



Institution name here

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Place Kasetsart University, Date 30/08/2022

Course Syllabus

1. Program

Title of the study programme: *Master of Science Program in Forestry*

2. Course details

Course name: *Logging systems*

Course code: *01303541*

Number of credits (hours/week): 3 (3 hours/week)

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

Prerequisites courses: *None*

Semester, in which the course is taught: *tick the appropriate box below*

Year 1		Year 2	
Semester 1	Semester 2	Semester 1	Semester 2
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

3. Responsible unit

3.1. **Department:** Department of Forest Engineering, Faculty of Forestry

Names and affiliations of lecturer(s): Asst.Prof.Nopparat Kaakkurivaara (Dept. of For. Eng.)

Asst.Prof.Laddawan Rianthakool (Dept. of For. Eng.)

Mr. Theerapong Chumsangsri (Dept. of For. Eng.)

4. Course description

The course aims to explain the differences between logging methods and logging systems including the overview of the examples of logging systems. It focuses on overviewing logging systems used on different continents and for different purposes: for timber, for bioenergy. Geographically, it tackles logging systems in the Tropics, Australia, Europe, North America, Africa, etc. Furthermore, it deals with factors that affect the suitability of logging systems. A case study approach is applied in the exercise aimed at selecting logging systems manually and by applying GIS.

5. Course objectives

At the end of the course, students are able to:

- *Apply the principles used when selecting a suitable logging system in practice*
- *Evaluate the pros and cons of each logging system*
- *Design logging systems that are suitable in a range of environmental and production conditions*

Knowledge: The students will know the functions of main components of logging systems and how they connect to a logging technology. Also students will know the differences between the logging systems and what parameters to use to optimize the logging process.

Skills: Able to select the proper logging systems for a range of different circumstances.

Application of theories to practice: Steps of selecting suitable logging systems (physically capable, economically efficient & feasible, meet environmental requirements, and socially acceptable)

Social knowledge and skills: problem solving, systematic thinking, collaboration, and communication.

5.1. Learning objectives of particular modules

Cross-reference to section 7 (Teaching plan)

6. Course teaching methods

Teaching methods includes online lecture, VDO clips, 360 photos, exercise, gamification (VR for Husqvarna Limberjack, Ponsse forwarder game), harvester simulator, self-study, discussion, presentation, and quiz.

7. Teaching plan

Week	Content	Method/activity	Hours
1	Introduction to the course	Lecture	3
2	Logging systems & Logging methods	Lecture, exercise, gamification (VR with husvarna limberjack), discussion	3
3	Productivity estimation	Lecture, exercise, harvester simulator, discussion	3
4	Logging costs	Lecture, exercise, discussion	3
5	Timber transportation	Lecture, exercise, gamification (Ponsse forwarder game), discussion	3
6	Logging systems in Thailand	Lecture, discussion	3
7	Loggings systems in Tropics	Lecture, discussion	3
8	Loggings systems in Australia & New Zealand	Lecture, discussion	3
9	Loggings systems in North America	Lecture, discussion	3
10	Loggings systems in Europe	Lecture, discussion	3
11	Loggings systems in Africa	Lecture, discussion	3
12	Loggings systems for bioenergy	Lecture, discussion	3
13	GIS application for selecting suitable logging system	Lecture, exercise, discussion	3
14	Logging systems analysis	Lecture, exercise, discussion	3
15	Student project presentation	Presentation	3

8. Material needs

8.1. Course equipment:

VR headsets,

360 camera,

Harvester simulator.

9. References

9.1. Compulsory reading list

Längin D, Ackerman P, Olsen G. 2010. **South African ground based harvesting handbook**. 182 p.

Sessions J. 2007. **Harvesting operations in the Tropics**. Springer, Heidelberg, 170 p.

Uusitalo J. 2010. **Introduction to forest operations and technology**. JVP Forest Systems Oy, Finland. 287 p.

9.2. Suggested reading list

Kaakkurivaara N., Stampfer K. 2018. Assessment for Improvement: Harvesting Operations in Small-Scale Forest on Thai Steep Terrain. **Small-Scale Forestry** 17(2): 259-276.

Kaakkurivaara N., Kaakkurivaara T. 2018. Productivity and Cost Analysis of Three Timber Extraction Methods on Steep Terrain in Thailand. **Croatian Journal of Forest Engineering** 39(2):213-221.

Klase, W. and T. W. Steele. 2011. **Logging Methods for Wisconsin Woodlands**. University of Wisconsin-Madison, Wisconsin, United States

Manavakun N. 2014. Harvesting operations in eucalyptus plantations in Thailand.

Dissertationes Forestales 177. 111 p.

Lundbäck M., Häggström C. & Nordfjell T. 2021. Worldwide trends in methods for harvesting and extracting industrial roundwood. **International Journal of Forest Engineering** 32(3): 202-215, DOI: 10.1080/14942119.2021.1906617

10. Assessment of students

10.1. Description of assessment

The assessment is a combination of direct and indirect measures that include examination, self-study, presentation, exercise, assignment, and class participation during the entire course.

10.2. Grade distribution and student assessment

Examination	40%
Self study/presentation	20%
Exercise/assignment	30%
Class participatory	10%
Total	100%

Grading scale

Grade		Total score	Scale
Symbol	Verbal grade		
A	Excellent	≥ 80	4.0
B+	Very good	75-79	3.5
B	Good	70-74	3.0
C+	Fairly good	65-69	2.5
C	Fair	60-64	2.0
D+	Poor	55-59	1.5
D	Very poor	50-54	1.0
F	Fail	< 50	0.0

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