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Ministry of Education and Sports

Savannakhet University

Faculty of Agriculture and Environment

No _____/.....

Savannakhet, Date ____/___/___

Course Syllabus

1 Program

Title of the study programme:Wood Processing Technology

2 Course details

Course name: Wood Utilization and Management

Course code: FOA04WUM21107

Number of credits (hours/week): 3(2-2-5)

Course type (tick the appropriate box): ☒ Required, ☐ Elective, ☐ Other, if other please explain:

Prerequisites courses: woody characteristics (FOA04WCT11108)

Semester, in which the course is taught:

Year 1		Year 2	
Semester 1	**Semester 2**	**Semester 1**	**Semester 2**
☐	☐	☒	☐

3 Responsible unit:

3.1 Department: Deparment of Forestry Resource

Names and affiliations of lecturer(s): Nongkhan BORLIVANH (Department of Resources Forestry, Faculty of Agriculture and Development, Savannankhet University), Lao PDR. Tel: +856 20 22663352, Email: Nongkhanblv@gmail.com

4 Course description

The course will be provided to graduates the knowledge, skiils and competences on structure of wood, properties of wood (physical and mechanical), major forest products, lumber industries, converting roundwood into primary products, veneer and plywood, wood composite materials, wood engineering (timber construction), wood furniture, pulp and paper, wood management and preservation, marketing wood products.

5 Course objectives

The course of wood utilizations and management aims to provide graduates understanding the importance of wood use for various application. Graduates will be able to choose suitable materials for application in the construction, furniture, and paper industries based on the physical and mechanical properties of wood.

Knowledge:

Graduates shall have a solid knowledge of the wood utilization and management gained from lectures, seminars, group working projects, asignments, and field trips. They shall understand on how to analyze properties of wood . Graduates can apply technique of wood products and wood processing, analyses of chemical wood protection, and creating the wood productive markets.

Skills:

Graduates shall be able to apply the acquired knowledge in the wood industry, working on timber constructions, planning wood manufacturing processes and creating functions of cost-effective products. They must be able to apply techniques for wood utilization and management in terms of wood productve efficiencies.

Application of theories to practice:

Graduates must be able to apply theories on wood utilization and management to practice in wood processing manufacturies. In addition, they can apply knowledge and skills gained from the course in the management of wood products effectively. The graduates can also apply theories to research institutes to do research, or teach in universities that offer forest-higher degrees.

Social knowledge and skills:

Graduates become specialists/experts in wood utilizations anh management, wood processing, and wood protection. Thay shall be managers and consultants in the field of wood utilization and tanagement. On the other hand, The graduates are able to apply and analyze different approaches in wood management, and protection in wood processing manufactories.

5.1 Learning objectives of particular modules

The course of wood utilization and management is divided into six modules such as:.

1) The structure of wood: This module is designed for graduates to understand and apply knowledge and skills in practice with the identified wood structure.
2) The Physical and Mechanical Properties of Wood: This module is designed for graduates to understand and apply knowledge and skills in practice with analyzing the physical properties and mechanical properties.
3) Converting round wood into primary products: This module is designed for graduates to understand and apply knowledge and skills in practice with the processing capacity of each type of woods to the products including veneer product, plywood, and board or panel products.

4) Wood furniture and other product: This module is designed for graduates to understand and apply knowledge and skills in practice with the design, manufacturing wood furnitures, wood flooring and other wood products.
5) Wood management, protection and preservation: This module is to provide graduate to apply with steps of non-chemical wood protection, chemical wood protection, and safety of operative tools, technologies of chemical wood protection.
6) Grading and marketing wood products: This module is designed for graduates to understand and apply knowledge and skills in practice with analyzing the wood productive markets.

6 Course teaching methods

- Lectures
- Seminars
- Field practices
- Assignment and submitting the reports (Briefly describe the assignment topics relating to the course that are planning to give to students)

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7 Teaching plan

Week	Content	Method/activity	Hours
1	**Introduction to Wood Utilizations and Management** - Instruction to wood utilization and management, - Plan of study: lectures, assignment and field trip. - Class attendance; - Course evaluation system.	Lecture and Classroom discussion	2
2	**Theories**		2
	Module 1: **Wood – important renewable material**		
	1.1. Forests and their Function 1.2. How Wood is Formed 1.3. Wood Structure 1.4. Wood Properties 1.5. Wood production	Lecture and discussion by PowerPoint/ LCD. Group student asignment.	
	Practical		

	Student presentation on asignment	- PowerPoint -Discusion/comment -Q & A	**2**
3	**Theories**		**2**
	Module 2: The Physical and Mechanical Properties of Wood		
	2.1 Physical Properties 2.2 Mechanical Properties 2.3 Influence of Moisture Content on Wood Properties	Lecture and discussion by PowerPoint/ LCD, Q & A	
	Practical		**2**
	Laboratory: Introduction used for property of wood	Assignment of student work, group work on the used of equipment on tree ring tester and Microscope looking at wooden structures	
4	**Theories**		**2**
	Module 2: The Physical and Mechanical Properties of Wood (Con't)		
	2.4 Other Properties Affecting Strength 2.5 Effect of Siviculture on Wood propreties 2.6 Wood Properties for Selected Products 2.7 Seleted Strength Values	Lecture and discussion by PowerPoint/ LCD, Q & A	
	Practical		**2**
	Laboratory: Test of Physical Properties and Mechanical Properties.	Student presented on the previots assignment	
5	**Theories**		**2**
	Module 3: Converting Round wood Into Primary Products		
	3.1 Introduction 3.2 The Sawmaill - Edging and Trimming - Sawmill Technology - Portable Sawmills - Sawmill equioment	Lecture and discussion by PowerPoint, Video/ LCD, Q & A	
	Practical		**2**
	Students' presentation: Implementation on wood processing	-Group discussions, - Panel discussions -Group working project	

6	**Theories**		**2**
	Module 3: Converting Round wood Into Primary Products (Can't)		
	3.3 Products of the Sawmill - Lumber - Dimension Stock - Other Softwood Products - Products from Low Grade Hardwoods 3.4 Sawing Patterns - Softwood - Hardwood	Lecture and discussion by PowerPoint, Video/ LCD, Q & A	
	Practical		**2**
	Laboratory: Introduction to equipment for analyzing wood production	Student working group	
7	**Theories**		**2**
	Module 3: Converting Round wood Into Primary Products (Can't)		
	3.5 Glued Wood Products 3.5.1 Veneer product - Log preparation - Peeling and Slicing - Veneer chipping - Veneer drying 3.5.2 Plywood - Definition - Plywood production process - Product quality	Lecture and discussion by PowerPoint, Viddeo/ LCD, Q & A	
	Practical		**2**
	Seminar topic: introduce types of machines used to processing veneer product	Assignment of student work, group work on the used of manchine on Veneer product	
8	**Theories**		**2**
	Module 3: Converting Round wood Into Primary Products (Can't)		

	3.5.3 **Board or Panel Products** - Parquet and Mosaic Parquet - Block Board	Lecture and discussion by PowerPoint, Viddeo/ LCD, Q & A	
	Practical		**2**
	Seminar topic: Plywood manufacturing	Assignment of student work, group work on the Plywood manufacturing	
9	**Theories**		**2**
	Module 3: **Converting Round wood Into Primary Products (Can't)**		
	3.5.4 Pulp and Paper - Chemical Process - Semi- Chemical Process - Mechanical Process	Lecture and discussion by PowerPoint, Viddeo/ LCD, Q & A	
	Practical		**2**
	Student presentation on group working project	-Students' PPT presentation; -Comment/suggestion	
10	**Theories**		**2**
	Module 3: **Converting Round wood Into Primary Products (Can't)**		
	3.5.5 Wood Residdues - Forest Residues - Plant Residues Uses for Wood Residues	Lecture and discussion by PowerPoint, Viddeo/ LCD, Q & A	
	Practical		**2**
	Seminar topic: Pulp and Paper manufacturing	Assignment of student work, group work on the Pulp and Paper manufacturing	
11	**Midterm Examination Theories**	Writing exam	**2**
	Midterm Examination Practical	Group project presentation	**2**
12	**Theories**		**2**
	Module 4: **Wood Furniture and Other Product**		

	4.1 Wood Furniture 4.1.1 Furniture Product Structure 4.1.2 Raw Materials 4.1.3 Production Process	-Lecture and discussion by PowerPoint, Viddeo / LCD, Q & A	
	Practical		
	Seminar topic**:** Pulp and Paper production process	Group discussions, panel discussions; -Asignment	**2**
13	**Theories**		
	Module 4: **Wood Furniture and Other Product (Can't)**		**2**
	4.2 Flooring and Other Product	Lecture and discussion by PowerPoint, Viddeo / LCD, Q & A	
	Practical		
	Seminar topic: Design and manufacture Wood Furniture	Group working project	**2**
14	**Theories**		
	Module 5: Wood Management, Protection and Preservation (Con't)		
	5.1 Non-Chemical Wood Protection Lumber drying - Air-drying - Pre-drying - Kiln-drying - How Wood Dries - Moisture Gradients and Shrinkage - How to Prevent Checking - Completing the Kiln-drying Process	Lecture and discussion by PowerPoint, Viddeo / LCD, Q & A	**2**
	Practical		
	Group students' presentation	-Discussion -Q &A -Comments	**2**
15	**Theories**		
	Module 5: Wood Management, Protection and Preservation (Con't)		
	5.2. Chemical Wood Protection - Brushing or Spraying - Dipping - Steeping - Hot and Cold bath	Lecture and discussion by PowerPoint, Viddeo / LCD, Q & A	**2**

	- Boucherie Process		
	Practical		
	Student presentation on group working project	-PPT presentation; Q & A; -Comment	**2**
16	**Theories**		
	Module 6: Grading and Marketing Wood Products		
	6.1 Marketing Wood Products 6.2 Grading Wood Products 6.3 Environmental Considerations 6.4 The Future of Wood	Lecture and discussion by PowerPoint, Viddeo / LCD,Q & A	**2**
	Practical		
	Seminar topic: Wood marketing	-Q & A -Discussion -Comments	**2**
17	**Theories**		
	Module 6: Grading and Marketing Wood Products		
	6.3 Environmental Considerations 6.4 The Future of Wood	Lecture and discussion by PowerPoint, Viddeo / LCD,Q & A	2
	Practical		
	Group students' presentation	Discussion -Q &A -Comments	2
18	**Theories**		**8**
	Field trip		
	Practice		**8**
	Field trip		
19	**Theories**		**8**
	Review/additional week		
	Practice		**8**
	Review/additional week		
20	**Theories**		**2**
	Final examination		
	Practice		**2**
	Final examination		

8 Material needs

Course equipment: ***link to equipment needs/purchases as part of the project***

- Shaking Water Bath
- Computer Control Wood Testing Machine Static Bending Test
- Electric Kilns
- Sliding Compound Miter Saw
- Polarizing Compound Microscope
- Hand Circular Saws
- Table Circular Saws
- Band Saw
- Circular Saws

9 References

9.1 Compulsory reading list

Bureau of Forest Research and Development, 2004. Basic Utilization of Wood, Royal Forest Department, Ministry of Natural Resources and Environment Thailand.

JERROLD E. WINANDY, 1994. Wood Properties, Encyclopedia of Agricultural Science, Orlando, FL: Academic Press: 549-561. Vol. 4.

Khanthaly Khamphilavong, 2003. Handbook for Teaching Wood Utilization, Faculty of Forest Sciences, National University of Laos.

Kasetsart University, 2011. Curriculum Wood science and Technology, Department of Forest Products, Faculty of Forestry, Kasetsart University, Thailand.

Xongkhoad Jalusombut, Phisu Siriphan and Kitipong Tangkid, 2020. Plan teaching Forest Products Utilization, Department of Forest Products, Faculty of Forestry, Kasetsart University, Thailand.

http://forprod.forest.go.th/forprod/Tips/DETAILS/woodpreserv.htm (19/12/2021)

9.2 Suggested reading list

Kitipong Tangkit,.... Handbook for teaching Chapter 2 Forest Products Industries, Department of Forest Products, Facuty of Forestry, Kasetsart University.

Thane Sukontachart, Arnut Siripithakul and Santi Kamonnarakit, 2014. The use of wood in the furniture industry (To design furniture for the home medium), This Report is Funded by Faculty of Architeure and Design, Rajamangala University of Teechnology PhaNaKon.

10 Assessment of students

10.1 Description of assessment

Lecture, Reporting, Midterm examination, Final examination

10.2 Grade distribution and student assessment

❖ Grade Distribution

- Attendance 10 %
- Reporting 35 %
- Midterm examination 20 %
- Final examination 35 %

❖ **Grading scale**

Grade		Total score	Scale
Symbol	**Verbal grade**		
A	(Excellent)	80-100	4,00
B+	(Very Good)	75-79	3,50
B	(Good)	70-74	3,00
C+	(Fairly Good)	65-69	2,50
C	(Fair)	60-64	2,00
D+	(Poor)	55-59	1,50
D	(Very Poor)	50-54	1,00
F	(Fail)	0-49	0,00
I	(Incomplete)		

Place, Date ...../...../.....

Head of Department..... Course Instructor

Dean of Faculty.....