



MASTER IN FORESTRY SCIENCE
FACULTY OF FORESTRY
UNIVERSITAS GADJAH MADA



ACADEMIC HANDBOOK

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ACADEMIC HANDBOOK

MASTER IN FORESTRY SCIENCE PROGRAMME (MFS)

CHAPTER I

INTRODUCTION

The Study Programme of Master in Forestry Science (MFS), Faculty of Forestry Universitas Gadjah Mada, organises a postgraduate education programme to produce graduates who uphold morals and ethics, honesty, transparency, and concern for the interests of society. The MFS study programme is a postgraduate programme of the Faculty of Forestry Universitas Gadjah Mada, located at Agro Street Number 1 Bulaksumur Yogyakarta. This study programme was established based on the Decree of the Minister of Education and Culture Number 580/DIKTI/Kep/1993 dated September 29 1993.

To ensure the sustainable management of forests for the future, it is now necessary to balance the management of forest resources and the need for forest products. When these challenges become increasingly complex, professional human resources who are educated in mastering the principles of forestry science become a fundamental necessity. The Faculty of Forestry Universitas Gadjah Mada organises a postgraduate level of education to produce professional human resources in forestry science through the Master in Science (M.Sc) level.

The Study Programme of Master in Forestry Science of UGM was established in 1980 in accordance with the policy of Universitas Gadjah Mada to organise Master's Degree Education under the Coordination of the UGM Postgraduate School. Following the Decree of the Rector of Universitas Gadjah Mada Number 89/P/SK/HT/2006, the Study Programme of Master in Forestry Science is a monodisciplinary education programme organised by the Faculty of Forestry Universitas Gadjah Mada. MFS in implementing the educational process is based on the Academic Regulation in 2005 for Organising the Postgraduate Programme, Universitas Gadjah Mada.

PHILOSOPHICAL PRINCIPLES OF MFS

Epistemologically, forestry science is an essential study field for the Indonesian people and nation. Highlighting the importance of this science, it requires substantial support and its philosophy that serve as the foundation to establish a robust science and to educate the society on the importance of this science. It is therefore important to understand what science is and what its achievement is in order to exist. Scientific epistemology, in this case, MFS, is obtained through the methods of obtaining facts, truths, probabilities, and scientific certainties.

Forest management encompasses silviculture science and biotechnology, conservation, social forestry, forest management, and forest product technology; taking into account aspects of national forest policy, local and global economies, local and global environment, and education for sustainable development. Scientific development and study approached using an integrative, descriptive, spatial, and exploratory analytical approach.

The ontology in the MFS domain is the scientific boundary to clarify whether research can be assigned to the MFS domain. This ontological boundary is the basis for the development of various subjects in the MFS programme, distinguishing it from other programmes.

Axiologically, the usefulness of MFS is an attempt to meet the needs of all those involved in the MFS programme, whether for scientific or practical purposes. MFS will provide the benefit of scientific development to help solving forest management problems in Indonesia as well as to improve the forest community welfare and resources.

VISION AND MISSION

Vision

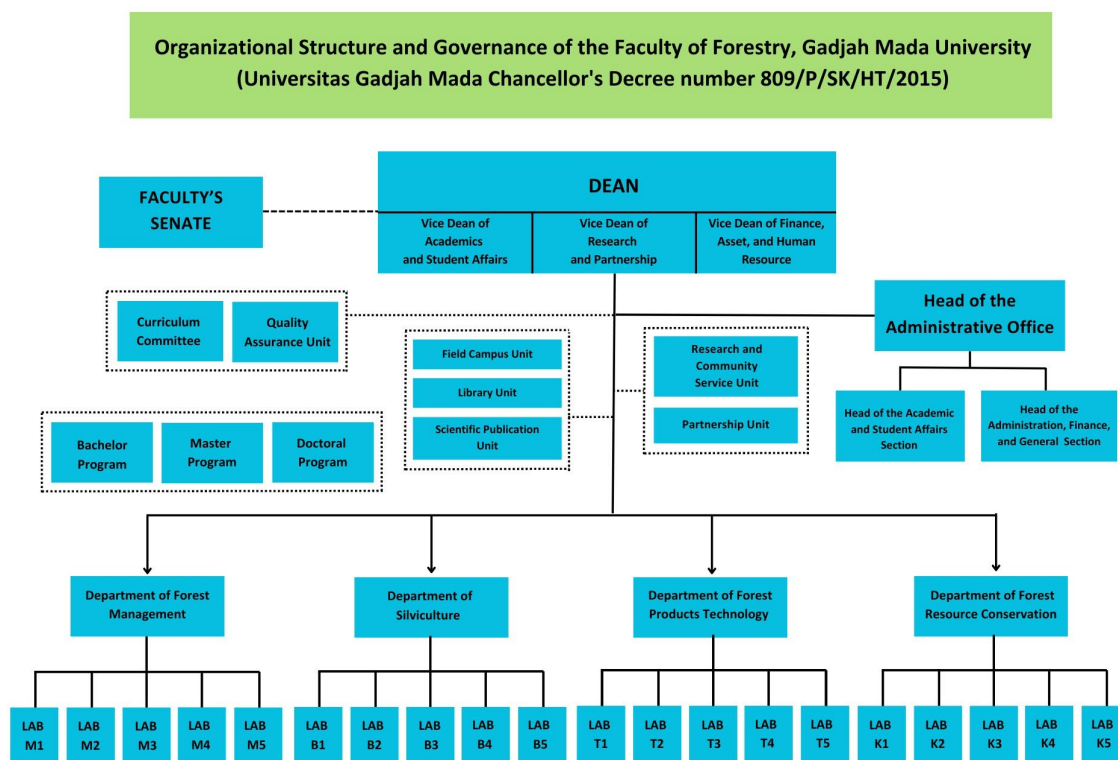
Our vision is to become a pioneer of a master's education programme in the field of tropical forestry that is outstanding, innovative, and prominent at the national and international level, as well as to serve the interests of the people and the nation imbued with cultural values based on Pancasila.

Mission

Our mission is to provide education, research, and community service, and to preserve and develop knowledge in the field of tropical forestry for the benefit of the community.

ORGANISATION

In accordance with the Universitas Gadjah Mada Rector's Decree Number 809/P/SK/HT/2015, the management of MFS was assigned under the Faculty of Forestry UGM under the responsibility of the dean with two administrators. The organisational structure of the MFS programme management is as follows.



Description:

Department of Forest Management

M1: Laboratory of Computer and Forest Biometrics

M2: Laboratory of Forest Product Harvesting

M3: Laboratory of Spatial Information System and Forest Mapping

M4: Laboratory of Forest Development Planning

M5: Laboratory of Forestry Social Economics

Department of Silviculture

B1: Laboratory of Silviculture and Agroforestry

B2: Laboratory of Tree Improvement

B3: Laboratory of Forest Physiology and Soil

B4: Laboratory of Forest Health and Protection

Department of Forest Products Technology

T1: Laboratory of Wood Formation and Quality Improvement

T2: Laboratory of Biomaterial Chemical Conversion

T3: Laboratory of Biomaterials Engineering

T4: Laboratory of Wood Basic Properties

T5: Laboratory of Forest Products Processing

Department of Forest Resource Conservation

K1: Laboratory of Forest Ecology

K2: Laboratory of Nature Tourism

K3: Laboratory of Watershed Management

K4: Laboratory of Nature Conservation

K5: Laboratory of Wildlife

CHAPTER II

MASTER PROGRAMME EDUCATION SYSTEM

Objectives

The Programme Education Objective (PEO) of MFS is to generate graduates who are:

1. Competent, outstanding, creative, and innovative in applying forestry knowledge and skills for a wide-scale professional career;
2. Able to communicate effectively and act with global and environmental sensitivity in demonstrating leadership.

Programme Learning Outcomes

MFS learning outcomes are based on the vision, mission, and educational goals. In addition, when creating learning outcomes, Law Number 12 of 2012 and Presidential Decree Number 08 of 2012 concerning the Indonesian National Qualifications Framework (KKNI) and its Attachments serve as a reference in preparing the learning outcomes of graduates from each level of education nationally, Minister of Education and Culture Regulation Number 73 of 2013 and finally refers to Permenristekdikti (Decree of the Ministry of Research, Technology, and Higher Education) Number 44 of 2015 concerning National Higher Education Standards, Indonesian National Work Competency Standards (SKKNI), and also Subject-Specific Criteria (SSC) ASIIN TC 08.

The following are the *Programme Learning Outcomes*:

PLO No.	Objectives No.	Learning Outcome	KKNI Elements (Appendix. Permenristekdikti No 44 2015)	SSC ASIIN TC 08
1.	1	Having high academic achievement and awareness of people and nation interests based on Pancasila values.	<p><ATTITUDE></p> <p>a. Devotes to the God Almighty and shows religious attitude;</p> <p>b. Upholds humanity values in performing duties based on religion, morals, and ethics;</p> <p>c. Contributes to the improvement of the quality of life and the advancement of civilization for the society and nation based on Pancasila;</p> <p>d. Respects the diversity of cultures, views, religions and beliefs, as well as the original opinions or findings of others;</p> <p>e. Cooperative, socially sensitive and concerned about the society and environment;</p>	<p>Having differentiated and advanced knowledge of the legal provisions relevant to their field of expertise.</p> <p>Fulfilling the requirements for bachelor's degree graduates for major qualifications in higher level master's programmes.</p>

PLO No.	Objectives No.	Learning Outcome	KKNI Elements (Appendix. Permenristekdikti No 44 2015)	SSC ASIIN TC 08
2.	2	Having responsibility, confidence, emotional maturity, ethics, and awareness of being a lifelong learner and able to develop networks.	<p><ATTITUDE></p> <p>f. Obeys to the laws and regulations in the life of society and the nation;</p> <p>g. Internalizes values, norms, and academic ethics;</p> <p>h. Demonstrates a responsible attitude to work independently in the field of expertise; and</p> <p>i. Internalizes independence, commitment, and entrepreneurship.</p>	<p>Having differentiated and advanced knowledge of the legal provisions relevant to their field of expertise.</p> <p>Having advanced knowledge of quality standards and quality processes as well as their management.</p> <p>Able to work effectively as leaders of teams comprising various disciplines and levels.</p>
3.	1	Able to compare and criticize the theory, philosophy, and design of sustainable development of forest and natural resources, considering the complexity of global issues.	<KNOWLEDGE>	<p>Having profound knowledge and understanding of their technical aspects including engineering specialties and broader scientific backgrounds.</p> <p>Having a critical awareness of differentiated knowledge and current knowledge in their field of discipline.</p>

PLO No.	Objectives No.	Learning Outcome	KKNI Elements (Appendix. Permenristekdikti No 44 2015)	SSC ASIIN TC 08
				<p>Are qualified to apply suitable methods to pursue investigations or detailed research as to technical-scientific issues in accordance to the status of their knowledge and understanding.</p> <p>Able to define and conduct research using various methods of analysing, modeling, and experimenting.</p> <p>Able to combine theories and practices to achieve quality of structures, processes, and results.</p> <p>Having a comprehensive understanding of applied theories, models, techniques, and methods and their limitations.</p>

PLO No.	Objectives No.	Learning Outcome	KKNI Elements (Appendix. Permenristekdikti No 44 2015)	SSC ASIIN TC 08
4.	1	Able to connect and criticize the science, knowledge, technology, and art of forestry based on ecosystems and landscapes, and cover silviculture, forest management, forest products technology, and forest resource conservation.	<KNOWLEDGE>	Having a profound knowledge and understanding of their technical aspects, including engineering specialization and broader scientific backgrounds.
				Having a critical awareness of differentiated knowledge and current knowledge in their field of discipline.
				Having advanced knowledge of quality standards and quality processes as well as their management.
5.	1	Able to analyze comprehensively updated issues in the specific fields of silviculture, forest management, forest products technology or forest resource conservation, and to recommend possible solutions based on defined problems.	<KNOWLEDGE>	Having a profound knowledge and understanding of their technical aspects, including engineering specialization and broader scientific backgrounds.
				Having a critical awareness of differentiated knowledge and current knowledge in their field of discipline.

PLO No.	Objectives No.	Learning Outcome	KKNI Elements (Appendix. Permenristekdikti No 44 2015)	SSC ASIIN TC 08
				<p>Having advanced knowledge of quality standards and quality processes as well as their management.</p> <p>Are qualified in formulating and solving problems arising in new, developing fields of their field of expertise.</p> <p>Are able to apply their knowledge and understanding to generate solutions for distinguished cases by integrating various disciplines.</p> <p>Are qualified to apply innovative methods for problem solving.</p>

PLO No.	Objectives No.	Learning Outcome	KKNI Elements (Appendix. Permenristekdikti No 44 2015)	SSC ASIIN TC 08
6.	1	Able to apply logical, critical, systematic and innovative thinking skills by utilizing information technology to generate solutions in the form of scientific documents individually as well as in a team.	<p><GENERAL SKILLS></p> <p>Able to develop logical, critical, systematic and creative thinking through scientific research, create designs and works of art in the field of science and technology that pay attention to and apply humanities values according to their field of expertise, compiling scientific conceptions and study results based on rules, procedures and scientific ethics in the form of a thesis or other equivalent form, and uploaded on the university website, as well as papers that have been published in accredited scientific journals or accepted in international journals.</p>	<p>Having a profound knowledge and understanding of their technical aspects, including engineering specialization and broader scientific backgrounds.</p> <p>Having a critical awareness of differentiated knowledge and current knowledge in their field of discipline.</p>
7.	1	Able to formulate research questions, develop and conduct proper plans and methods, collect and analyse data, synthesise and infer research findings in forestry using multidisciplinary approaches that are publishable in nationally accredited and/or reputable international journals.	<p><SPECIFIC SKILLS></p> <p>Able to identify research object in the scientific field and place them on a research map developed through an interdisciplinary or multidisciplinary approach;</p>	<p>Are qualified in formulating and solving problems arising in new, developing fields of their field of expertise.</p> <p>Having a comprehensive understanding of applied theories, models, techniques, and methods and their limitations.</p>
PLO No.	Objectives	Learning Outcome	KKNI Elements	SSC ASIIN TC 08

	No.		(Appendix. Permenristekdikti No 44 2015)	
			Able to document, store, secure, and retrieve research data to ensure validity and prevent plagiarism.	Able to work and communicate in national and international scope.
				Are qualified to plan, conduct, and evaluate field and laboratory experiments.
			<SPECIFIC SKILLS> Able to compile ideas, thoughts and scientific arguments responsibly based on academic ethics, and inform them through the media to the academic community and the wider society;	Able to identify, locate, and procure required information.
				Able to define and conduct investigations using the methods of analyzing, modeling, and experimenting.
				Able to investigate the application of new emerging technologies in their scientific field.
				Are able to apply their knowledge and understanding to generate solutions for distinguished cases by integrating various disciplines.

				Are qualified to apply innovative methods to problem solving.
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Learning System

The learning system at MFS adheres to the Semester Credit System (SKS). In accordance with the provisions of the National Higher Education Standards (SNPT), a semester is a unit of activity time consisting of 14 to 16 weeks of lectures or other scheduled activities, along with accompanying activities, including 2 to 3 weeks of assessment activities. SKS is an education system that uses semester credit units (SKS) to express student study load, lecturer workload, learning experience, and programme implementation load. One credit is a level of appreciation for the learning experience gained during one semester through scheduled activities per week of 1 hour of lecture or 2 hours of practicum, or 4 hours of fieldwork, each of which is accompanied by around 1 to 2 hours of structured activities and around 1-2 independent activity hours. The preparation, planning, and implementation of educational programmes use SKS as a benchmark for student academic load.

Study Load and Interests

Based on the provisions stipulated in Permenristekdikti Number 44/2015, the study load of master-level students at MFS is set at a minimum of 40 credits, including several credits of compulsory courses, elective courses, practicum, research and thesis preparation. Students enrolled in MFS can choose a combination of subjects that support their study interests, namely Forest Management, Silviculture, Forest Resource Conservation, Forest Product Technology, and other interests. The number of courses to be taken is proposed by students individually based on the results of consultations with Academic and Thesis Supervisors, as outlined in the Master Plan of Study. The courses taken in the first semester (before the academic advisor is designated) are determined by the student and a temporary academic advisor or Head of the Study Programme. Based on students' interests, each student can take courses offered by other study programmes within Universitas Gadjah Mada based on consultation with the academic advisor.

Systematically, the course combinations chosen consist of:

- (1) MFS compulsory subjects, and
- (2) MFS subjects according to interests.

Student Supervision in Master Study Plan

Supervision in the first semester is carried out by a temporary academic advisor, namely the Head of the Department, according to each student's interest. Meanwhile, in the following semester, the permanent academic advisor is determined by a Dean's Decree based on students' interests. This supervisor is also the head of the thesis supervisor. Thesis supervision is carried out by a supervisory team chaired by the permanent academic advisor with one team member. Replacement of permanent academic advisor is allowed for following reasons:

1. Permanent academic advisors have reached retirement age.
2. The advisor is designated for other assignments from the government that are not possible for intensive supervision.
3. The advisor suffers from an illness that does not allow supervision for more than one semester.
4. The advisor is permanently absent/deceased.
5. If both advisors are permanently absent, the MSF manager appoints a replacement advisor according to the student's research field.
6. Aspirations from students.

Teaching Staff and Thesis Supervision

The teaching staff of the MFS programme are lecturers who have met the qualifications as lecturers of master programmes according to the Law on Teacher and Lecturer Number 14 of 2005.

Based on their competence and willingness of the lecturers and the requirement of the faculty, retired lecturers, lecturers or experts from other institutions can be offered as course lecturers or members of student thesis supervisors along with lecturers who are still active as chief supervisors. Permanent academic advisors are determined based on student proposals and interests that have been approved by the faculty committee.

Assessment of Learning Outcomes and Academic Achievements

The learning outcomes of each course are assessed using several methods, such as written exams, oral exams, seminars, paper writings, quizzes or a combination of these methods. Written exams are conducted at the middle and end of the semester. Essay writings, homeworks, and lecture participation assessments are adjusted to the time available. The assessment is intended to measure students' understanding of course material and categorise students based on their understanding of the course material.

Assessment of practicum and field practice activities is carried out based on the completeness of following the training event or module and the accomplishment of the practicum report. Practicum oral examination must be completed one year after the practice is carried out, and if it does not meet the assessment criteria, students must repeat practicum or field practice activities.

Grades for learning outcomes assessment uses the letters A, B, C and D. If students withdraw from teaching activities illegally until the deadline for changing the study plan card and are still listed in the list of participants in lectures or teaching activities; thus, at the end of the semester students will be graded E. Grade T (incomplete) is given to students who do not entirely fulfil the elements of the assessment criteria or have not completed all assignments. If the student cannot complete the requirements within one month, then the Grade T will be changed to E.

Guidance and Counselling System

Students who encounter issues during their study periods are entitled to receive services from their permanent academic and thesis advisor. If these services do not resolve the issue, the student may contact the manager or counselling team for services and resolution.

Evaluation of Learning Outcomes

Determination of Grade Point Average (GPA)

Student performance in learning is expressed in the GPA, which is calculated by weighting letter values into numbers as follows.

- A is equivalent to 4.0 (four point zero)
- A- is equivalent to 3.75 (three point seventy five)
- A/B is equivalent to 3.5 (three point five)
- B+ is equivalent to 3.25 (three point twenty five)
- B is equivalent to 3.0 (three point zero)
- B- is equivalent to 2.75 (two point seventy five)
- B/C is equivalent to 2.5 (two point five)
- C+ is equivalent to 2.25 (two point twenty five)
- C is equivalent to 2.0 (two point zero)
- C- is equivalent to 1.75 (one point seventy five)
- C/D is equivalent to 1.5 (one point five)

D+ is equivalent to 1.25 (one point twenty five)

D is equivalent to 1.0 (one point zero)

E equals 0 (zero)

GPA is calculated using the following formula.

$$\text{GPA} = \frac{\text{Sum (Credit unit of each course x score of each course)}}{\text{Total credits of all courses/practicums}}$$

Example: A student takes 6 (six) courses with the following exam results:

Table 4. Example of GPA Value Calculation Per Semester

Course Content	SKS Weight	Value = N		K*N
		Value	Weight	
AAA	3	C	2	6
BBB	3	A	4	12
CCC	3	B	3	9
DDD	3	B	3	9
FFF	3	A	4	12
GGG	3	A	4	12
Total weight of credits = 18		Total weighted score = 60		

$$\text{GPA} = \frac{60}{18} = 3.33$$

GPA consists of GPA from each semester and cumulative GPA. GPA consists of all courses that have been taken.

Semester and Programme Evaluation

Evaluation of study performance consists of the end-of-semester evaluation and the end-of-programme evaluation. Students with a GPA below 3.00 at the end of the first semester will be given a written warning.

At the end of the second semester, students will not be allowed to continue their studies if their highest 16 credits GPA is less than 3.00 and they do not have proof of English language skills certificate and academic potential tests as required by UGM.

Students are declared to have completed the Master in Forestry Science if they have fulfilled the following requirements:

1. Have passed a comprehensive examination, which is an examination of all courses that have been taken by students.
2. Have passed the thesis examination.

Thesis examination grades are compiled by the Office of Academic Affairs of MFS by combining the grades provided by each examiner. The compilations are used as a reference for determining the final grade of a thesis examination with weights as follows.

A is equivalent to 4.0 (four point zero)

A- is equivalent to 3.75 (three point seventy five)

A/B is equivalent to 3.5 (three point five)

B+ is equivalent to 3.25 (three point twenty five)

B is equivalent to 3.0 (three point zero)

B- is equivalent to 2.75 (two point seventy five)

B/C is equal to 2.5 (two point five)

C+ is equivalent to 2.25 (two point twenty five)

C is equivalent to 2.0 (two point zero)

C- is equivalent to 1.75 (one point seventy five)

C/D is equivalent to 1.5 (one point five)

D+ is equivalent to 1.25 (one point twenty five)

D is equivalent to 1.0 (one point zero)

E equals 0 (zero)

3. Have submitted a thesis manuscript in the form of a pdf file format that has been signed by the supervisor.
4. Have submitted the manuscript file in soft and hard copy to the Head of Study Programme.
5. Have obtained a minimum GPA of 3.00 and no grade D nor E.
6. Have obtained a minimum TOEFL score of 450.
7. Have submitted proof of manuscript submission to an accredited national journal.

Students who have completed the Master in Forestry Science degree will receive the following graduation predicates:

3.76 - 4.00: Cumlaude

3.51 - 3.75: Very satisfactory

3.00 - 3.50: Satisfactory

The predicate of graduation with Cumlaude can only be given to students who complete their studies in less than or equal to 5 (five) semesters.

Study Period Monitoring

In accordance with the Rector's Regulation Number 11 of 2016 concerning Postgraduate Education, study monitoring and evaluation is carried out in 2 (two) stages, namely:

1. Early-Stage Learning Evaluation

The initial learning evaluation of master students is carried out under two conditions:

- a. Students, who do not achieve 15 (fifteen) credits by the end of the second semester with a minimum GPA of 3.00 (three point zero), are not allowed to pursue their thesis until the deadline set by the MFS study programme.
- b. If within 1 (one) additional semester the student cannot achieve their study progress as referred to point (a), the student will be not allowed to continue the study and declared to have resigned or **a dropout**.

2. Final Stage Learning Evaluation

The final stage of the student's study evaluation is carried out with the following conditions:

- a. Students who have not completed all learning activities with a minimum GPA of 3.00 (three point zero) by the end of their 3rd semester will be given an initial warning.
- b. Students who have not completed all learning activities with a minimum GPA of 3.00 (three point zero) by the end of their 4th semester will be given a second warning.
- c. Students who have not completed all learning activities with a minimum GPA of 3.00 (three point zero) by the end of the 5th semester will be given a third warning and the opportunity to complete their studies within another 1 (one) semester.
- d. If the students are unable to complete their studies in accordance with point c, they will not be allowed to continue their studies and will be declared to have resigned or **a dropout**.

Thesis Examination

Thesis examination is carried out by assessing the thesis *draft* and oral presentation. The examination will be conducted after the advisors approve the thesis *draft*, and the student has submitted the thesis *draft* to the administration of the MFS Study Programme. The thesis examination procedures are regulated under the Thesis Examination Procedures.

The final grade of the thesis examination is weighted as follows.

- A is equivalent to 4.0 (four point zero)
- A- is equivalent to 3.75 (three point seven five)
- A/B is equivalent to 3.5 (three point five)
- B+ is equivalent to 3.25 (three point two five)
- B is equivalent to 3.0 (three point zero)
- B- is equivalent to 2.75 (two point seven five)
- B/C equal to 2.5 (two point five)
- C+ is equivalent to 2.25 (two point two five)
- C is equivalent to 2.0 (two point zero)
- C- is equivalent to 1.75 (one point seven five)
- C/D is equivalent to 1.5 (one point five)
- D+ is equivalent to 1.25 (one point two five)
- D is equivalent to 1.0 (one point zero)
- E equals 0 (zero)

Graduation

Students who will be graduated and meet all graduation requirements will be verified through a judicium meeting. The judicium meeting is held regularly at the end of the month.

Graduates who have been verified at the judicium meeting are eligible for graduation if they meet some of the applicable conditions. All prospective graduates must attend the graduation ceremony. Graduation ceremony is held four times during each academic year: January, April, July, and October. Graduation ceremony is held at the university and faculty level.

New Student Registration Requirements and Procedures

Prospective students should register online through www.um.ugm.ac.id and submit a written application letter to become a master student in the MFS Study Programme with the following attachments.

1. Certified copy of undergraduate diploma and transcript.
2. Letters of recommendation from two persons who recognize the candidate's academic abilities.
3. Permit letter from the agency/institution (for working candidates).
4. Health certificate from a doctor.
5. Proof of payment for administrative fees paid through Bank BNI 46 with account Number 00.392.338.94 on behalf of Rector of UGM.
6. Certificate of sponsorship for prospective students who receive financial support.
7. A stamped return envelope to notify you of the screening/passing results.
8. TOEFL / AcEPT certificate with a minimum score of 450.
9. OTO BAPPENAS/ PAPs UGM TPA (Academic Potential Test) certificate with a minimum score of 500.

Registration Period

Applications are open every semester. The even semester starts at the beginning of February to July; the odd semester starts at the beginning of August to January.

Student Re-Registration

All MFS students must re-register (administrative and academic) at the beginning of each semester according to the schedule issued by the University following the academic calendar.

Students who will re-register are required to fulfil the following conditions.

1. A request letter of re-registration permit for the semester from the Dean or the authorised staff.
2. Student ID Card (SIC) from the previous semester or the current SIC for students whose studies have been discontinued.
3. Receipt of payment of tuition fees and other fees during the semester. Students who take a leave of absence without permission must pay the full the tuition fee for the period of leave of absence.

Regarding to the re-registration procedure, students must comply the following conditions:

1. Students who have discontinued their studies for less than two years must attach a letter of reactivation permit from the Dean.

2. Students who have discontinued their studies for more than two years must attach a letter of reactivation permit from the Rector.
3. Re-registration must be carried out by the student by submitting the registration form provided by the MSF Study Programme.
4. Students who are late for re-registration must obtain special permission for late re-registration in advance from the Dean or the authorised staff.
5. The status of students who do not re-register for maintaining their student status in the semester will be cancelled and not allowed to participate in all academic activities and use the available facilities.

Student Obligations and Rights

The obligations and rights of MFS students are attached to the students after completing the administration in accordance with applicable regulations and being declared valid as MFS students. Their rights and obligations will be cancelled if the students are no longer MFS student.

Student Obligations

All MFS students are required to:

1. Pay the cost of education and other expenses regulated by the MSF Study Programme and/or university, except for students on study leave with the Dean's permission.
2. Maintain order and discipline to create a conducive learning atmosphere.
3. Demonstrate courteous behavior, be responsible, and maintain high ethics to maintain the good reputation of the faculty and the university's alma mater.
4. Participate in promoting academic culture both inside and outside the university in order to create MFS as one of the sources of education and culture.
5. Improve intellectual abilities in various fields of science and technology, academic and social skills, as well as work abilities to provide security to those needing their competence and expertise.
6. Continue to maintain and honour the great name of UGM after they have completed their studies and devoted themselves to society.

Student Rights

All MFS students have the rights to:

1. Obtain education and teaching that meet the academic standards that apply in MFS Study Programme.

2. Utilize available academic facilities according to the regulations applied.
3. Receive recognition for their academic achievements for the benefit of both inside and outside campus as general terms.
4. Assure protection for the freedom of academic speech in accordance with the academic ethics that apply at UGM.
5. Receive professional and proportional services from the MFS Study Programme.

Academic Administration

Academic administration of the MFS Study Programme is a whole supporting system for planning, organising, and evaluating the implementation of education.

Administrative Requirements

In conducting academic administration activities, there are several things that must be noted, namely:

Instructions and Conditions

Academic calendar includes lectures and other academic activities: The first semester starts from the beginning of August to the end of January. The second semester begins in early February until the end of July.

Course list, prerequisite and types, as well as the credit number for each courses. Courses with prerequisites are only allowed to be taken if the prerequisite courses have been previously taken with a minimum grade of C.

Academic Guidance by Academic and Thesis Supervisors

For supporting the learning process during the studies, each student is advised by a permanent academic advisor. For supervising thesis, this academic advisor acts as the head of the student thesis committees, assisted by one co-supervisor. The student supervision process includes:

- Preparing a master plan study with the advice from the permanent academic advisor for the entire semester during the studies. The master plan study is prepared individually for each student, at the latest before the end of the first semester for the student.
- Preparing study plan for each semester.

Implementation of Academic Administration

Academic administration is carried out every semester and its implementation is organised in several stages of activity as follows.

Registration Preparation

At the beginning of the first semester, students will determine all courses to be taken during the programme by consulting their permanent academic advisor. The courses should follow the master plan study. In this case, students must prepare themselves before the day of registration. Things that must be prepared include:

1. Master plan study document
2. Study plan
3. Study results
4. Study results compilation
5. Student ID
6. Study change plan

Study planning must be carried out according to established procedures and authorised by the permanent academic advisor. Study planning time is regulated and announced by the academic study programme. Study change plan is required if there are changes to the study plan for particular reasons, such as concurrent lecture hours, course cancellations due to a small number of participants, and so on.

At the time of registration, students must show a valid student ID and proof of tuition fees payment. If all requirements have been met, students will be given a sheet of the study plan instructions and study results from the previous semester. Study planning cannot be represented by other persons, except with a letter of attorney signed by the Dean following the reasons. The procedures of filling, managing and changing the study plan are regulated under Quality Procedure Number FKT-PSIK-PRO-AKA-004.

Implementation of Lectures, Labs and Practicals

Lectures, laboratory works and field practices begin in early September for first semester and early February for second semester.

Examination and Announcement of Exam Results

- The mid-semester exam is held after the 7th lecture of each semester and the final exam is held after the 14th lecture of each semester.
- Determination of the grade of the course exam results is the academic authority of the lecturer.

- The results of the examination are announced publicly and can be accessed by the student's parents or the institution where the student works.

CHAPTER III.

FORESTRY SCIENCE MASTER PROGRAMME STRUCTURE (MFS)

A. Matriculation

Matriculation is applied to prospective students of the MFS study programme whose background from non-forestry undergraduate degrees. The programme is given before the first semester starts, in order to equalise understanding in forestry science among all new students. Matriculation courses are conducted by the following departments.

- MTK 1 Forest Management
- MTK 2 Silviculture
- MTK 3 Forest Product Technology
- MTK 4 Forest Resources Conservation

B. Master in Forestry Science (MFS) Program Courses

MFS students must take 28 credits of compulsory courses and a minimum of 12 credits of elective courses; thus, the total number of credits taken is 40 credits.

- Compulsory courses are courses that characterise MFS study programme following the vision and mission of the Faculty and University, so that they become the main competencies of the MFS graduates.
- Elective courses are courses that support research and thesis writing, which are determined based on the advice from the permanent academic advisor and thesis supervisors.

Below is the details of the course structure classified based on the MFS study programme competencies.

1. Compulsory Courses (28 Credits)
 - 1.1. General Expertise (2 Credits)
 - 1.2. Research Skills (4 Credits)
 - 1.3. Tropical Forestry Expertise (8 credits)
 - 1.4. Thesis (12 credits)
 - 1.4.1. Proposal Preparation (1 Credit)
 - 1.4.2. Seminar (Class or National Seminar) (2 Credits)
 - 1.4.3. Research and Thesis Writing (7 Credits)
 - 1.4.4. Publication in Accredited National Journal (2 Credits)
 - 1.5. Soft Skills (Academic English) (2 credits)
2. Interest-based Elective Courses (12 Credits)

Details of the composition and structure of the courses, codes, number of credits, semesters and lecturers are presented in the tables of the following pages.

1. Compulsory Courses

No.	Code	Course Content	Smt.	Workload (ECTS)
1	KTU 698	Analysis of Sustainable Forest Development	1	4.4
2	KTU 697	Forestry Scientific Method	1	4.4
3	KTU 695	Forestry Statistics	1	4.4
4	KTU 694	Tropical Forest Management	(1/2)	4.4
5	KTU 693	Tropical Forest Silviculture	(1/2)	4.4
6	KTU 692	Conservation of Tropical Forest Resources	(1/2)	4.4
7	KTU 691	Value-Added Tropical Forest Products	(1/2)	4.4
8	KTU 700	Thesis - Proposal (2) - Seminar (3) - Research and Thesis Writing (6) - Publication (1)	(1 to 4)	12
9	KTU 690	English for Academic		4.4
		Total		28

2. Interest-based Courses

2.A. Silviculture Elective Courses

No.	Code	Course Content	Smt.	Workload (ECTS)
1	KTB 652	Ecosystem Restoration Silviculture	1	4.4
2	KTB 620	Advanced Tree Improvement	1	4.4
3	KTB 653	Site Manipulation and Land Rehabilitation	1	4.4
4	KTB 654	Tree Physiology and Environmental Stress	1	4.4
5	KTB 626	Silviculture for Agroforestry System	1	4.4

6	KTB 655	Ecological Genetics	1	4.4
7	KTB 603	Tropical Forest Entomology	1	4.4
8	KTB 602	Ecosystem-based Forest Protection	2	4.4
9	KTB 621	Advanced Tree Improvement Practicum	2	2.2
10	KTB 624	Genetic Resources Conservation	2	4.4
11	KTB 623	Tropical Forest Seed Technology	2	4.4
12	KTB 604	Tree Domestication	2	4.4
13	KTB 631	Planted-Forest Disease Management	2	4.4
14	KTB 605	Anthropogenic Disturbance Tropical Forests	2	4.4
15	KTB 606	Ecosystem-based Forest Protection Practicum	2	2.2
16	KTB 617	Soil Fertility of Tropical Forest	2	4.4
17	KTB 619	Tropical Soil Fertility Practicum	2	2.2
18	KTB 663	Technology of Tropical Agroforestry	2	4.4
19	KTB 657	Silviculture of NTFP	2	4.4
20	KTB 658	Tropical Forest Diseases Ecology	2	4.4
21	KTB 659	Tropical Forest Dendrology	2	4.4
22	KTB 660	Tropical Forest Pests and Diseases Monitoring	2	4.4
23	KTB 673	Agroforestry for Functional Food	2	4.4
24	KTB 661	Silviculture for Climate Change Mitigation	2	4.4

25	KTB 651	Genetics Molecular	1	4.4
26	KTB 662	Practice of Molecular Detection	1	4.4
27	KTB 665	Genetic Manipulation	1	4.4
28	KTB 666	Cell Biology	1	4.4
29	KTB 667	Cell Propagation	1	4.4
30	KTB 668	In Vitro Culture Techniques	2	4.4
31	KTB 669	Plant Organogenesis	2	4.4
32	KTB 670	Forest Biotechnology	2	4.4
33	KTB 671	Tropical Silviculture Field Trip	2	2.2
34	KTB 672	Special Problems of Improvement	2	4.4

2.B. Forest Management Elective Courses

No.	Code	Course Content	Smt.	Workload (ECTS)
1	KTM 618	Forest Resources and Environmental Accounting	2	4.4
2	KTM 621	Forest Resources and Environmental Accounting Practicum	2	2.2
3	KTM 609	Management Science	1	4.4
4	KTM 603	Quantitative Management of Sustainable Forests	1	4.4
5	KTM 611	Economic Value of Forests and the Environment	2	4.4
6	KTM 625	Advanced Forest Products Marketing	1	4.4
7	KTM 617	Optimising the Management of Natural Resources	2	4.4
8	KTM 619	Forest Business Analysis	1	4.4
9	KTM 615	Forestry Spatial Analysis	2	4.4
10	KTM 645	Advanced Forest Policy	2	4.4
11	KTM 636	Advanced Social Forestry	2	4.4

12	KTM 616	Conflict Management and Politics of SDH	1	4.4
13	KTM 620	Advanced Forest Planning	1	4.4
14	KTM 626	Practicum of Forestry Applied GIS and Remote Sensing	1	2.2
15	KTM 614	GIS and Inderaja Applied Forestry	1	4.4
16	KTM 622	System Modelling and Analysis	1	4.4
17	KTM 624	Forest Biomass Inventory	1	4.4
18	KTM 605	Empowerment and Deliberative Policy	2	4.4
19	KTM 647	Forestry Administration and Governance	1	4.4
20	KTM 637	Forest Growth Science	2	4.4
21	KTM 612	Eco-friendly Harvesting	2	4.4
22	KTM 602	Practicum of Applied Statistical Methods	1	4.4
23	KTM 610	Community Forestry	1	4.4
24	KTM 604	Agroforestry Management	2	4.4
25	KTM 646	Forest Production	2	4.4

2.C. Forest Product Technology Elective Courses

No	Code	Courses	Smt.	Workload (ECTS)
1	KTT 654	Extractive Properties of Wood	1	4.4
2	KTT 688	Biomass for Renewable Energy	1	4.4
3	KTT 671	Biomass Conversion for Energy & Chemical Products	2	4.4
4	KTT 603	Carbonisation of Wood for Engineering Materials	2	4.4
5	KTT 672	Technology of Plant Oils and Fats	1	4.4
6	KTT 673	Processing of Exudate and Extractive	2	4.4
7	KTT 674	Indonesian Forestry Waste Management Engineering	2	4.4
8	KTT 656	Advanced Technology of Pulp and Paper	2	4.4
9	KTT 601	Solid Wood Chemistry	2	4.4
10	KTT 665	Variability of Wood Properties	1	4.4
11	KTT 675	Wood Formation and Qualities	1	4.4
12	KTT 676	Tree Growth Stress	2	4.4
13	KTT 677	Formation and Characteristic of Reaction Wood	2	4.4
14	KTT 678	Wood Microtechnique	1	4.4
15	KTT 650	Tropical Wood Drying Technology	1	4.4
16	KTT 687	Tropical Wood Preservation Technology	2	4.4
17	KTT 642	Biocomposite Technology	1	4.4
18	KTT 680	Composite Materials	1	4.4

19	KTT 602	Binderless Biocomposite Technology	2	4.4
20	KTT 681	Wood Machinery	1	4.4
21	KTT 682	Wood Modification	2	4.4
22	KTT 683	Life Cycle Assessment	2	4.4
23	KTT 684	Heritage Wood Conservation	2	4.4
24	KTT 685	Non-Timber Forest Product Processing	2	4.4
25	KTT 653	Research Instrumentation of Forest Product Technology	2	4.4
26	KTT 686	Formation of Heartwood and Exudate	1	4.4

2.D. Forest Resource Conservation Elective Courses

No	Code	Courses	Smt.	Workload (ECTS)
1	KTK 618	Vegetation Ecology	1	4.4
2	KTK 621	Landscape and Biodiversity Conservation	1	4.4
3	KTK 623	Wildlife Habitat Management	1	4.4
4	KTK 625	Wildlife Ecology	1	4.4
5	KTK 628	Ecosystem Ecology	1	4.4
6	KTK 634	Mangrove Ecology	1	4.4
7	KTK 608	Ecotourism Business	2	4.4
8	KTK 610	Watershed Management	2	4.4
9	KTK 619	Tropical Forest Ecology	2	4.4
10	KTK 627	Integrated Coastal Area Management	2	4.4
11	KTK 632	Advanced Aquatic Ecology	2	4.4
12	KTK 637	Environmental Impact Analysis	2	4.4
13	KTK 624	Wildlife Population Management	2	4.4
14	KTK 617	Tropical Forest Hydrology	1	4.4
15	KTK 670	Forest Resource Conservation Policy	2	4.4
16	KTK 665	Economic Valuation of Conservation Areas	2	4.4
17	KTK 640	Conservation Area Restoration	2	4.4
18	KTK 669	Advanced Conservation Area Management	2	4.4
19	KTK 666	Seminar of Forest Resource Conservation	2	4.4
20	KTK 667	Forest Resource Conservation Modelling and System Analysis	2	4.4
21	KTK 668	Forest Resources Conservation Research Methods	2	4.4
22	KTK 630	Ecotourism Planning	1	4.4
23	KTK 631	Forest Landscape Management for Tourism	1	4.4

2.E. FORESTRY EXTENSION ELECTIVE COURSES

2.E.1. Integrated of Forestry Extension Elective Courses

No	Code	Courses	Smt.	Workload (ECTS)
1	KTT 669	Forest Product Added Value Improvement	1	4.4
2	KTB 664	Intensive Silviculture-Based Agroforestry	1	4.4
3	KTK 659	Participatory Forestry Extension Methods	1	4.4
4	KTK 660	Psychology of Environmental and Forestry Extension	1	4.4
5	KTK 662	Forestry Development Communication	1	4.4
6	KTM 616	Forest Resource Politic and Conflict Management	1	4.4
7	KTK 661	Forestry Extension Planning	2	4.4
8	KTK 619	Tropical Forest Ecology	2	4.4
9	KTM 605	Empowerment and Deliberative Policy	2	4.4
10	KTF 601	Entrepreneurship	2	4.4
11	KTK 663	Media Production	2	6.6
12		Other Elective Courses	2	8.8

2.E.2. OPTIONAL COURSES IN FORESTRY EXTENSION

No	Code	Courses	Smt.	Workload (ECTS)
1	KTM 645	Advanced Forestry Policy	2	4.4
2	KTK 664	Non-Profit Organization Management	2	4.4
3	KTT 670	Non-Timber Forest Product Management	2	4.4
4	KTF 602	Case Study	2	4.4

1.A. ELECTIVE COURSES OF STUDY PROGRAMME

No	Code	Courses	Smt.	Workload (ECTS)
1	KTF 601	Entrepreneurship	2	4.4
2	KTF 602	Case Study 1	2	4.4
3	KTF 603	Case Study 2	2	4.4
4	KTF 604	Case Study 3	2	4.4
5	KTF 605	Case Study 4	2	4.4

CHAPTER IV

SYLLABUS

KTU 698 The Analysis of Forest Development Sustainability (2 Credits)

Lecturer :

Prof. Dr. Ir. San Afri Awang, M.Sc.

Syllabus:

The competency of this course is to be able to explain the history and concept of sustainable development and forest development in Indonesia, as well as its application and the influencing factors. The material courses cover the history and concept of sustainable development, Indonesian forestry development, forest destruction, implementation of forest community development, and carbon incentive mechanisms.

Learning methods include providing material in class, self-learning, and group discussion. Assessment is carried out by quiz, assignment, mid-semester exam, and final exam.

References:

- Awang, S. 1991. HP Membangun Desa Hutan. Dalam Prospek Pedesaan: hutan, Perladangan dan Pertanian Masa Depan. Prospek Pedesaan, edisi keenam. Yogyakarta: P3PK UGM.
- Bartelmus, P. 1994. Environment, growth and development: the concepts and strategies of sustainability. London, Routledge.
- Cutter, SL. 1995. The forgotten casualties: women, children and environmental change. *Global Environmental Change* 5 (3): 181-194
- Kementerian Kehutanan. 1998-2014. Statistik Kehutanan. Kementerian Kehutanan. Jakarta.

KTU 697 Forestry Scientific Method (2 Credits)

Lecturers:

Prof. Dr. Ir. Djoko Marsono & Prof. Dr. Ir. Soemardi, M.For.Sc.

Syllabus:

The competency of this course is to enable students to explain techniques for conceptual and proportional analysis, types of logic, research planning, defining scientific conclusions, and determining research methodology. The course material includes components of process, planning, deducing, analysis of concept and proportion, development of plans, theory development and implementation, principles of assessing new concepts, measurement and experimental techniques, reasoning method, postulates evaluation, mathematical model application, progressive synthesis methodology, and scientific research strategy.

Learning methods consist of providing material in class, self-learning, and group discussion. Assessment is carried out by quiz, assignment, mid-semester exam, and final exam.

References:

- Ford, DE. 2000. Scientific method for ecological research. Cambridge University Press, Cambridge.

Fowler, J.L., Cohen L., & Jarvis P. 2006. Practical statistics for field biology. John Wiley & Son. New York.

Ludwig, J.A. & Reynolds, J.F. 1998. Statistical ecology. John Wiley & Son, New York.

KTU 695 Forestry Statistic (2 Credits)

Lecturer:

Dr. Ir. Ronggo Sadono

Syllabus:

A lecture with two credits. What to learn: data classification and appropriate analysis selection; the objective and procedure of Double Linear Regression Analysis; analysis techniques and procedure; factor, cluster, discriminant, and procedure of Non-Parametric Statistical Analysis.

References:

Assmann, E. 1970. The Principle of Forest Yield Study. Pergamon Press. Oxford-New York-Toronto-Sydney-Braunschweig.

Pandy, D. 1983. Growth and Yield of Plantation Species in The Tropics. FAO, Rome.

KTU 694 Tropical Forest Management (2 Credits)

Lecturers :

Dr. Ir. Nunuk Supriatno, M.Sc.; Dr. Ir. Rishadi Purwanto, M.Agr.Sc.; Dr. Ir. Ronggo Sadono;

Dr. Wahyu Wardhana, S.Hut., M.Sc.

Syllabus:

The aim of this course is to develop knowledge and skills as well as attitudes in managing tropical forest resources. Students are expected to understand the system of tropical forest resources management, which includes biophysical or ecological, technical, environmental, social, and economic. The course syllabus covers the integration of all planning and managing aspects of sustainable tropical forest resources. This course becomes the basis of the policy framework that regulates the management of sustainable tropical forest resources; the practical design of forest resource management within the context of tropical landscape; and the development and implementation of tropical forest resources management planning.

References:

Davis, L.S., Johnson, K.N., Bettinger, P.S. and Howard, T.E. 2001. Forest Management: To Sustain Ecological, Economic, and Social Values.

KTU 693 Silviculture of Tropical Forest (2 Credits)

Lecturers:

Prof. Dr. Ir. Suryo Hardiwinoto, M.Agr.Sc.; Prof. Dr. Ir. Mohammad Na'iem, M.Agr.Sc.; Dr. Ir.

Eny Faridah, M.Sc.; Dr. Ir. Sri Rahayu, M.P.

Syllabus:

Natural and Plantation Forests Review. Tropical and Temperate Forests Ecosystem. Silviculture System: Selective-Cutting and Planting. Intensive Silviculture for Meranti. Plant Production and Planning. Plant Breeding: Reproduction Method and Seedling Technology. Uneven-Aged Stands Growth and Thinning Method. Tree Health Management. Harvesting Method.

References:

Nyland, R.D. 1996. *Silviculture, Concepts and Applications*. The McGraw-Hill Companies Inc. Singapore

KTU 692 Conservation of Tropical Forest Resources (2 Credits)

Lecturers:

Dr. Sena Adi Subrata, S.Hut., M.Sc.; Dr. Much. Taufik Tri Hermawan, S.Hut., M.Si.

Syllabus:

References:

KTU 691 Value-Added of Tropical Forest Product (2 Credits)

Lecturers:

Dr. Joko Sulistyono, S. Hut., M.Sc.; Dr. Ragil Widyorini, S.T., M.T; Tomy Listyanto, S.Hut., M.Env.Sc., Ph.D.; Dr. Sigit Sunarta, S.Hut., M.P.; Dr.Ir. Johanes Pramana Gentur Sutapa, M.Sc.

Syllabus:

Wood characteristics. Inferior Woods Quality Improvement. Solid Wood Modification. Wood Product Engineering. Wood Processing for Energy. Extractive Products Development. Cultivation Products Development.

References:

Hill, C.A.S. 2006. *Wood Modification: Chemical, Thermal and Other Processes*. John Wiley & Sons, West Sussex.

Walker, J.C.F. 2006. *Primary Wood Processing: Principles and Practice*. Chapman & Hall, London

KTU 690 English Academic (2 Credits)

Lecturers:

Dr. Ir. Eny Faridah, M.Sc., Dr. Ir. Ambar Kusumandari, M.ES., Tomy Listyanto, S.Hut., M.Env.Sc., Ph.D.

Syllabus:

References:

KTB 602 Ecosystem-Based Forest Protection (2 Credits)

Lecturers:

Dr. Ir. Musyafa, M.Sc.; Prof. Dr. Ir. Soemardi M.For.Sc.; Prof. Dr. Ir. SM. Widyastuti, M.Sc.; Dr. Ir. Sri rahayu, M.P.; Ananto Triyogo, S.Hut., M.Sc., Ph.D.

Syllabus:

The subject matter is directed to the position and function of forest protection as one of the functions that must be carried out by silviculturists in planning and implementing silviculture. The material includes: Integrated Forest Health Management with a damage control approach; The Principles and Approaches of Ecology Ecosystem; and Forest Management with Silviculture-Based. The whole discussion starts with understanding protection as a science, for example, The Principles of Forest Protection as one of the courses in the undergraduate program.

References:

- Cossalter, C. dan K.S.S. Nair. 2000. The state of the forest and plantation. In: K.S.S. Nair (Ed). *Insect Pests and Diseases in Indonesian Forests. An assessment of the major threats, research efforts and literature*. CIFOR, Indonesia, 5-9.
- Hawley, R.C. dan P.W. Stickel. 1948. *Forest Protection*. 2nd ed. John Wiley & Sons, Inc. New York. 355 pp.
- Kimmins, J.P. 1997. *Forest Ecology. A foundation for sustainable management. Second Edition*. Printice, Upper Saddle River, New Jersey, 596 pp.

KTB 660 Monitoring of Tropical Forest Pests and Diseases (2 Credits)

Lecturers:

Dr. Ir. Sri Rahayu, M.P.; Prof. Dr. Ir. SM Widyastuti, M.Sc.; Dr. Ir. Musyafa, M.Sc.; Ananto Triyogo, S.Hut., M.Sc., Ph.D.

Syllabus:

Insects Function in Ecosystem; Insect Classification based on Feeding Habits; Ecology of Insects; Principal and Techniques of Integrated Pest Management; The Concept of Integrated Pest Management; Population Dynamics of Forest Insect; The Principles of Population Modification and Regulation Using Artificial and Natural Agent; Monitoring of Pest Population and Forest Stand.

References:

- Coulson, R.N. and Witter, J.A. 1984. *Forest Entomology. Ecology and Management*. John Wiley and Sons. New York.
- Schowalter, T.D. 1996. *Insect Ecology*. Academic Press. San Diego.
- Journal of Economic Entomology.

KTB 605 Anthropogenic Damage (2 Credits)

Lecturers:

Dr. Ir. Musyafa, M.Sc.; Prof. Dr. Ir. Sumardi M.For.Sc.; Ananto Triyogo, S.Hut., M.Sc., Ph.D.

Syllabus:

The discussion will cover about characteristics and dimensions of the biology and sociology of anthropogenic damage. Besides, the material will provide comprehensive concepts, methods,

practical asset security and protection, and the implementation opportunity for forest resources management.

References:

- Bastian O, C. Beierkuhnlein, H.-J Klink, J. Löffler, M. Volk, M. Wilmking. 2002. Landscape Structures and Processes. In : O. Bastian and Uta Steinhardt (eds). Development and Perspectives of Landscape ecology. Kluwer Academic Publishers, London, pp. 49-112.
- Bastian O, B. C. Meyer, E. Panse, M. Roder, R.-U Sirbe. Landscape assessment. In : O. Bastian and Uta Steinhardt (eds). Development and perspectives of landscape ecology. Kluwer Academic Publishers, London, pp. 206-256.
- Magrath, W.B, R.L. Grandalski, G.L. Stuckey, G.B. Vikanes, G.R. Wilkinson. Timber theft prevention. Introduction to security for forest management. The World Bank, Washington.

KTB 654 Abiotic Stresses and Plant Physiology (2 Credits)

Lecturers:

Dr. Ir. Eny Faridah, M.Sc.; Dr. Ir. Handojo Hadi Nurjanto, M.Agr.Sc.

Syllabus:

The course will focus on general abiotic stresses in which frequently experienced by tropical plants, such as stress because of water, temperature, drought, nutrition, acidity, and salinity. The general mechanisms of occurrence from each stress and plant physiology response will be explained in detail. Furthermore, the discussion is not limited to morphology level but is directed to physiology and cellular biology instead. The advanced discussion will happen at the genetic level (DNA/RNA) for some stresses.

References:

- Nilsen ET & Orcutt DM. 1996. *Physiology of Plants under Stress - Abiotic Factors*. New York, John Wiley & Sons.
- Nilsen ET & Orcutt DM. 1996. *Physiology of Plants under Stress - Soil and Biotic Factors*. New York, John Wiley & Sons.
- Smallwood MF, Calvert CM, & Bowles DJ (eds). 1999. *Plant Responses to Environmental Stress*. Oxford, BIOS-Scientific Publisher Ltd.
- Hopkins WG & Huner ND. 2004. *Introduction to Plant Physiology*. New York, John Wiley & Sons.

KTB 617 Soil Fertility of Tropical Forest (2 Credits)

Lecturers:

Prof. Dr. Ir. Cahyono Agus DK M.Agr.Sc.; Dr. Dra. Winastuti Dwi Atmanto, M.P.; Dr. Ir. Handojo Hadi Nurjanto, M.Agr.Sc.; Dr. Ir. Haryono Supriyo M.Agr.Sc.

Syllabus:

Soil Fertility Aspect Reviewed: chemical (pH, nutrient status, cation exchange capacity & anion exchange capacity); physical (solum, structure); biological (bacterium, earthworms); and mineralogy (soil types) aspects. Nutrients Cycle: nitrogen, phosphorus,

calcium, potassium, sulphur, carbon, magnesium, and micro nutrients. Indonesian Problem Soils (Entisols, Inceptisols, Andisols, Oxisols, Ultisols, Alfisols, Vertisols dan Histosols).

Fertilization with Nutrients (essential defining of macro and micro, nutrients status, and the form of absorption); factors that affected the availability of nutrients (pH, water stress, and oxygen); procedure of the analyzed sample (soil, leaves, water, and objective); organic fertilizer (compost, manure, etc) versus inorganic fertilizer (single, compound, etc); biological fertilizer; characteristics of fertilizer (nutrients component, solubility, etc)

References:

Brady NC. 2000. The Nature and Properties of Soils.

Mengel K & Kirkby EA. 1995. Principles of Plant Nutrition.

Havlin JL, Beaton JD, Tisdale SL & Nelson WL. 2005. Soil Fertility and Fertilizers. An Introduction to Nutrient Management. 7th ed. Pearson Prentice Hall.

KTB 620 The Advanced Tree Breeding (2 Credits)

Lecturers:

Prof. Dr. Ir. Mohammad Naiem, M.Agr.Sc.; **Dr. Ir. Eko Bhakti Hardiyanto, M.Sc.**; Dr. Sapto Indrioko, S.Hut., M.P.

Syllabus:

An advanced course of tree breeding and forest genetic issues. The emphasizing material in experimental design and data analysis for genetic test, genetic parameter valuation, method and strategy of breeding.

References:

William, E. R., Matheson, A.C. and Harwood, C. 2002. Experimental design and analysis for tree improvement. Second edition. CSIRO Publishing, Collingwood Victoria, Australia. 214p.

Handbook of quantitative forest genetics. 1992. Fins, L., Friedman, S.T., Brottschol, J.V. (eds.). Kluwer Academic Publishers.

Zobel, B.J. and Talbert, J.T. 1984. Applied forest tree improvement. John Wiley & Sons. New York. 505p.

KTB 623 Tropical Forest Seed Technology (2 Credits)

Lecturers:

Prof. Dr. Ir. Mohammad Naiem, M.Agr.Sc.; Dr. Yeni Widiana N.R, S.Hut., M.Sc.

Syllabus: see

Further explanation about the biological reproduction of forestry plants, the occurrence of hereditary, breeding system, also aspects within it such as self-incompatibility and self-sterility. Other than that, the course will dig deeper into physiology and seed handling.

References:

McDonald, M.B., Kwong, F.Y. 2005. Flower seeds, biology and technology. CABI Publishing. Oxfordshire, Cambridge.

- McDonald, M.B. & Copeland, L. 1997. Seed production, principles and practices. Chapman & Hall. New York.
- Copeland, L.O. & McDonald, M.B. 2001. Principles of seed science and technology, 4th ed. Kluwer Academic Publishers. Massachusetts.
- Benech-Arnold, R.L. & Sánchez (eds.). 2004. Handbook of Seed Physiology, applications to Agriculture. Food Products Press. New York, London, Oxford.

KTB 624 Conservation of Genetic Resources (2 Credits)

Lecturers:

Dr. Sapto Indrioko, S. Hut., MP.; Prof. Dr. Ir. Mohammad Na'iem, M.Agr.Sc.

Syllabus:

The principles and correlation between genetic structure and species extinction. Various evolution aspects within a natural population. Population fragmentation and a breeding system of limited population as well as the affection of inbreeding and genetic viability. Genetic resource valuation procedure and management of population genetic diversity.

References:

- Frankham, R., Ballou, J.D., & Briscoe, D.A. 2002. Introduction to conservation genetics. Cambridge University Press. Cambridge.
- Young, A, Boshier, D. & Boyle, T. (eds.). 2000. Forest conservation genetics, principles and practice. CABI Publishing.
- Landweber, L.F., Dobson, A.P (eds.). 1999. Genetics and the extinction of species. Princeton University Press. Princeton.

KTB 626 Agroforestry Silviculture (2 Credits)

Lecturers:

Dr. Budiadi, S. Hut., M.Sc.; Prof. Dr. Ir. Moch. Sambas Sabarnurdin, M.Sc.; Widiyatno, S.Hut., M.Sc., Ph.D.

Syllabus:

The definition of agroforestry planting is a pattern of tree-based landscape management, the meaning of efficiency is described as taking advantages from tree existence. The basic knowledge that must be developed as a strategy for the cultivation of agroforestry ecosystem plants includes:

- Philosophical Approaches of Silviculture Agroforestry
- Plant-Regeneration Methods
- The Various Patterns of Agroforestry Planting
- Biodiversity Concept and Application of Mixed-Planting
- Environmental Manipulation and Biofertilizer Application
- Species Selection and Domestication
- Productivity Maintenance with Organic Farming-Based
- Biomass Cycle Intensity Improvement, Nutrients Cycle, and Nutrient Use Efficiency (NUE)

- The Analogy of Agroforestry-Nature Forest Succession
- Landscape Agroforestry
- Silviculture Systems for Agroforestry Planting

References:

Ashton MS and Montagnini F (2000) *The Silvicultural Basis for Agroforestry Systems*. CRC Press LLC, Florida

Elevitch C. and Wilkinson K. (1999) *Nitrogen fixing tree start-up guide*. AgroForester, Hawaii.

Elevitch C. and Wilkinson K. (1999) *A guide to orchard alley cropping for fertility, mulch and soil conservation*. AgroForester, Hawaii

KTB 670 Forest Biotechnology (2 Credits)

Lecturers:

Dr. Sapto Indrioko, S.Hut, MP & Prof. Dr. Ir. Mohammad Naiem, M.Agr.Sc.

Syllabus :

The aim of this course is to enhance knowledge of the position and role of biotechnology within tree breeding activities. The material includes: The Principals of Molecular Genetics; The Designation and Application of Genetics; The Principles and Methods of Genetic Manipulation; The Engineering of Forestry Plant Genetic; and The Risks and Advantages of Transgenic Plants.

References:

Griffiths, A., Wessler, S., Lewontin, R., Gelbart, W. 2005. *Introduction to Genetic Analysis*, 8th ed. W.H. Freeman & Co. New York.

Kumar, S., Fladung, M. (eds.). 2004. *Molecular Genetics and Breeding of Forest Trees*. The Haworth Press, Inc. New York.

KTB 631 Plantation Forest Disease Management (2 Credits)

Lecturers:

Prof. Dr. Ir. S. M. Widyastuti, M.Sc.; Dr. Ir. Sri Rahayu, M.P.

Syllabus:

Introduction; Biotic and Abiotic Diseases; Introduction of Disease-Causing Organisms; Nursery Disease; Root and Stem Disease; Leaf Disease; Decrease of Forest Quality; Forest Disease Management; Special Interest: Biological Control; Resistance.

References:

Edmonds, R. L., Agee, J. K. and Gara, R. I. 2000. *Forest health and protection*. McGraw-Hill, New York.

Tainter, F. H. and Baker, F. A. 1996. *Principles of Forest Pathology*, Wiley, New York.

Internet.

KTM 602 Practicum of Applied Statistical Methods (1 Credits)

Lecturer:

Dr. Ir. Ronggo Sadono

Syllabus:

Studying data classification and testing. Data analysis with parametric statistical procedures, non-parametric correlation analysis, and data analysis with non-parametric procedures.

References:

Pramesti, G. 2006. Panduan Lengkap PS 13.0 dalam Mengolah Data Statistik. PT Elex Media Komputindo, Jakarta.

Santoso, S. 2006. Seri Solusi Bisnis Berbasis TI : Menggunakan SPSS untuk Statistik Parametrik. PT Elex Media Komputindo, Jakarta.

_____. Seri Solusi Bisnis Berbasis TI : Menggunakan SPSS untuk Statistik Multivariat. PT Elex Media Komputindo, Jakarta.

_____. Seri Solusi Bisnis Berbasis TI : Menggunakan SPSS untuk Statistik Non Parametrik. PT Elex Media Komputindo, Jakarta.

KTM 603 Quantitative Management of Sustainable Forests (2 Credits)

Lecturers:

Dr. Ir. Ris Hadi Purwanto, M.Agr.Sc.; Dr. Ir. Nunuk Supriyatno, M.Sc

Syllabus:

Terms and concepts of forest sustainability; Development of the concept of forest sustainability and the conditions for realising forest sustainability; Definition and concept of normal forests; Yield tables and forest reservoirs (*growing stock*); Definition and types of cycles/rotations; How to determine cycles/rotations; Various forest budding systems commonly applied for the realisation of forest sustainability; Calculation of etat based on area, volume and increment of forest stands; Calculation of etat based on optimisation approach; Environmentally friendly forest harvesting plans for the realisation of forest sustainability and forest companies.

References:

Leuschner, W.A. 1984. Introduction to Forest Regulation. John Wiley & Sons, New York.

Clutter J.L. *et al.*, 1983. Timber Management: A Quantitative Approach. John Wiley & Sons, New York.

Knuchel, H. 1953. Planning and Control in the Managed Forest. Oliver & Boyd, London: 98 Great Russell Street, W.C.

Davis, K.P. 1952. Forest Management: Regulation and Valuation. McGraw-Hill-Company, New York.

KTM 604 Agroforestry Management (2 credits)

Lecturer:

Prof. Dr. Ir. San Afri Awang, M.Sc.; Prof. Dr. Ir. Wahyu Andayani, M.S.

Syllabus:

Agroforestry epistemology, scope and deepening of agroforestry management material, agroforestry domain in tropical land use systems, sustainable agriculture systems,

evaluation of land use systems from socio-cultural and economic perspectives. Agroforestry planning complexity, agroforestry management aspects, economic benefits of mixed cropping pattern land management (i.e: agroforestry); farming analysis (cropping pattern, mixed cropping system pattern, farm capital theory, investment, balance sheet/budgeting, cash flow, cost-income-return analysis, economic efficiency, price analysis, risk analysis, marginal analysis, farm credit, tax theory); production theory (relationship between products, competitive combination, complementary, supplementary, joint-cost, technical-economic efficiency analysis, marginal analysis, elasticity, optimisation theory / optimum combination of agroforestry pattern land management); business feasibility analysis (using several indicators: NPV, NFV, B/C Ratio, IRR, ERR, AEV, EAI, EAA, LEV); interest theory (macro-micro); sensitivity analysis (sensitivity, post-optimality); Agroforestry research experience.

References:

- Andayani, W. 2005. *Ekonomi Agroforestry*. Debut press, Yogyakarta.
- Buck, L.E; Lassoie, J.P; and Fernandez, E.C.M. (Eds). 1999. *Agroforestry in Sustainable Agricultural Systems*. New York : Lewis Publishers.
- Doll, J.P. & Orazem, F. (1984). *Production Economics : Theory with Applications*. Grid Inc.,Columbus Ohio.
- Ellis, Frank.1988. *Peasant Economics : Farm households and agrarian development*. Cambridge, New York, New Rochelle, Melbourne, Sydney.
- Fillus, A.M. 1982. *Economic Aspects of Agroforestry*.
- Kragten, M; Tomich, T.P; Vosti, S; and Gronkowski. 2001. *Evaluating Land Use System from A Socio Economic Perspective*. Bogor.ICRAF.
- MacDikken, KG and Vergara, N.T. 1989. *Agroforestry: Classification and Management*. New York: John Wiley & Sons.

KTM 605 Deliberative Empowerment and Policy (2 credits)

Lecturer:

Prof. Dr. Ir. San Afri Awang, M.Sc.

Syllabus:

Empowerment epistemology and deliberative policy; forest natural resources conflict; the concept of community empowerment related to natural resources; Local action and impact on policy; Participatory poverty assessment of forest communities; theories and concepts of public policy; policy methods, policy implementation and evaluation; policy conflict and deliberation in networked forest communities; reviewing theories and thoughts on positivist and deliberative policy debates; The principles of deliberative policy analysis; deliberative policy case studies on forest natural resources; Deliberative policy research opportunities.

References:

- Tyler, S.R (ed). 2006. *Communities, Livelihoods and Natural Resources : Action research and policy change in Asia*. Ottawa : International Development Research Center.
- Hajer, M and Wagenaar, H. 2003. *Deliberative policy Analysis : Understanding governance in the network society*. USA : Cambridge University Press.
- Dunn, W.N. 2000. *Pengantar Analisis Kebijakan Publik*. Yogyakarta : Gadjah Mada University.

KTM 617 Forest Resources Management Optimisation (2 credits)

Lecturer:

Prof. Dr. Ir. Wahyu Andayani, M.S.

Syllabus:

The principles of optimization theory for decision making; matrix-determinant theory; graphical analysis; the standard form of linear program (static model, single objective); simplex; duality; big M; shadow price; canonical-slack variable-artificial variable; post optimal; transportation model, assignment; integer programming; multiple objective programs (minimum deviation); optimization models of SDH management; the introduction of computer program packages.

References:

- Buongiorno. J; Gilles, Keith.J. 1987. Forest Management and Economics: A Primer in Quantitative Methods. MacMillan Publishing Company, New York.
- _____.2003. Decision Methods for Forest Resource Management
- Dykstra, Denis P.1984. Mathematical Programming for Natural Resources Management. Mc. Graw-Hill Book Company, New York.

KTM 618 Forest Resource Accounting (2 credits)

Lecturer:

Dr. Sofyan P Warsito

Syllabus:

Theory of National Income (NI) Formation; NI in Closed and Open Systems; Sustainable Economic Development; Measurement of the role (shares) of the forestry sector in the national economy; Philosophy of Forest Resources (SDH) Sustainability; Two Parameters of Natural Resource Economics (including SDH): stocks and flows; Relationship between stocks and flows in monitoring SDH sustainability; Preparation of Forest Resource Analysis (ASDH) in physical value: for plantation forests and natural forests; Preparation of ASDH in monetary value: preparation of rupiah value of natural forest stands (market value), Preparation of rupiah value of plantation forest stands (cost value). Interpretation of ASDH results in time-series; Integration of ASDH into the Corporate Management Accounting system and in the calculation of sustainable national income; Relationship between ASDH and Environmental Accounting.

References:

- Repetto. 1990. *Natural Resource Accounting*, World Bank Institute.
- Warsito, Sofyan. 1994. *Natural Resources Depletion in Indonesia: A Natural Resource Accounting Approach (unpublished Dissertation, UPLB)*.
- Klemperer, David. 1996. *Forest Resource Economics and Finance*. McGraw-Hill. Singapore.
- Dernburg, Thomas F., Dougall MMC. 1980. *Macroeconomics*. 6th Ed. Mc. Graw-Hill.

KTM 624 Forest Biomass Inventory (2 credits)

Lecturers: Dr. Ir. Ris Hadi Purwanto, M.Agr.Sc.; Dr. Wahyu Wardhana, S.Hut., M.Sc.

Syllabus:

The definition of forest biomass, benefits of forest biomass study in forestry and environment, factors affecting forest biomass, the components of forest biomass, and methods of measuring forest biomass.

References:

- Karizumi, N. 1974. The mechanism and function of tree root in the process of forest production I : "Method of investigation and estimation of the root biomass". Bull. Gov. for. Exp. Sta Number 259 : 1-99.
- Kira, T., Ogawa, H., Yoda, K., & K. Ogino. 1967. Comparative ecological studies on three main types of forest vegetation in Thailand. IV. Dry matter production, with special reference to the Khao Chong rain forest. *Reprinted from* : Nature and Life in Southeast Asia Vol. V (ed.). Published by Fauna & Flora Research Society, Kyoto, 174 pp.

KTM 625 Advanced Forest Products Marketing (2 credits)

Lecturer:

Prof. Dr. Ir. Wahyu Andayani, M.S.

Syllabus:

The concept of forest product commodity marketing in macro and micro economy; general theory of commodity marketing, regulation, marketing system and mixed-marketing analysis and efficiency indicators, demand and supply analysis of forest product, elasticity theory, derived demand concept, marketing strategy, pricing theory, pricing analysis (cost concept, demand, marginal analysis, mark-up, break event point, price discrimination), trading system and efficiency (profit and marketing margin analysis, economic efficiency, trading chain), promotion analysis, commodity market structure and types, marketing research, international trade theory.

References:

- Sinclair, Steven A. 1998. Forest Product Marketing. McGraw Hill.Inc, New York.
- James G. Beierlein. 1991. Agribusiness Marketing : "The Management Perspective" Prentice Hall. Englewood Cliffs. New Jersey 07632.

KTM 636 Advanced Social Forestry (2 credits)

Lecturer:

Dr Ir Ris Hadi Purwanto, M.Agr.Sc

Syllabus:

Discusses the basics of social forestry, teak forests and their environment, forestry and community relations, the development of forest management from timber mining, timber plantation management, forest resource management, forest ecosystem management, and forest management evaluation. The discussion is also on natural forest ecosystems, monoculture crops, polyculture crops, community forest ecosystems and agroecosystems. It also discusses the concept of social forestry on optimal teak forest management, joint forest management and forest models.

References:

- Simon, Hasan, 1982, Analisis Interrelationship Antara Pembangunan Hutan dengan Masyarakat Sekitar Hutan, Tesis S2, Fakultas Pasca Sarjana UGM, Yogyakarta, xv-392*
- Simon, Hasan, 1991, Pedoman Teknis Pilot Proyek Pengelolaan Hutan Jati Optimal di KPH Madiun, Fakultas Kehutanan UGM, Yogyakarta*
- Simon, Hasan, 1993, Hutan Jati dan Kemakmuran, Aditya Media, Yogyakarta, ix-244*
- Simon, Hasan, 1994, Merencanakan Pembangunan Hutan untuk Strategi Kehutanan Sosial, Yayasan Pusat Studi Sumber Daya Hutan, Yogyakarta*
- Simon, Hasan, 1995, Pembangunan Hutan Berwawasan Lingkungan dan Kesejahteraan Masyarakat, Pidato Pengukuhan Guru Besar, Universitas Gadjah Mada, Yogyakarta*
- Simon, Hasan, 2002, Aspek Sosio-Teknis Pengelolaan Hutan di Jawa, Pustaka Pelajar, Yogyakarta*
- Simon, Hasan, 2004a, Problem Sosial dan Pendekatan Pemecahannya, Dalam: Pembangunan Hutan Tanaman Acacia Mangium, PT Musi Hutan Persada, Jakarta, 361-396*
- Simon, Hasan, 2004b, Misteri Syekh Siti Jenar, Pustaka Pelajar, Yogyakarta, xxx-550*
- Simon, Richard, dan Marie-Claude Millet, 1997, Over Indonesia, Archipelago Press, Singapore, 207*

KTM 637 Forest Growth Science (2 credits)

Lecturer:

Dr Ir Ronggo Sadono

Syllabus:

Study the objectives and methods of forest growth research, basic characteristics of forest growth, tree form and growth, wood increment as an organic product, stand structure and forest growth, growth regulation efforts and their effects, and growth models.

References:

- Assmann, E. 1970. The Principle of Forest Yield Study. Pergamon Press. Oxford-New York-Toronto-Sydney-Braunschweig.
- Pandy, D. 1983. Growth and Yield of Plantation Species in The Tropics. FAO, Rome.

KTM 645 Advanced Forestry Policy (2 credits)

Lecturer:

Prof. Dr Ahmad Maryudi, S.Hut, M.For.

Syllabus:

Discusses the basics of forestry policy; the formulation of forestry policy; the hierarchy of forestry policy which includes micro, meso and macro policies and their integration; cases of forestry policy in Java, outside Java, and abroad such as in Sabah, Germany, America, and New Zealand, as well as developing forests in Indonesia including national forest development, forests in Sumatra, Kalimantan, Sulawesi, forest development in Java, Nusa Tenggara, Maluku and West Papua.

References:

Hasanu Simon, 1980, *Perladangan di Riam Kanan, Kalimantan Selatan*, Makalah dalam Seminar Perladangan dan Pembangunan Kawasan Hutan Tidak Produktif, Fakultas Kehutanan UGM, Yogyakarta.

Hasanu Simon, 1993, *Hutan Jati dan Kemakmuran*, Aditya Media, Yogyakarta, ix-224

Hasanu Simon, 2000, *Pengelolaan Hutan Bersama Rakyat (Cooperative Forest Management), Teori dan Aplikasi pada Hutan Jati di Jawa*, Bigraf Publishing, Yogyakarta, xiii-229

KTM 646 Forest Production (2 credits)

Lecturer:

Dr Ir Rishadi Purwanto, M.Agr.Sc

Syllabus:

Definition of forest production, benefits of forest production studies in forestry and the environment, factors affecting forest production, several components of forest production, and methods of measuring forest production.

References:

Du vignaud, P. 1971. Productivity of forest ecosystems. Unesco Paris. 707 pp.

Fujimori, T. & D. Whitehead. 1986. Crown and canopy structure in relation to productivity. Forestry and Forest Products Research Institute Po Box. 16, Tsukuba Norin Kenkyu Danchi-Nai Ibaraki 303, Japan, 448 pp.

Jones, G. 1979. Topics in applied geography vegetation productivity. Published in the United States of America, Longman, London and New York, 100 pp.

Lieth H and R.H. Whittaker (ed.).1975. Primary productivity of the biosphere. Springer-Verlag, New York, 339 pp.

Ogawa, H. & T. Kira. 1977. Primary productivity of Japanese Forests: - productivity of terrestrial communities. Japanese Committee for the International Biological Program. University of Tokyo Press, 289 pp

KTT 601 Solid Wood Chemistry (2 credits)

Lecturer:

Prof. Dr Ganis Lukmandaru, S.Hut, M.Agr.Sc.; Dr Ragil Widyorini, S.T., M.T.

Syllabus:

The course focuses on the reactions and chemistry of wood and its products covering aspects of basic and chemical properties, reactivity, surface chemistry and degradation of wood.

References:

Fengel, D., G. Wegener. 1989. Kayu: Kimia, Ultrastruktur, Reaksi-reaksi. Gajah Mada University Press (diterjemahkan oleh Sastrohamidjojo H.) Yogyakarta.

Hon, D.N.S., N. Shiraishi (eds). 2001. Wood and Cellulosic Chemistry. Marcel Dekker, New York.

Rowell, R.M. (ed). 1984. The Chemistry of Solid Wood. American Chemical Society, Seattle, Washington.

Rowell, R.M. (ed). 2005. Handbook of Wood Chemistry and Wood Composites. CRC Press. USA.

Zabel, R.A., Morrell J.J. 1992. Wood Microbiology: decay and its prevention. Academic Press Inc.

KT 642 Biocomposite Technology (2 credits)

Lecturer:

Prof. Dr. Ir. TA Prayitno, M.For.; Muhammad Navis Rofii, S.Hut., M.Sc., Ph.D.; Dr. Ragil Widyorini, S.T., M.T.

Syllabus:

Discusses the principles of biocomposites; wood and other materials. Wood composites: dimensions of wood: long, short, fibre and chemical elements; agricultural waste: sawdust, husks; plant waste: kenaf, hemp, pineapple stem, oil palm, rubber, bamboo and other materials. Biocomposite production process, factors affecting wood material, factors affecting process and standards.

References:

Lyons,JS.and MR.Ahmed. 2005. Factors affecting bond between wood and polymer composite. Journal of Reinforced plastic and composite 24 (4)'405-412

Moses,DM. 2003. Composite behavior of laminated strand lumber; wood sci and Tech.Jour

Mule,JL AM. Krysiak and P.Chow. 2004. Composite panels made of biofibers and wastepaper bonded with thermoset and thermoplastic resin, USDA for prod.Lab

KT 650 Tropical Wood Drying Technology (2 credits)

Lecturer:

Tomy Listyanto, S.Hut, M.Env.Sc., Ph.D.; Dr. Ir. Yustinus Suranto, M.P.

Syllabus:

Drying schedules for tropical timber, specialised drying schedules, stress on timber during drying, preparation of drying schedules, Terazawa method, sun drying, and timber drying in some timber mills.

References:

Simpson, WT.(ed).1991. Dry Kiln Operator's Manual. USDA Forest Service. FPL Madison

McMillen, J.M dan Wengert, E.M.1978 Drying Eastern Hardwood Lumber. Agric. Hdbk Number 528. USDA Forest Service FPL Madison

Forest Products Research Society. Forest Product Journal

KT 687 Tropical Wood Preservation Technology (2 credits)

Lecturer:

Tomy Listyanto, S.Hut, M.Env.Sc., Ph.D.; Dr. Ir. Yustinus Suranto, M.P.

Syllabus:

Factors affecting the treatability of wood, methods to improve, retention and concentration of formulas in pressure treatment, physical and chemical effects of preservatives and effectiveness of wood preservatives, fixation, leaching, evaporation and biodeterioration of preservation, chemical changes, effects of cutting, drilling, maintenance, construction and environment, pollution control, water quality standards, pollution control by process changes in factories, pollution control by maintaining sanitation, and pollution control by processes in liquid waste, pollution control in some chemical industries.

References:

Nicholas, D.D. 1973. Wood Deterioration and Its Prevention by Preservative Treatment. Vol. II. Syracuse University Press, Syracuse.

KTТ 653 Forest Product Technology Research Equipment (2 credits)

Lecturer:

Prof. Dr Ir. TA Prayitno, M.For.

Syllabus:

Discusses equipment specifications used in forestry research; instrumentation systems, mechanics, electrical and mechatronics; open loop, closed loop, batch and continuous types, sensors, condition signals, displays, actuators, non-destructive tests: scanning, sound, vibration, electromagnetic.

References:

Amstrong, M. 2003. Wood quality. A review of wood quality requirements for processing and the development of non destructive evaluation techniques for wood property traits. Hardwood Queensland report no 6

Beall, F.C. 2003. Future of non destructive evaluation of wood and wood based material, keynote address of symposia of NDE

Carter,P, X.Wang, RJ. Ross and D.Briggs. 2005. NDE of logs and standing trees using new acoustic tools technical and results. The Fourth international symposium on NDT of wood.

Lenk, JD. 1980. Handbook of controls and instrumentation. PrenticeHall. Englewood

Wang, X, A. Salenikovich, M.Mochamad dan LJ.Hu. 2005. Evaluation of Density distribution in wood based panel using x ray scanning. The 14th international symposium on NDE of wood.

KTТ 665 Variability of Wood Properties (2 credits)

Lecturer:

Prof. Dr. Ir. Soenardi Prawirohatmojo; Prof. Dr. Ir. Sri Nugroho Marsoem, M.Agr.Sc., Fanny Hidayati, S.Hut., M.Sc., Ph.D.

Syllabus:

Variability of wood properties includes: phenomena of wood properties variability; causes of wood properties variability; and influence of tree variability/wood properties on wood usages as construction material and/or as raw material for pulp and paper.

References:

Chafe, S.C. 1979. Growth Stress in Trees. Australian Forestry Research. Vol. 9 (3) pp 203-223

Desch, H.E. Revised by D.H. Dinwoodie. 1983. Timber, its Structure, Properties and Utilization, McMillan Euc. London

Haygreen, J.G. and J.L. Bowyer. 1989. Forest Product and Wood Science. IOWA State Univ. Press/ Ames

Panshin, A.J. and Carl de Zeeuw. 1980. Textbook of Wood Technology. McGraw Hill Book Co, N.Y

Soenardi Prawirohatmodjo. 2004. Development of Heartwood. Paper Prepared of Publication

Tsoumis, G. 1991. Science and Technology of Wood. Structure, Properties and Utilization, van Nostrand, Reinhold, N.Y.

KTG 654 Extractive Properties of Wood (2 credits)

Lecturers:

Dr.Ir. Johaness Pramana Gentur Sutapa, M.Sc.; Dr. Ganis Lukmandaru, S. Hut., M.Agr.

Syllabus:

This course studies and provides an overview of: (1) extractives in wood and their variations, (2) sources of extractives, (3) the relationship between extractives and wood processing, (4) the relationship between extractives and wood durability, (5) the relationship between extractives and wood gluing, (6) the use of extractives as fungicides, (7) the relationship between extractives and wood drying, (8) Extractive relationship with pulp and paper industry, (9) extractive use as a colour material, (10) extractive use as medicine/health aspect, (11) creativity and innovation used in extractive product utilization, (12) optimization of extractive products.

KTG 608 Ecotourism Business (2 credits)

Lecturers:

Prof. Dr. Ir. Lies Rahayu Wijayanti Faida, M.P.; Prof. Dr. Ir. Djoko Marsono; Prof. Chafid Fandeli

Syllabus:

Old to new paradigm shift on tourism, mass tourism, special interest and ecotourism. The difference between mass tourism and green tourism from a product and market perspective. Ecotourism enterprise.

References:

Aronson L. 2000. The Development of Sustainable tourism. Continuum. London

Eagles, PFJ dan Stephen FMc, Cool. 2002. tourism in national parks and protected areas. Planning and Management. CABI Publishing. NY

Fandeli C dan Nurdin M. 2005. Pengembangan Ekowisata berbasis Konservasi Taman Nasional. Fakultas Kehutanan UGM

Lindberg D dan Donald EH. 1993. Ecotourism. A Guide for Planner and Manager. The Ecotourism Society. North. Benington. Vermont

KTK 610 Watershed Management (2 credits)

Lecturers:

Prof. Dr. Ir. Ambar Kusumandari, M.E.S.; Dr. Hatma Suryatmojo, S.Hut., M.Si.; Prof. Dr. Ir. Sahid Susanto

Syllabus:

Management of tropical watershed area; Concept of watershed management for policy strategy development; Conceptualisation and planning of watershed management; Economic and institutional aspects of watershed management; Community involvement in watershed management; Review of several case studies.

References:

- Arsyad, S., Amien, I., Sheng, T., and moldenhauer, W. (ed), 1992. Conservation policies for sustainable hillslope farming. Soil and Water Conservation Society, Ankey, Iowa, USA.
- Banskota, M. and Sharma, P (ed)., 1993. Development of poor mountain areas. ICIMOD (International Center for Integrated Mountain Development). Kathmandu, Nepal.
- Fao,1986. Strategies, approaches and systems in integrated watershed management. FAO Conservation Guide 14, Rome.
- _____, 1986. Guidelines for watershed management. Forest Resources Division, FAO Forestry Department, Rome.
- _____, 1986. FAO watershed management field manual : Vegetative and Soil treatment measures. Conservation Guide 13, Rome.
- _____, 1986. Guidelines for economic appraisal of watershed management projects. FAO Conservation Guide 6, Rome.
- _____, 1986. Incentives for community involvement in conservation programs. FAO Conservation Guide 12, Rome.
- ICIMOD (International Center for Integrated Mountain Development, 1993. Mountain Environment and Development.
- Lal, R. and Russell, E.W (ed), 1981. Tropical Agricultural Hydrology. Watershed Management and Land Use. John Wiley & Sons.

KTK 617 Tropical Forest Hydrology (2 credits)

Lecturers:

Dr. Hatma Suryatmojo, S.Hut., M.Si.; Dr. Ir. Ambar Kusumandari, M.E.S.

Syllabus:

Forest hydrology courses study the understanding and scope of hydrology in general and specifically the relationship between hydrology and forestry aspects. The course material includes an understanding of watersheds, rain gauge networks and rainfall analysis, evaporation and infiltration, groundwater, hydrographs, and hydrological models that describe the role of watershed characteristics in relation to watershed water yield. Lecture material is complemented by group discussions and enrichment of material from student papers.

References:

- Batala R.J. dan C. Garcia. 2005. Geomorphological Processes and Human Impacts in River Basins. IAHS Publication 299.
- Chow, V. T., D. R. Maidment, dan L. W. Ways. 1988. Applied Hydrology. McGraw-Hill Book Co. New York.
- Clarke, R.T. 1973. Mathematical Model in Hydrology, FAO Rome.
- Sivapalan, M., T. Wagener, S. Uhlenbrook, E. Zehe, V. Laksmi, Xu Liang, Y Tachikawa A dan P kumar.2006. Predictions in Ungauged Basins : Promise and Progress. IAHS publication 303.
- Oki, T., C. Valeo, K. Heal. 2006. Hydrology 20202. An Integrating Science to Meet World Water Challenges. IAHS publication 300.
- Schultz, E. F. 1976. Problem in Applied Hydrology. Water Resources Publication, Colorado, USA.
- Sri Harto, Br. 1993. Analisis Hidrologi. Pt Gramedia Pustaka Utama, Jakarta.

KTK 618 Vegetation Ecology (2 credits)

Lecturer:

Prof Dr Ir Djoko Marsono

Syllabus:

Study the scope of vegetation ecology, vegetation classification, vegetation ecology orientation, experimental and observational vegetation ecology study approaches, vegetation structure, stratification, spatial distribution, association analysis, vegetation analysis and species abundance, biodiversity, community similarity and dissimilarity, and several vegetation study models.

References:

- Mueller-Dombois, D and H Ellenberg, 1974. Aims and methods of Vegetation Ecology.
- Greis-Smith. 1974. Quantitative Ecology
- Kershaw, KA. 1974. Quantitative and Dynamic plant ecology

KTK 623 Wildlife Habitat Management (2 credits)

Lecturers:

Dr Muhammad Ali Imron, S.Hut., M.Sc.; Dr Sandy Nurvianto, S.Hut., M.Sc.

Syllabus:

Introduces the concepts of habitat-wildlife relationships, resource selection by animals and the importance of habitat components for wildlife at different spatial scales: within stands, stands, between stands and landscape. An important aspect is the measurement of wildlife habitat at different scales and the manipulation of habitat to achieve specific management objectives. Ecosystem approaches to wildlife conservation and management in a number of land use systems are discussed in relation to sustainable forest management issues. Habitat evaluation and planning frameworks as well as the processes in the context of conservation biology.

References:

- Bissonette, JA & I Storck. 2003. Landscape Ecology and Resource Management. Island Press. Washington
- Bollen, E.G. & W.L. Robinson. 2003. Wildlife Ecology and Management. Prentice Hall. New Jersey
- Braun, C.E. 2005. Techniques for Wildlife Investigation Management. The Wildlife Society. Bethesda
- Gutzwiller, K.J. 2002. Applying Landscape Ecology in Biological Conservation. Springer-Verlag. NY
- Morrison, M.L., B.G. Marcot & R.W. Mannan. 2006. Wildlife Habitat Relationships: Concepts and Application. Island Press. Washington
- Morrison, M.L. 2002 Wildlife Restoration: technique for habitat analysis and animal monitoring. Island Press. Washington
- Morrison, M.L., W.M. Block. Strickland & W.L. Kendall. 2001. Wildlife Study Design. Springer-Verlag. NY

KTK 624 Wildlife Population Management (2 credits)

Lecturers:

Dr Satyawan Pudyatmoko, S.Hut, M.Sc.; Dr Muhammad Ali Imron, S.Hut, M.Sc.

Syllabus:

The principles of ecology with emphasis on their application in conservation and management. Population definitions and concepts, mathematical models of population growth, life tables, population monitoring techniques, sustainable uses of wildlife, ecology and conservation of small populations, metapopulations and population viability analysis.

References:

- Bollen, E.G. & W.L. Robinson. 2003. Wildlife Ecology and Management. Prentice Hall. New Jersey
- Begon, M. & Mortimer, M. 1986. Population Ecology. Blackwell Scientific Publication. London
- Beissinger, S.R & D.L. McCullough. 2002. Population Viability Analysis. The University of Chicago Press. Chicago
- Berryman, A.A. 1981. Population System: a general introduction. Plenum Press. NY
- Clark, L R., P.W. Geier, R.D. Hughes, & R.F. Morris. 1967. The Ecology of Insect Population. Methuen. London
- Halliburton, R. 2004. Introduction to Population genetics. Pearson Education International. Upper Saddle River
- Jachman, H. 2001 Estimating Abundance of African Wildlife: an aid to adaptive Management. Kluwer. Norwalk
- Maehr, DS., R.F. Noss & J.I. Larking. 2001. Large Mammal Restoration. Island Press. Washington
- Sinclair, A.R.E., J.M. Fryxell & G. Caughley. 2006. Wildlife Ecology, conservation and Management. Blackwell Publishing. Oxford
- Smith, R.L. & T.M. Smith. 2001. Ecology and Field Biology. Benjamin Cummings. San Francisco

- Sutherland, W.J. 2000. The Conservation Handbook: research, management, and policy. Blackwell Science. Oxford
- Tilson, RP. Nyhus, N, Franklin, Sriyanto, Bastoni, M Yunus & Sumianto. 2001. Tiger Restoration in Asia: Ecological theory vs sociological reality. In Large mammal restoration. Island Press. Washington

KTK 625 Wildlife Ecology (2 credits)

Lecturers:

Dr Muhammad Ali Imron, S.Hut., M.Sc.; Dr Sena Adi Subrata, S.Hut., M.Sc.

Syllabus:

Identify ecological factors that influence the abundance and distribution of wildlife populations in tropical forest ecosystems. The emphasis is on behavioural ecology, to understand how wildlife populations are able to exist, grow and thrive in tropical forest ecosystems.

References:

- Shaw, James H. 1985. Introduction to wildlife management. McGraw-Hill Book Company. New York, St. Louis, San Francisco, Auckland, Bogota, Singapore, Tokyo. 316 pp.
- Peek, James, M. 1984. A review of wildlife management. McGraw-Hill Book Company. New York, St. Louis, San Francisco, Auckland, Bogota, Singapore, Tokyo. 485 pp.

KTT 627 Integrated Coastal Area Management (2 credits)

Lecturer:

Prof. Dr Erny Poedjirahajoe, M.P.

Syllabus:

Discusses integrated management of aquatic ecosystem relationships; intertidal zone, coral reef, mangrove, peat, seaweed and marine weeds, integrated management planning, and application of Indonesian government programs.

References:

- Dahuri R. Jakub R Sapta PG dan MJ Sitepu. 1996. Pengelolaan Sumberdaya Wilayah Pesisir dan Lautan secara terpadu
- Arthur MR and Edward OW. 1967. The Theory of Island Biogeography. Princeton, New Jersey
- Angelier. E. 2000. Ecology of Stream and Rivers. Science Publisher, INC.

KTK 628 Ecosystem Ecology (2 credits)

Lecturer:

Prof. Dr Ir. Djoko Marsono, M.Sc.

Syllabus:

Studying the balance of natural and or forest resource ecosystems, energy flows, material cycles, nutrient cycles, the productivity of natural and plantation forest ecosystems, tribes, and efforts to conserve forests and the environment.

References:

Odum EP. 1971 Basic Ecology
Chapin, FS; PA matson; and HA Mooney. 2002. Principles of Terrestrial Ecosystem Ecology
Resenberg, 1974. Microclimate, Biological Environment
Likens, GE et al. 1977. Biogeochemistry of Forested Ecosystem
Jordan, CF. 1985. Nutrient Cycling in Tropical Forest Ecosystem
Marsono, D. 2002. Konservasi Sumberdaya Alam dan Lingkungan

KTK 630 Nature Tourism Planning (2 credits)

Lecturers:

Prof. Dr. Ir. Lies Rahayu Wijayanti Faida, M.P.; **Prof. Dr. Ir. Chafid Fandeli, M.S.**

Syllabus:

Introduction to nature tourism, discussion of tourist destinations, and the relationship between tourism products and markets. Classification of travelers. Nature attractions and their character. Some ideas and choice of destinations for planning determination.

References:

Douglass, RW. 1985. Forest Recreation. Pergamin,. NY
Fandeli, C. 2003. nature Based Tourism, Planning. Faculty of Forestry. Gadjah Mada University. Yogyakarta
Inskeep, E. 1991. Tourism Planning. AN Integrated and Sustainable Development Approach. Van Nostrand Reinhold. NY
Wall G. 1989. Outdoor recreation in Canada. John Wiley & Sons Toronto

KTK 631 Landscape Forest Management for Tourism (2 credits)

Lecturers:

Prof. Dr. Ir. Lies Rahayu Wijayanti Faida, M.P.; **Prof. Dr. Ir. Chafid Fandeli, M.S.**; Dr. Hero Marhaento, S.Hut., M.Si.

Syllabus:

Definition of landscape, landscape ecology, and landscape forestry. The relationship between people and landscape. Various forms of terrestrial and aquatic landscapes. Design of conservation forest, production forest, and landscape forestry models. Landscape forestry management.

References:

Boyce, S.G. 1995. Landscape Forestry. John Wiley Dan Sons, Inc. New York.
Drdos, J; 1983. Landscape Synthesis. Geological Foundations of The Complex Landscape Management. Veda, Publishing House of The Slovak Academy of Sciences.Bratislava.
Vink, A.P.A; 1983. Landscape Ecology and Land Use. Longman. London.

KTK 632 Advanced Aquatic Ecology (2 credits)

Lecturer:

Prof. Dr Erny Poedjirahajoe, M.P.

Syllabus:

Introduction; Aquatic Ecology and Ecosystems; Components of Aquatic Ecosystems; Aquatic Ecosystems/Coastal Forests; Aquatic Ecosystems: Coral Reefs, Swamps and Estuaries, Mangrove Forests; Freshwater Ecosystems.

References:

Clinton J.D. 1999. marine Botany. 2nd . John Wiley & Sons, INC. New York.

Mann KH. 1982. Ecology of Coastal Water. Blackwell Scientific Publications

Nybakken JW. Ocean biology: An Ecological Approach. John Willey and Sons

CEC 634 Mangrove Ecology (2 credits)

Lecturer:

Prof. Dr Erny Poedjirahajoe, M.P.

Syllabus:

Introduction; Mangrove Zoning and Vegetation; Intertidal Zone; Mangrove Aquatic Biota; Mangrove Habitat; Mangrove Habitat Quality; Mangrove Productivity; Energy and Matter Cycles; Mangrove Function and Utilisation; Mangrove Degradation and Rehabilitation; Mangrove Silviculture; Research Methods in Mangrove Areas; Mangrove Habitat Management Strategies.

References:

Nybakken JW. Ocean biology: An Ecological Approach. John Willey and Sons

Hogarth. PJ. 1999. The Biology of Mangroves. Oxford University Press

Kitamura S Amayos C. Shigeyuki B. 1997. Handbook of Mangroves in Indonesia (Bali & Lombok) The Development of Sustainable Mangrove Project. JICA-ISME

CEC 637 Environmental Impact Assessment (2 credits)

Lecturers:

Prof. Dr.Ir. Ambar Kusumandari, M.E.S. & **Prof. Dr. Ir. Chafid Fandeli, M.S.**

Syllabus:

Introduction; Project Cycle; The Relationship of Human and Environment; The Concept of Pollution Prevention; Screening and Scoping of EIA; Analysis and Identification; Impact Prediction and Evaluation; Impact Mitigation; Environmental Impact Document.

References:

Cheremisinoff, PN, Angelo MC. 1980. Environmental Assessment and Impact Statement Handbook. Ann Arbor Science Public Inc. New Jersey

Fandeli C. 2004. Environmental Impact Assessment in Development. Liberty. Yogyakarta

Munn, RE. 1979. Environmental Impact Assessment. Principles and Procedure. John Wiley & Son. Chichester

KTU 700 Thesis (12 credits)**Syllabus:**

This course contains activities related to special problems, proposal seminars, thesis research preparation, and thesis examinations.



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