

TreProX: Innovations in Training and Exchange of Standards for Wood Processing

GREEN FOREST 3

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Green forests 3

workshop series

Curriculum



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Treprox 

 Erasmus+

Introduction

Green Forests is a course sequence that was founded in the year 2001 in cooperation between the Icelandic Horticultural College at Reykir, Ölfusi, the Icelandic Forest Service, Local Forest projects and The Soil Conservation Service of Iceland (SCSI). The courses have since the beginning been aimed at forest owners and the goal is to increase their knowledge of everything related to forestry, to increase the positive results of forestry. The course sequences were offered in every part of the country and the content of the courses took aim from the local situation in forestry. In the beginning there was only one course sequence, Green Forests 1, but shortly after the first group graduated the students felt they needed further education. Green Forests 2 were soon founded and have been taught successfully throughout the country.

Now we introduce Green forest 3 with the focus the maintenance of timber forest, the forest products, harvesting methods, management plans, sawmills and wood processing, timber grading and forest economics.

Course sequence layout

The Green Forests studies are at the upper secondary level and evaluated for ECVET credits. Each credit equals 3 working days for the student, whether that be lectures, practical exercises or homework. Each sequence takes up to three years and each participant must take a certain number of mandatory courses and some elective ones, at least two per semester. Each course is a mixture of lectures, practical exercises, field visits and homework. Teaching is on a Friday from 16-19 and the following Saturday from 9-16.

Course descriptions

Green forests 3

The focus of Green Forests 3 is forest management, wood processing, timber quality and timber grading. Different thinning and harvesting practice, sawing (small scale and large scale), drying and storing and the utilizing of timber for different end products. Timber grading and standards. Forest Economics; the production, distribution, and consumption of forest products and services. The course material (e-platform) created in conjunction with the Erasmus+ project Treprox will be available for the coming Green forests 3 workshop series.

List of courses in Green Forest 3 (GF3):

- The maintenance of timber forest (20%)
- Multiple use of an up-growing forest (10%)
- Harvesting practice in forests (10%)
- Sawmills and wood processing (10%)
- Drying and storing (10%)
- Timber grading and standards (10%)
- Forest management plan (10%)
- Forest Economics (10%)
- Study tour (10%)

GF3 The maintenance of timber forest (20%)

Course The maintenance of timber forest	Credits (ECVET) 2	Skills level 2
Course description Participants will have theoretical and practical training. Forest management processes in cultivated forests of different ages, density and tree species. Insight into sustainable forest management. Best practice thinning methods e.g., low thinning, crown thinning, selective thinning. Timber forest criteria, to maintain the best wood quality. Differences in management practice based on forest types and species. What will be the end-product we gain from the forest. What requirements are set by the timber industry on wood quality. This part of the course will take two weekends (20% of Green forests 3)		
Prerequisites Green forest 1 and 2 or equivalent experience.		
Knowledge criteria The student should have knowledge and understanding of: <ul style="list-style-type: none"> • Timber forest, the definition. • What is meant by wood quality? • What is the result of thinning? • Thinning and maintenance of the forest to gain the best wood quality for the sawmill industry. • Difference in maintenance based on forest types, age and species. • What are the requirements of the timber industry? • What kind of products can we gain from the forest. 	Learning outcomes The student should be able to use the knowledge, skills and competency he has accumulated to: <ul style="list-style-type: none"> • Insight into forest management practices in general. • Evaluate wood quality of standing trees. • Planning the next steps of forest management based on the development of the forest, age, species and density (number of trees/ha) • Maintain the forest ecosystem health and vitality. 	
Competency/skills The student should be competent in: <ul style="list-style-type: none"> • Maintaining forest to gain excellent quality timber as an end-product for the industry • Using different procedures to maintain the forest, e.g., thinning, pruning etc. • Be able to estimate the timber quality of standing trees in the forest. What trees should be kept and taken care of and what trees should be thinned. 		

Evaluation Individual assignments and group work.	
Instructions and comment (for other teachers)	
Connection to key factors of curriculum This course is a key factor in Green Forest 3 together with the course in Forest management plan.	
Date: 20.10.2022 Authors: Ólafur Eggertsson, Trausti Jóhannsson, Björn Bjarndal Jónsson and Bent Jensen	

GF3 Multiple use of an up-growing forest (10%)

Course Multiple use of an up-growing forest	Credits (ECVET) 1	Skills level 2
<p>Course description Participants will gain insight into the products they will gain from the forest both short term and long term. Non-timber forest products; Mushrooms, berries and oil (essential oils). Raw material products; e.g, firewood, charcoal, fenceposts, woodchips and pulp. Equipment needs and cost to gain the material from the forest and to generate a product for the market. Marketing a product, is there a market out there? Are grants available to start a small-scale business and to market a product? Visit to a forest farmer (e.g Sifrastaðir) or regional forestry association (Skógræktarfélag) where commercial activities are already ongoing.</p>		
<p>Prerequisites Green forest 1 and 2 or equivalent experience.</p>		
<p>Knowledge criteria The student should have knowledge and understanding of:</p> <ul style="list-style-type: none"> • The early products that can be gained from the forest. • Selecting the most feasible products depending on tree species, age and production capacity of the forest. • The equipment that might be needed to “harvest” the early products. • Marketing a product, is there a market out there? • Are grants available to start a small-scale business? 	<p>Learning outcomes The student should be able to use the knowledge, skills and competency he has accumulated to:</p> <ul style="list-style-type: none"> • Analyzing the feasibility of obtaining products from an up-growing forest. • The economy behind the various products. • Understand the value of owning an up growing forest. • What equipment is the most suitable for “my” forest. 	
<p>Competency/skills The student should be competent in:</p> <ul style="list-style-type: none"> • Identifying products from a young forest. • Understanding the value of the forest. • Choosing the appropriate material and equipment. • Knowledge of the market opportunities for various products. • Gathering information on grants available to start a small-scale business. 		

Evaluation

Group assignments with short presentations.

Instructions and comments (for other teachers)**Connection to key factors of curriculum**

Literacy – Health and wellbeing – Self sustainability

Date: 19.10.2022

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GF3 Harvesting practice in forests (10%)

Course Harvesting practice in forests	Credits (ECVET) 1	Skills level 2
<p>Course description</p> <p>Different methods of harvesting. Timber harvesting is a forest management practice that requires careful planning and strict devotion to the chosen methods. Otherwise, it can bring significant economic losses to forestry and harm the environment. In this course, you will learn about the leading causes, techniques, and timber harvesting stages. Forestry requires the right approach to gain the best care and restoration of trees. The following methods will be discussed; clear-cutting, group selection or small-scale clear-cutting and single-tree selection. Regardless of ways to harvest timber, there are usually three stages: preparation, operations, and post-harvesting (“cleaning up” after harvesting). One important aim of harvesting is to create a fire-resistant forest for the “future”.</p>		
<p>Prerequisites</p> <p>Green forest 1 and 2 or equivalent experience/studies.</p>		
<p>Knowledge criteria</p> <p>The student should have knowledge and understanding of:</p> <ul style="list-style-type: none"> • Reasons for timber harvesting. • Different timing of harvesting. • Which harvesting methods are suitable for each species? • Planning the work at the harvesting site. • Improving forest value and health. • Choosing the right tools for harvesting. • Creating a fire-resistant forest. • Sustainable timber harvesting methods. 	<p>Learning outcomes</p> <p>The student should be able to use the knowledge, skills and competency he has accumulated to:</p> <ul style="list-style-type: none"> • Compare and choose appropriate methods of harvesting, with regards to different tree species. • Discuss and explain to others the importance of correct harvesting methods. • Evaluate work planning at harvesting site and come up with improvements. • Explain to others the importance of harvesting. • The long-term health of the forest. 	
<p>Competency/skills</p> <p>The student should be competent in:</p> <ul style="list-style-type: none"> • Harvesting with different methods and at different times of the year. • Examining different harvesting methods and which quality criteria are appropriate for each type. • Optimize the harvesting to gain high product value of the forest. • Planning work at the harvesting site. 		

Evaluation

Practical exercises in the forest. The students will be evaluated by a teachers.

Instructions and comment (for other teachers)**Connection to key factors of curriculum**

Literacy – Health and wellbeing – Self sustainability

Date: 20.10.2022

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GF3 Sawmills and wood processing (10%)

Course Sawmills and wood processing	Credits (ECVET) 1	Skills level 2
Course description The aim of the course is to give an overview of the economic value of a timber forest and what sort of timber products can be gained from the forest. Evaluate standing forest before felling, measurements of standing volume and calculation methods. Methods of sawing roundwood into boards. What kind of sawmill equipment is most appropriate, when will it be needed? Overview of the ongoing small scale wood processing in Iceland. Visits to an operating sawmill. Different types of sawmills and wood processing techniques.		
Prerequisites Green forest 1 and 2 or equivalent experience.		
Knowledge criteria The student should have knowledge and understanding of: <ul style="list-style-type: none"> • The economic value of a timber forest. • What kind of timber products we can gain from the forest. • The volume of the wood that can be harvested from a specific forest. • The different sawing methods for roundwood. • The wood quality of the forest. 	Learning outcomes The student should be able to use the knowledge, skills and competency he has accumulated to: <ul style="list-style-type: none"> • Estimate if the forest will give the required volume of wood for a specific wood processing industry. • Finding the right equipment for the establishment of a small-scale sawmill industry. • Estimate the quality and quantity of the roundwood that can be gained from the forest. 	
Competency/skills The student should be competent in: <ul style="list-style-type: none"> • Estimate the timber quality of his own forest. • Calculate the volume of an even aged forest stand. • Estimate the equipment needed for a small-scale timber production/industry. 		
Evaluation Assignments in forest and workshops.		

Instructions and comment (for other teachers)

Connection to key factors of curriculum

Literacy – Health and wellbeing – Self sustainability

Date: 20.10.2022

Authors: Ólafur Eggertsson, Trausti Jóhannsson, Björn Bjarndal Jónsson and Bent Jensen

GF3 Drying and storing (10%)

Course Wood drying and storing	Credits (ECVET) 1	Skills level 2
Course description Wood drying reduces the moisture content of wood before its use and is needed to make most timber suitable for use. Drying results in dimensionally stable wood with increased strength. Effects of felling time on wood moisture content. Water in wood, its movement and flow, moisture gradients, shrinkage calculations and measurements of moisture content. The difference between free water and bound water in wood. We will discuss “fiber saturation point” and “equilibrium moisture content” of wood. Drying stress, checking, splitting and warp – what they are, how they occur and how to prevent them. Different methods of drying, natural drying (air drying) and artificial drying (kiln drying). Benefits and drawbacks depending on drying methods. Storage of wood before drying and after.		
Prerequisites Green forest 1 and 2 or equivalent experience.		
Knowledge criteria <ul style="list-style-type: none"> • Knowing the basic physics of wood drying processes. • Know the effects the drying process has on the wood. • Know the drying need for your operation. • Different methods of drying. 	Learning outcomes The student should be able to use the knowledge, skills and competency he has accumulated to: <ul style="list-style-type: none"> • Understand the difference between free and bound water in wood. • Know the importance of drying. • The effects of drying on wood quality • Different methods of drying • Be able to select the right drying method and equipment based on the product obtained from the forest/sawmill. 	
Competency/skills <ul style="list-style-type: none"> • Understanding the effects of drying on wood quality. • What is gained by drying the wood • Be able to select the right drying method for your timber product. • 		
Evaluation Students will write a short report about wood drying.		
Instructions and comment (for other teachers)		
Connection to key factors of curriculum Literacy – Health and wellbeing – Self sustainability		

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GF3 Timber grading and standards (10%)

Course Timber grading and standards	Credits (ECVET) 1	Skills level 2
<p>Course description The aim of the course is to teach how to evaluate the quality of the wood after sawing logs into boards. We will discuss the wood quality of different tree species. Grading of sawn timber, appearance grading and strength grading for the building industry. Load-bearing structures use construction timber that is sorted mechanically or visually. The sawn timber is sorted into classes based on different parameters e.g., fewer and smaller knots, for example, result in a higher grade. The students will be given practical training in grading wood in different classes. Practical training in estimating wood density will also been given. We will discuss the relationship between durability and wood density.</p>		
<p>Prerequisites Green forest 1 and 2 or equivalent experience.</p>		
<p>Knowledge criteria The student should have knowledge and understanding of:</p> <ul style="list-style-type: none"> • Timber grading in general • Different end use based on grading classes. • Different wood quality measures based on tree species. • Density principles of wood • Why we grade timber. • Know the most common certificates Svanurinn, FSC etc... 	<p>Learning outcomes The student should be able to use the knowledge, skills and competency he has accumulated to:</p> <ul style="list-style-type: none"> • Measure the density of wood. • Grading sawn timber boards into grade classes. 	
<p>Competency/skills The student should be competent in:</p> <ul style="list-style-type: none"> • Grading timber into different classes. • Differentiate between good and bad wood quality. • Measure the density of wood. • Estimate the durability of wood base on e.g. density 		
<p>Evaluation Assignments, group work and timber grading in a workshop.</p>		

Instructions and comment (for other teachers)

Connection to key factors of curriculum

Literacy – Health and wellbeing – Self sustainability

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GF3 Forest management plan (10%)

Course Forest management plan (10%)	Credits (ECVET) 1	Skills level 2
<p>Course description A forest management plan defines the planned forestry activities (e.g., inventory, yield calculation, harvesting, silviculture and monitoring using GIS applications). A forest management plan outlines your vision for your forest, describes the current forest condition, and outlines a plan of action to achieve your management goals. A forest management plan is not just about the trees. It includes all the resources on your land – roads, water sources, wildlife, recreational sites, and anything else that is relevant to your goals for the forest. A plan can help you keep track of activities, communicate with professionals, and gain certification for your forest if relevant. A management plan is a vital component of successful forest or woodland management.</p>		
<p>Prerequisites The course; GF3 The maintenance of timber forest (20%)</p>		
<p>Knowledge criteria</p> <ul style="list-style-type: none"> • Gain information about the benefits of having a forest management plan. • Understanding the future goals of your forest • Guidance on what kinds of information to include in a plan and how to obtain it. • Tools for making a management plan. • Basic GIS mapping skills. • Simple application using a Tab or your mobile to plan/map your forest. 	<p>Learning outcomes The student should be able to use the knowledge, skills and competency he has accumulated to:</p> <ul style="list-style-type: none"> • Understand the benefits of having a forest management plan. • Gain an overview of the future activities in the forest. • Timing the activities and the resources needed to hold on to the management plan. • When is time to review your management plan. 	
<p>Competency/skills</p> <ul style="list-style-type: none"> • Learn to use the necessary tool to make a forest management plan. • Define the timeline of upcoming activities in the forest. • Use applications for mapping the forest. • Be able to create a forest management plan for a farm forest. 		
<p>Evaluation Assignment; draft of a forest management plan for a farm forest.</p>		
<p>Instructions and comment (for other teachers)</p>		

Connection to key factors of curriculum

Literacy – Health and wellbeing – Self sustainability

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GF3 Forest Economics (10%)

Course Forest Economics	Credits (ECVET) 1	Skills level 2
<p>Course description In this course participants learn about forest economy, including the products and jobs that come from forestry. Forest economics deals with the economic challenges involving buying, selling and management of forest land. Forest economics also deals with economic problems of growing, protecting, harvesting and marketing of forest products. Forest economics identifies and analyzes the cost and return from various forest resources. Based on this information, owners of the forest estimate the return from their crops and make the decision whether to harvest their trees or continue growing them in the field. Ecosystem service benefits will also be discussed such as climate change mitigation (carbon), recreation and tourism (e.g., campsites). Special emphasis will be on Icelandic forestry with examples from more established forest nations like the Sweden and Finland.</p>		
<p>Prerequisites Green forest 1 and 2 or equivalent experience.</p>		
<p>Knowledge criteria</p> <ul style="list-style-type: none"> • Basic terms used in economics • Economic benefits of an up growing forest • The role of Icelandic forest in national carbon counting. • Economic value of non-timber forest versus timber forest. • To decide whether to harvest or continue growing in the field based on economical evaluation. • Governmental support to forestry and innovation. 	<p>Learning outcomes The student should be able to use the knowledge, skills and competency he has accumulated to:</p> <ul style="list-style-type: none"> • Be able to apply basic economic terms to explain the future value of an up-growing forest. • Understand economic relationships between forestry and other sectors. • Students will be able to identify and evaluate non-timber benefits of forest. 	
<p>Competency/skills</p> <ul style="list-style-type: none"> • Understand the basic terms used in Forest economy. • Understand the economic value of the service an up-growing forest can give. • Be able to calculate the cost behind the products that comes from the forest. 		
<p>Evaluation Short report on specific issues concerning forest economics.</p>		
<p>Instructions and comment (for other teachers)</p>		

Connection to key factors of curriculum

Literacy – Health and wellbeing – Self sustainability

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GF1 Study tour

Course Study tour, domestic or abroad	Credits (ECVET) 1	Skills level 2
Course description The study tour is a 3-to-5-day tour that aims to introduce students to excellent practices in forestry. During the tour different companies, institutions and municipalities will be visited depending on if the tour is domestic or abroad.		
Prerequisites Green forest 1 and 2 or equivalent experience.		
Knowledge criteria The student should have knowledge and understanding of: <ul style="list-style-type: none"> • The different challenges in forestry in different parts of the country or abroad. • The structure of the social system of forestry. • The everyday work of the people working for Forestry Services, Forestry Associations and forest farmers. • The importance of field trips to get to know the culture in forestry in the country or abroad. 	Learning outcomes The student should be able to use the knowledge, skills and competency he has accumulated to: <ul style="list-style-type: none"> • Discuss the different challenges in forestry in different parts of the country/abroad. • Explain to others the structure of forestry in the country, with regards to the social system of forestry. • Organize informative and educational field trips to forests in Iceland with focus on culture connected to forestry. 	
Competency/skills The student should be competent in: <ul style="list-style-type: none"> • Identifying different challenges in forestry in different parts of the country/foreign country. • Gathering further information on the social system and structure of forestry in the country. • Getting to know the daily work of those who work in forestry. 		
Evaluation Students will write a report/diary about their study tour.		
Instructions and comment (for other teachers)		
Connection to key factors of curriculum Literacy – Health and wellbeing – Self sustainability		

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