EXAM</p> <p>9. The Role of Forests in Reducing Disaster Risk</p> <p>10. Integration of Disaster Risk Reduction in Development Policy</p> <p>11. The Role of Mangrove Forests in Disaster Mitigation</p> <p>12. Spatial Planning in Disaster Risk Reduction</p> <p>13. Analysis of Disaster Losses</p> <p>14. Spatial Analysis in Disaster Mitigation</p> <p>15. Statistical Analysis in Disaster Mitigation Studies</p> <p>16. FINAL EXAM</p>																								
Examination forms	<ul style="list-style-type: none"> • Quiz: Short questions related to the lecture subject (topic) given to students at the beginning or end of the lecture. • Assignment: Assignments to deepen the lecture topics given to students after several lectures. • Project Based: Problem-based individual or group assignments to strengthen skills related to learning topics in several lectures. • Case Study: Individual or group assignments based on case study to strengthen skills related to learning topics in several lectures. • Midle Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in the first to seventh lectures. • Final Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in lectures after half a semester until the end of the semester. 																								
Study and examination requirements	<ul style="list-style-type: none"> - Minimum lecture attendance is 80%. - Weighting composition for the final grade is quiz (5%), Assignment (5%), Project Based (25%), Case Study (25%). Midle Exam (20%), and Final Exam (20%). - Final grade is defined as: <table border="1"> <thead> <tr> <th>Score</th> <th>Grade</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>≥ 80</td> <td>A</td> <td>4</td> </tr> <tr> <td>75 - < 80</td> <td>B+</td> <td>3,5</td> </tr> <tr> <td>70 - < 75</td> <td>B</td> <td>3</td> </tr> <tr> <td>65 - < 70</td> <td>C+</td> <td>2,5</td> </tr> <tr> <td>60 - < 65</td> <td>C</td> <td>2</td> </tr> <tr> <td>50 - < 60</td> <td>D</td> <td>1</td> </tr> <tr> <td>< 50</td> <td>E</td> <td>0</td> </tr> </tbody> </table>	Score	Grade	Value	≥ 80	A	4	75 - < 80	B+	3,5	70 - < 75	B	3	65 - < 70	C+	2,5	60 - < 65	C	2	50 - < 60	D	1	< 50	E	0
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Learning media	Class room, TV Projector, In Focus, Power Point																								
Reading List	<ol style="list-style-type: none"> 1. Committee on Assessing and Valuing the Services of Aquatic and Related Terrestrial Ecosystems. 2004. Valuing Ecosystem Services: Toward Better Environmental Decision-Making water science and technology board. national research council of the national academies. The National Academies Press. Washington, D.C. 2. De Groot. 2002. A Typology for the Classification Description and Valuation of Ecosystem Functions, Goods and Services. Ecological Economics 41 (3): 393-408 3. Millennium Ecosystem Assessment, 2005. Ecosystems and Human Well-being: Synthesis. Island Press, Washington, DC. 4. [NDMA] National Disaster Management Agency. 2016. Disaster Risk in Indonesia. Director of Disaster Risk Reduction (Jakarta-BNPB) 																								

Module designation	Peat Ecosystem Conservation Strategy					
Subtitle	Strategi Konservasi Ekosistem Gambut					
Code	IKH 2 644					
The year in which the module is taught						
Person responsible for the module	Dr. Alfian Gunawan Ahmad S.Hut, M.Si					
Lecturer						
Language	Indonesia / English					
Relation to curriculum	Compulsory / elective / specialisation Names of other study programmes with which the module is shared					
Teaching methods	Lecture and discussion: 150 minute, 14 Lecturer = 35 hour Structured Activities: 180 minute, 14 activities = 42 hour Self Learning (Individual/Group Project): 450 minute, 14 week = 105 hour Middle exam: 100 minute = 1.6 hour Final exam: 100 minute = 1,6 hour					
Workload (incl. contact hours, self-study hours)	Activity	Lecture and Discussion	Structured Activities	Self Learning (Individual / Group Project)	Exam	Total
	Hours	35	42	105	3.2	185
Credit points	3 semester credit unit (SCU) equivalent 6.64 ECTS					
Required prerequisites for joining the module	None					
Recommended prerequisites for joining the module	None					
Module objectives/intended learning outcomes	<p>PLO 4 Having understanding of the theories and advancements in the forestry industry basic science, cultivation, management, technology, and conservation.</p> <p>PLO 6 Capable of making appropriate decisions based on standard procedures and data, in communication, supervision and evaluation of work in forestry field. efforts at various levels (genetic, species and ecosystem)</p> <p>PLO 11 Having skill to elaborate the forest resources conservation efforts, including provide the solution alternatives, community collaborations, prioritizing a holistic approach (ecological, economic and socio-cultural) in forest resources conservation</p>					
Content	<ol style="list-style-type: none"> 1. Introduction to peat ecosystems, distribution, and ecological functions 2. Morphology, hydrology, and classification of peatlands 3. Carbon stocks, GHG emissions, role of hydrology 4. Deforestation, drainage, land conversion, fires 5. Land conflicts, livelihoods, social policies 6. Government Regulation No. 71/2014, BRGM, National Peatland Restoration 7. Rewetting, revegetation, revitalization 8. Midterm exam 9. Community-based peatland management 10. GIS, satellite monitoring, drones, biotechnology 					

	<p>11. UN-REDD, FAO, BRGM, NGOs, CIFOR</p> <p>12. Conservation planning models</p> <p>13. Multidisciplinary approaches</p> <p>14. Policy/restoration research proposals</p> <p>15. Mini-project results seminars</p> <p>16. Final exams</p>																								
Examination forms	<ul style="list-style-type: none"> • Quiz: Short questions related to the lecture subject (topic) given to students at the beginning or end of the lecture. • Assignment: Assignments to deepen the lecture topics given to students after several lectures. • Project Based: Problem-based individual or group assignments to strengthen skills related to learning topics in several lectures. • Case Study: Individual or group assignments based on case study to strengthen skills related to learning topics in several lectures. • Midle Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in the first to seventh lectures. • Final Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in lectures after half a semester until the end of the semester. 																								
Study and examination requirements	<ul style="list-style-type: none"> - Minimum lecture attendance is 80%. - Weighting composition for the final grade is quiz (5%), Assignment (5%), Project Based (25%), Case Study (25%). Midle Exam (20%), and Final Exam (20%). - Final grade is defined as: <table border="1" style="margin-left: 40px;"> <thead> <tr> <th>Score</th> <th>Grade</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>≥ 80</td> <td>A</td> <td>4</td> </tr> <tr> <td>75 - < 80</td> <td>B+</td> <td>3,5</td> </tr> <tr> <td>70 - < 75</td> <td>B</td> <td>3</td> </tr> <tr> <td>65 - < 70</td> <td>C+</td> <td>2,5</td> </tr> <tr> <td>60 - < 65</td> <td>C</td> <td>2</td> </tr> <tr> <td>50 - < 60</td> <td>D</td> <td>1</td> </tr> <tr> <td>< 50</td> <td>E</td> <td>0</td> </tr> </tbody> </table>	Score	Grade	Value	≥ 80	A	4	75 - < 80	B+	3,5	70 - < 75	B	3	65 - < 70	C+	2,5	60 - < 65	C	2	50 - < 60	D	1	< 50	E	0
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Learning media	Class room, TV Projector, In Focus, Power Point																								
Reading List	<ol style="list-style-type: none"> 1. Page, S.E. & Rieley, J.O. (2016). Tropical Peatland Ecosystems. Springer. 2. Wibisono, I.T.C., et al. (2019). National Strategy for Peatland Ecosystem Restoration. BRGM. 3. Rieley, J.O. & Page, S.E. (2005). Wise Use of Tropical Peatlands: Focus on Southeast Asia. 4. Agus, F. & Subiksa, I.G.M. (2008). Peatlands: Potential for Agriculture and Environmental Aspects. Soil Research Center. 																								

Module designation	Urban Forest Landscape Conservation					
Subtitle	Konservasi Lanskap Hutan Kota					
Code	IKH 2 645					
The year in which the module is taught						
Person responsible for the module	Dr. Alfian Gunawan Ahmad S.Hut, M.Si					
Lecturer						
Language	Indonesia / English					
Relation to curriculum	Compulsory / elective / specialisation Names of other study programmes with which the module is shared					
Teaching methods	Lecture and discussion: 150 minute, 14 Lecturer = 35 hour Structured Activities: 180 minute, 14 activities = 42 hour Self Learning (Individual/Group Project): 450 minute, 14 week = 105 hour Middle exam: 100 minute = 1.6 hour Final exam: 100 minute = 1,6 hour					
Workload (incl. contact hours, self-study hours)	Activity	Lecture and Discussion	Structured Activites	Self Learning (Individual / Group Project)	Exam	Total
	Hours	35	42	105	3.2	185
Credit points	3 semester credit unit (SCU) equivalen 6.64 ECTS					
Required prerequisites for joining the module	none					
Recommended prerequisites for joining the module	none					
Module objectives/intended learning outcomes	<p>PLO 4 Having understanding of the theories and advancements in the forestry industry basic science, cultivation, management, technology, and conservation.</p> <p>PLO 6 Capable of making appropriate decisions based on standard procedures and data, in communication, supervision and evaluation of work in forestry field. fforts at various levels (genetic, species and ecosystem)</p> <p>PLO 11 Having skill to elaborate the forest resources conservation efforts, including provide the solution alternatives, community collaborations, prioritizing a holistic approach (ecological, economic and socio-cultural) in forest resources conservation</p>					
Content	<ol style="list-style-type: none"> 1. Introduction: landscape ecology, urban forest functions 2. Ecological, social, and aesthetic functions of urban forests 3. Vegetation structure, biodiversity, microclimate 4. Green corridor concept, urban green network 5. Fragmentation, pollution, socioeconomic pressures 6. Landscape ecology principles in urban spatial planning 7. Law No. 26/2007, Government Regulation No. 63/2002, local regulations 8. Midterm exam 9. Urban forestry, green building, smart landscape 10. Social approach, community-based planning 11. Examples: Jakarta, Bandung, Tokyo, Singapore 					

	<p>12. Spatial planning and adaptive vegetation 13. Collaborative and adaptive management 14. Conservation model design and policy 15. Mini project results seminar 16. Final exam</p>																								
Examination forms	<ul style="list-style-type: none"> • Quiz: Short questions related to the lecture subject (topic) given to students at the beginning or end of the lecture. • Assignment: Assignments to deepen the lecture topics given to students after several lectures. • Project Based: Problem-based individual or group assignments to strengthen skills related to learning topics in several lectures. • Case Study: Individual or group assignments based on case study to strengthen skills related to learning topics in several lectures. • Midle Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in the first to seventh lectures. • Final Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in lectures after half a semester until the end of the semester. 																								
Study and examination requirements	<ul style="list-style-type: none"> - Minimum lecture attendance is 80%. - Weighting composition for the final grade is quiz (5%), Assignment (5%), Project Based (25%), Case Study (25%), Midle Exam (20%), and Final Exam (20%). - Final grade is defined as: <table border="1" style="margin-left: 40px;"> <thead> <tr> <th>Score</th> <th>Grade</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>≥ 80</td> <td>A</td> <td>4</td> </tr> <tr> <td>75 - < 80</td> <td>B+</td> <td>3,5</td> </tr> <tr> <td>70 - < 75</td> <td>B</td> <td>3</td> </tr> <tr> <td>65 - < 70</td> <td>C+</td> <td>2,5</td> </tr> <tr> <td>60 - < 65</td> <td>C</td> <td>2</td> </tr> <tr> <td>50 - < 60</td> <td>D</td> <td>1</td> </tr> <tr> <td>< 50</td> <td>E</td> <td>0</td> </tr> </tbody> </table>	Score	Grade	Value	≥ 80	A	4	75 - < 80	B+	3,5	70 - < 75	B	3	65 - < 70	C+	2,5	60 - < 65	C	2	50 - < 60	D	1	< 50	E	0
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Learning media	Class room, TV Projector, In Focus, Power Point																								
Reading List	<ol style="list-style-type: none"> 1. Forman, R.T.T. (2014). Urban Ecology: Science of Cities. Cambridge University Press. 2. McHarg, I. (1992). Design with Nature. Wiley. 3. Miller, R.W. (2015). Urban Forestry: Planning and Managing Urban Greenspaces. Waveland Press. 4. Sukwika, T., et al. (2021). Urban Forests and Urban Landscapes in Indonesia. IPB Press. 																								

Matriculation Courses

Module designation	Forest Management					
Subtitle	Manajemen Hutan					
Code	IKH 0 6001					
The year in which the module is taught						
Person responsible for the module	Prof. Ir. Siti Latifah S.Hut, M.Si, Ph.D, IPU					
Lecturer	Dr. Samsuri S.Hut., M.Si. Dr. Oding Affandi S.Hut., MP. Dr. OK Hasnanda Syahputra, MP					
Language	Indonesia / English					
Relation to curriculum	Compulsory / elective / specialisation Names of other study programmes with which the module is shared					
Teaching methods	Lecture and discussion: 100 minute, 14 Lecturer = 23.33 hour Structured Activities: 120 minute, 14 activities = 24 hour Self Learning (Individual/Group Project): 300 minute, 14 week = 84 hour Middle exam: 100 minute = 1.6 hour Final exam: 100 minute = 1,6 hour					
Workload (incl. contact hours, self-study hours)	Activity	Lecture and Discussion	Structured Activities	Self Learning (Individual / Group Project)	Exam	Total
	Hours	23.33	24	84	3.2	134.53
Credit points	2 semester credit unit (SCU) equivalen 4.43 ECTS					
Required prerequisites for joining the module	none					
Recommended prerequisites for joining the module	none					
Module objectives/intended learning outcomes	<p>PLO 4 Having understanding of the theories and advancements in the forestry industry basic science, cultivation, management, technology, and conservation.</p> <p>PLO 7 Capable of arranging scientific research, compile the scientific and non-scientific reports in the form of thesis and prevent the plagiarism.</p> <p>PLO 8 Having skill to enhance the sustainable forest resource management, including watershed management, forest assessment, socio-economics, communication, as well as adapting to developments through various technological approaches: GIS, drones and info</p>					
Content	<p>Study materials (teaching materials):</p> <ol style="list-style-type: none"> 1. Introduction to Forest Management 2. Sustainable Forest Management 3. Growth of a stand 4. Customary forest management 5. Forest Management Unit (FMU) 6. Land classification and land prescription 7. Normal Forest 8. Result Setting I (component of result setting) 9. Result Setting II (result setting method) 					

	<p>10. Site Classification 11. Stand Density Setting 12. Preparation of Forest Management Plan 13. Socio-Economic and Financial Aspects of Forest Management 14. Assessment of Tangible and Intentiible Benefits of Forests in Forest Management</p>																								
Examination forms	<ul style="list-style-type: none"> • Quiz: Short questions related to the lecture subject (topic) given to students at the beginning or end of the lecture. • Assignment: Assignments to deepen the lecture topics given to students after several lectures. • Project Based: Problem-based individual or group assignments to strengthen skills related to learning topics in several lectures. • Case Study: Individual or group assignments based on case study to strengthen skills related to learning topics in several lectures. • Midle Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in the first to seventh lectures. • Final Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in lectures after half a semester until the end of the semester. 																								
Study and examination requirements	<ul style="list-style-type: none"> - Minimum lecture attendance is 80%. - Weighting composition for the final grade is quiz (10%), Assignment (10%), Project Based (25%), Case Study (25%). Midle Exam (15%), and Final Exam (15%). - Final grade is defined as: <table border="1" style="margin-left: 40px;"> <thead> <tr> <th>Score</th> <th>Grade</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>≥ 80</td> <td>A</td> <td>4</td> </tr> <tr> <td>75 - < 80</td> <td>B+</td> <td>3,5</td> </tr> <tr> <td>70 - < 75</td> <td>B</td> <td>3</td> </tr> <tr> <td>65 - < 70</td> <td>C+</td> <td>2,5</td> </tr> <tr> <td>60 - < 65</td> <td>C</td> <td>2</td> </tr> <tr> <td>50 - < 60</td> <td>D</td> <td>1</td> </tr> <tr> <td>< 50</td> <td>E</td> <td>0</td> </tr> </tbody> </table>	Score	Grade	Value	≥ 80	A	4	75 - < 80	B+	3,5	70 - < 75	B	3	65 - < 70	C+	2,5	60 - < 65	C	2	50 - < 60	D	1	< 50	E	0
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< 50	E	0																							
Learning media	Class room, TV Projector, In Focus, Power Point.																								
Reading List	<ol style="list-style-type: none"> 1. Forest Management Textbook (2022) 2. Forest Management (Davis, L.S. and K.N. Johnson, 1987) 3. Forest Management and Economics (Buongiorno and Giles, 1986) 4. Timber Management: A Quantitative Approach (Clutter, J. et al, 1988) 5. Forest Management: Regulation and Valuation (Kenneth P. Davis, 1966) 																								

Module designation	Silviculture						
Subtitle	Silvikultur						
Code	IKH 0 6002						
The year in which the module is taught							
Person responsible for the module	Dr. Kansih Sri Hartini S.Hut., MP.						
Lecturer	Prof. Dr. Arida Susilowati S.Hut., M.Si Prof. Dr. Delvian SP., MP.						
Language	Indonesia / English						
Relation to curriculum	Compulsory / elective / specialisation Names of other study programmes with which the module is shared						
Teaching methods	Lecture and discussion: 100 minute, 14 Lecturer = 23.33 hour Structured Activities: 120 minute, 14 activities = 24 hour Self Learning (Individual/Group Project): 300 minute, 14 week = 84 hour Midle exam: 100 minute = 1.6 hour Final exam: 100 minute = 1,6 hour						
Workload (incl. contact hours, self-study hours)	Activity	Lecture and Discussion	Structured Activites	Self Learning (Individual / Group Project)	Exam	Total	
	Hours	23.33	24	84	3.2	134.53	
Credit points	2 semester credit unit (SCU) equivalen 4.43 ECTS						
Required prerequisites for joining the module	none						
Recommended prerequisites for joining the module	none						
Module objectives/intended learning outcomes	<p>PLO 4 Having understanding of the theories and advancements in the forestry industry basic science, cultivation, management, technology, and conservation.</p> <p>PLO 5 Capable of demonstrating independent and team work, quality and measurable performance, able to apply various methods of science and technology in forestry issue identification and solving.</p> <p>PLO 9 Having skill to innovate forest cultivation, including biotechnology and other silvicultural activities in forest rehabilitation and reforestation effort.</p>						
Content	<p>Study materials (teaching materials):</p> <ol style="list-style-type: none"> 1. Silviculture Concept 2. Sustainable Forest Concept 3. Application of Silviculture 4. Silviculture System Concept 5. World Silviculture System 6. Silviculture System in Indonesia 7. Silviculture Systems Analysis 						
Examination forms	<ul style="list-style-type: none"> • Quiz: Short questions related to the lecture subject (topic) given to students at the beginning or end of the lecture. • Assignment: Assignments to deepen the lecture topics given to students after several lectures. 						

	<ul style="list-style-type: none"> • Project Based: Problem-based individual or group assignments to strengthen skills related to learning topics in several lectures. • Case Study: Individual or group assignments based on case study to strengthen skills related to learning topics in several lectures. • Midle Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in the first to seventh lectures. • Final Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in lectures after half a semester until the end of the semester. 																								
Study and examination requirements	<ul style="list-style-type: none"> - Minimum lecture attendance is 80%. - Weighting composition for the final grade is quiz (10%), Assignment (10%), Project Based (25%), Case Study (25%). Midle Exam (15%), and Final Exam (15%). - Final grade is defined as: <table border="1"> <thead> <tr> <th>Score</th> <th>Grade</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>≥ 80</td> <td>A</td> <td>4</td> </tr> <tr> <td>75 - < 80</td> <td>B+</td> <td>3,5</td> </tr> <tr> <td>70 - < 75</td> <td>B</td> <td>3</td> </tr> <tr> <td>65 - < 70</td> <td>C+</td> <td>2,5</td> </tr> <tr> <td>60 - < 65</td> <td>C</td> <td>2</td> </tr> <tr> <td>50 - < 60</td> <td>D</td> <td>1</td> </tr> <tr> <td>< 50</td> <td>E</td> <td>0</td> </tr> </tbody> </table> 	Score	Grade	Value	≥ 80	A	4	75 - < 80	B+	3,5	70 - < 75	B	3	65 - < 70	C+	2,5	60 - < 65	C	2	50 - < 60	D	1	< 50	E	0
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65 - < 70	C+	2,5																							
60 - < 65	C	2																							
50 - < 60	D	1																							
< 50	E	0																							
Learning media	Class room, TV Projector, In Focus, Power Point.																								
Reading List	<ol style="list-style-type: none"> 1. Main: Write down the main literature used, including the teaching materials compiled by this MK lecturer. Please adjust. 2. Forestry Manual; Ministry of Forestry of the Republic of Indonesia 1992 3. Indonesian Forestry Guide 4. Intensive Silviculture Engineering (SILIN); Soekotjo, Gadjah Mada University Press, 2009 5. Guide to Rehabilitation and Silviculture Techniques in Peatlands, Wibisono et al., Wetlands International-IP, 2005 6. Silviculture in the Tropics; Sven Gunter et al., Springer, 2011 7. Silviculture: Concepts and Applications, Third Edition; Ralph D Nyland, Waveland Press, 2016. 																								

Module designation	Structure and Properties of Wood					
Subtitle	Struktur dan Sifat Kayu					
Code	IKH 0 6003					
The year in which the module is taught						
Person responsible for the module	Dr. Luthfi Hakim, S.Hut., M.Si.					
Lecturer	Dr. Evalina Herawati, S.Hut., M.Si. Prof. Apri Heri Iswanto, S.Hut., M.Si. Prof. Dr. Rudi Hartono, S.Hut., M.Si.					
Language	Indonesia / English					
Relation to curriculum	Compulsory / elective / specialisation Names of other study programmes with which the module is shared					
Teaching methods	Lecture and discussion: 100 minute, 14 Lecturer = 23.33 hour Structured Activities: 120 minute, 14 activities = 24 hour Self Learning (Individual/Group Project): 300 minute, 14 week = 84 hour Middle exam: 100 minute = 1.6 hour Final exam: 100 minute = 1,6 hour					
Workload (incl. contact hours, self-study hours)	Activity	Lecture and Discussion	Structured Activites	Self Learning (Individual / Group Project)	Exam	Total
	Hours	23.33	24	84	3.2	134.53
Credit points	2 semester credit unit (SCU) equivalen 4.43 ECTS					
Required prerequisites for joining the module	none					
Recommended prerequisites for joining the module	none					
Module objectives/intended learning outcomes	<p>PLO 4 Having understanding of the theories and advancements in the forestry industry basic science, cultivation, management, technology, and conservation.</p> <p>PLO 5 Capable of demonstrating independent and team work, quality and measurable performance, able to apply various methods of science and technology in forestry issue identification and solving.</p> <p>PLO 10 Having skill to improve and to inovate timber and non-timber forest product technology, as well as value enhancement and business feasibility analysis of forest products.</p>					
Content	<p>Study materials (teaching materials):</p> <ol style="list-style-type: none"> Anatomical, chemical, physical and mechanical properties of wood, as well as an explanation of forests as a source of wood Important properties of wood (macroscopic properties: color, pattern, texture, direction of wood grain, gloss, touch effect, ash, wood hardness) Anatomical properties of broadleaf wood: types and functions of cells, pores, vessels, parenchyma and fingers Sapwood and sapwood: definition, differences and mechanisms of formation of sapwood and sapwood, as well as their properties 					

	<ol style="list-style-type: none"> 5. Juvenile wood and adult wood: the meaning of juvenile wood, the properties of juvenile wood and the difference between juvenile and adult wood 6. Definition of Physical Properties and Train <ul style="list-style-type: none"> - Definition of wood moisture content - Various water rates - How to calculate moisture content 7. Density, shrinkage and dimensional stability of Wood, as well as its calculations 8. Basic definition and statics <ul style="list-style-type: none"> - Definition of mechanical properties - Basic statics and strain stress curves - Full scale and small clear specimen testing 9. Mechanical properties of wood <ul style="list-style-type: none"> - Various mechanical properties of wood - How to calculate the mechanical properties of wood 10. Factors affecting the strength of wood <ul style="list-style-type: none"> - Wood defects - Other factors (not defects) 11. Chemical properties of wood <ul style="list-style-type: none"> - Understanding wood chemistry - Chemical components of wood 12. Chemical components of wood (cellulose, hemicellulose, lignin) 13. Distribution of chemical components in wood 14. Application of wood chemistry in Industry 																		
Examination forms	<ul style="list-style-type: none"> • Quiz: Short questions related to the lecture subject (topic) given to students at the beginning or end of the lecture. • Assignment: Assignments to deepen the lecture topics given to students after several lectures. • Project Based: Problem-based individual or group assignments to strengthen skills related to learning topics in several lectures. • Case Study: Individual or group assignments based on case study to strengthen skills related to learning topics in several lectures. • Midle Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in the first to seventh lectures. • Final Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in lectures after half a semester until the end of the semester. 																		
Study and examination requirements	<ul style="list-style-type: none"> - Minimum lecture attendance is 80%. - Weighting composition for the final grade is quiz (10%), Assignment (10%), Project Based (25%), Case Study (25%). Midle Exam (15%), and Final Exam (15%). - Final grade is defined as: <table border="1"> <thead> <tr> <th>Score</th> <th>Grade</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>≥ 80</td> <td>A</td> <td>4</td> </tr> <tr> <td>75 - < 80</td> <td>B+</td> <td>3,5</td> </tr> <tr> <td>70 - < 75</td> <td>B</td> <td>3</td> </tr> <tr> <td>65 - < 70</td> <td>C+</td> <td>2,5</td> </tr> <tr> <td>60 - < 65</td> <td>C</td> <td>2</td> </tr> </tbody> </table> 	Score	Grade	Value	≥ 80	A	4	75 - < 80	B+	3,5	70 - < 75	B	3	65 - < 70	C+	2,5	60 - < 65	C	2
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		50 - < 60	D	1	
		< 50	E	0	
Learning media	Class room, TV Projector, In Focus, Power Point.				
Reading List	<ol style="list-style-type: none"> 1. Haygreen, JG and Bowyer, JL. 2003. Forest Products and Wood Science, as an Introduction. Gadjah Mada University Press. Yogyakarta. 2. Pandit IKN. 1996. Anatomy, Growth and Quality of Wood. Forestry Science Study Program, Postgraduate Program 3. Pandit IKN. and Ramdan H. 2003. Anatomy of Wood: An Introduction to the Properties of Wood as a Raw Material. Faculty of Forestry IPB. 4. Porter T. 2006. Wood Identification and Use. Guild of Master Craftman Publication, Ltd. 5. Mardikanto TR, Karlinasari L, Bahtiar ET. 2011. Mechanical Properties of Wood. IPB Press. 6. Bahtiar ET. 2018. Material Strength (Theory, Case Examples, and Solutions). IPB Press. 7. Ambrose J. 2002. Simplified Mechanics and Strength of Materials. John Wiley and Sons, Inc. 8. Wood Hadbook: Wood as an Engineering Material. Chapter 4: Mechanical Properties. 2010. USDA FPL. 9. Achmadi, S. 1990. Wood Chemistry. Ministry of Education and Culture, Directorate General of Higher Education. Inter-University Center for Life Sciences, IPB. Bogor 				

Module designation	Forest Ecology					
Subtitle	Ekologi Hutan					
Code	IKH 0 6004					
The year in which the module is taught						
Person responsible for the module	Prof. Dr. Budi Utomo, S.P., M.P.					
Lecturer	Prof. Mohammad Basyuni, S.Hut., M.Si., Ph.D. Prof. Dr. Ir. Yunasfi, M.Si. Onrizal, S.Hut., M.Si., Ph.D.					
Language	Indonesia / English					
Relation to curriculum	Compulsory / elective / specialisation Names of other study programmes with which the module is shared					
Teaching methods	Lecture and discussion: 100 minute, 14 Lecturer = 23.33 hour Structured Activities: 120 minute, 14 activities = 24 hour Self Learning (Individual/Group Project): 300 minute, 14 week = 84 hour Middle exam: 100 minute = 1.6 hour Final exam: 100 minute = 1,6 hour					
Workload (incl. contact hours, self-study hours)	Activity	Lecture and Discussion	Structured Activites	Self Learning (Individual / Group Project)	Exam	Total
	Hours	23.33	24	84	3.2	134.53
Credit points	2 semester credit unit (SCU) equivalen 4.43 ECTS					
Required prerequisites for joining the module	none					
Recommended prerequisites for joining the module	none					
Module objectives/intended learning outcomes	<p>PLO 3 Having competency in research techniques, scientific analysis of study findings, and presentation of findingsrmation technology.</p> <p>PLO 4 Having understanding of the theories and advancements in the forestry industry basic science, cultivation, management, technology, and conservation.</p> <p>PLO 9 Having skill to innovate forest cultivation, including biotechnology and other silvicultural activities in forest rehabilitation and reforestation effort.</p>					
Content	<p>Study materials (teaching materials):</p> <ol style="list-style-type: none"> 1. Concepts and basics of Forest Ecology 2. Vegetation Analysis Techniques and Methods 3. Ecosystems in Forest Ecology 4. Ecosystems in Advanced Forest Ecology 5. Forests as Plant Communities 6. Mangrove Forest Ecology 7. Classification of Forest Vegetation 8. Advanced Forest Vegetation Classification 9. Dynamics of Plant Communities (Succession) 10. Plant Community Relations with the Environment 11. Plant Community Relations with the Advanced Environment 					

	<p>12. Forest formations in Indonesia 13. Impact of Forest Disturbance 14. Tree Type Selection</p>																								
Examination forms	<ul style="list-style-type: none"> • Quiz: Short questions related to the lecture subject (topic) given to students at the beginning or end of the lecture. • Assignment: Assignments to deepen the lecture topics given to students after several lectures. • Project Based: Problem-based individual or group assignments to strengthen skills related to learning topics in several lectures. • Case Study: Individual or group assignments based on case study to strengthen skills related to learning topics in several lectures. • Midle Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in the first to seventh lectures. • Final Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in lectures after half a semester until the end of the semester. 																								
Study and examination requirements	<ul style="list-style-type: none"> - Minimum lecture attendance is 80%. - Weighting composition for the final grade is quiz (10%), Assignment (10%), Project Based (25%), Case Study (25%), Midle Exam (15%), and Final Exam (15%). - Final grade is defined as: <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>Score</th> <th>Grade</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>≥ 80</td> <td>A</td> <td>4</td> </tr> <tr> <td>75 - < 80</td> <td>B+</td> <td>3,5</td> </tr> <tr> <td>70 - < 75</td> <td>B</td> <td>3</td> </tr> <tr> <td>65 - < 70</td> <td>C+</td> <td>2,5</td> </tr> <tr> <td>60 - < 65</td> <td>C</td> <td>2</td> </tr> <tr> <td>50 - < 60</td> <td>D</td> <td>1</td> </tr> <tr> <td>< 50</td> <td>E</td> <td>0</td> </tr> </tbody> </table> 	Score	Grade	Value	≥ 80	A	4	75 - < 80	B+	3,5	70 - < 75	B	3	65 - < 70	C+	2,5	60 - < 65	C	2	50 - < 60	D	1	< 50	E	0
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Learning media	Class room, TV Projector, In Focus, Power Point.																								
Reading List	<ol style="list-style-type: none"> 1. Odum, E.P. 1959. Fundamentals of ecology. W.B. Saunders Co. Philadelphia 2. Soerianegara, I. & A, Indrawan. 1982. Forest ecology in Indonesia. Faculty of Huatan IPB. Bogor. 3. Kusmana, C. & Onrizal. 2004. Forest ecology. Department of Forestry FP USU. Terrain 4. Poole, R.W. 1974. An introduction to quantitative ecology. McGraw-Hill. York. 5. Mueller-Dombois, D. & H. Ellenberg. 1974. Aims and methods of vegetation ecology. John Wiley and Sons. York. 6. Ludwig, J.A., & J.F. Reynolds. 1988. Statistical ecology: a primer on methods and computing. John Wiley and Sons. York. 7. Kusmana, C. 1997. Vegetation survey method. IPB Press. Bogor 																								

Module designation	Conservation of Biological Resources					
Subtitle	Konservasi Sumberdaya Alam Hayati					
Code	IKH 0 6005					
The year in which the module is taught						
Person responsible for the module	Dr. Pindi Patana S.Hut., M.Sc.					
Lecturer	Dr. Ir Ma'rifatin Zahrah M.Si.					
Language	Indonesia / English					
Relation to curriculum	Compulsory / elective / specialisation Names of other study programmes with which the module is shared					
Teaching methods	Lecture and discussion: 100 minute, 14 Lecturer = 23.33 hour Structured Activities: 120 minute, 14 activities = 24 hour Self Learning (Individual/Group Project): 300 minute, 14 week = 84 hour Middle exam: 100 minute = 1.6 hour Final exam: 100 minute = 1,6 hour					
Workload (incl. contact hours, self-study hours)	Activity	Lecture and Discussion	Structured Activites	Self Learning (Individual / Group Project)	Exam	Total
	Hours	23.33	24	84	3.2	134.53
Credit points	2 semester credit unit (SCU) equivalen 4.43 ECTS					
Required prerequisites for joining the module	none					
Recommended prerequisites for joining the module	none					
Module objectives/intended learning outcomes	<p>PLO 4 Having understanding of the theories and advancements in the forestry industry basic science, cultivation, management, technology, and conservation.</p> <p>PLO 6 Capable of making appropriate decisions based on standard procedures and data, in communication, supervision and evaluation of work in forestry field. fforts at various levels (genetic, species and ecosystem)</p> <p>PLO 11 Having skill to elaborate the forest resources conservation efforts, including provide the solution alternatives, community collaborations, prioritizing a holistic approach (ecological, economic and socio-cultural) in forest resources conservation</p>					
Content	<p>Study materials (teaching materials):</p> <ol style="list-style-type: none"> 1. Lecture contract for one semester, arrangement of learning materials for conservation of biological natural resources 2. Definition of conservation, conservation problems, conservation movements and their goals 3. Scope of biological natural resources (definition of natural resources, distribution of natural resources, characteristics of natural resources, benefits and management of natural resources) 4. History of conservation of biological natural resources and conservation issues in Indonesia 					

	<ol style="list-style-type: none"> 5. Biodiversity (level of biodiversity (genetic, species, ecosystem), megabiodiversity countries, benefits of biodiversity: economic, ecological and social) 6. Biogeography (definition, theories of island biogeography, geological history, evolution, geography and distribution of fauna, zoogeography and phytogeography) 7. Endemism and umbrella species 8. International conservation issues (genetic erosion, hunting and wildlife trade, global warming impacts on biodiversity, carbon trade) 9. Management of protected areas 10. Categories of protected areas <ul style="list-style-type: none"> • Criteria for classification of protected areas • International Category System • Policies for choosing locations for protected areas 11. Local conservation issues in Sumatra 12. Challenges of conservation of biological natural resources 13. Ecosystems and habitat fragmentation <ul style="list-style-type: none"> • ecosystem approach as a concept of natural resources management and conservation • Major Ecosystem Groups in Indonesia • Habitat and fragmentation • Landscape Management-Based Conservation 14. In-situ and ex-situ conservation <ul style="list-style-type: none"> • in-situ conservation of nature reserves: nature reserves, wildlife sanctuaries nature conservation areas: national parks, tahura, Hunting Park • ex-situ conservation: botanical gardens, arboretums, animal captivity, 15. <i>High Conservation Value of Forest (HCVF)</i> 						
Examination forms	<ul style="list-style-type: none"> • Quiz: Short questions related to the lecture subject (topic) given to students at the beginning or end of the lecture. • Assignment: Assignments to deepen the lecture topics given to students after several lectures. • Project Based: Problem-based individual or group assignments to strengthen skills related to learning topics in several lectures. • Case Study: Individual or group assignments based on case study to strengthen skills related to learning topics in several lectures. • Midle Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in the first to seventh lectures. • Final Exam: The exam is in the form of multiple choice or essay to assess students' understanding of the learning topics in lectures after half a semester until the end of the semester. 						
Study and examination requirements	<ul style="list-style-type: none"> - Minimum lecture attendance is 80%. - Weighting composition for the final grade is quiz (10%), Assignment (10%), Project Based (25%), Case Study (25%), Midle Exam (15%), and Final Exam (15%). - Final grade is defined as: <table border="1"> <thead> <tr> <th>Score</th> <th>Grade</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	Score	Grade	Value			
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		50 - < 60	D	1	
		< 50	E	0	
Learning media	Class room, TV Projector, In Focus, Power Point.				
Reading List	<ol style="list-style-type: none"> 1. MacKinnon, John and Kathy, et al.1993. Management of Protected Areas in the Tropics. Gadjah Mada University Press. 2. Primack, Richard B., et al..1998. Conservation Biology. Indonesian Torch Foundation. 3. Wiratno, et al. 2004. Reflecting on the Cracked Mirror of Conservation Reflection and Implications for National Park Management. The Gibbon Foundation Indonesia, PILI-NGO Movement. Jakarta. 4. Law No. 5 of 1990 concerning the Conservation of Biological Natural Resources and Their Ecosystems. 				