

# FORESTRY STUDENTS' GUIDE

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This guide is only available in an electronic format at: <https://www.uef.fi/intra/metsa/oppaat>

## 1 GENERAL

The Forestry Students' Guide provides instructions on the proseminar, Master's thesis seminar, Bachelor's thesis, Master's thesis and training requirements of the School of Forest Sciences. Also described in the guide are the school's examination practices and how to solve study-related issues. The guide is aimed both at students and the teaching staff of the School of Forest Sciences. The latter are provided with advice on leading seminars and supervising study plans and thesis work.

## 2 PSP – PERSONAL STUDY PLAN

Each student is required to draft a personal study plan (PSP) for their Bachelor's degree studies (Bachelor of Science in Agriculture and Forestry, Finnish abbreviation MMK) and their Master's degree studies (Master of Science in Agriculture and Forestry, or in some other field; Finnish abbreviation MMM or FM). The purpose of the PSP is to design a study path for the student that will enable the completion of studies within the recommended time frame and help form an entity that is best suited to the student and meets the degree requirements. Adjustments can be made to the study plan, if necessary. Instructions on how to draft a PSP are provided on the Intranet pages of the School of Forest Sciences <https://www.uef.fi/intra/metsa/hops> to students studying in Finnish. Students following international Master's degree programmes are provided with instructions by their programme coordinator.

### Study plan for a Bachelor's degree

At the beginning of their studies at the School of Forest Sciences, students are provided with information on studying forest sciences in general, the degree requirements, and the courses and study modules included in the degree programmes. At the School of Forest Sciences, the first year's courses and study modules towards attaining a Bachelor's degree (worth 60 ECTS credits) are the same for all students. The courses and study modules that need to be completed during the first year are, therefore, gone through with the students right at the beginning of the first academic year, so that everyone gets their studies off to a good start. As a priority, students are urged to complete those courses required for attending the field course (3511009, 10 ECTS) included in the forest science basic studies. The course is intended to be taken during the summer of the first academic year, and delaying the field course to a later phase of one's degree programme is not even a consideration unless there are exigent circumstances. Bachelor's degree students draft their personal study plans (PSP) for attaining a Bachelor of Science in Agriculture and Forestry degree (worth 1 ECTS credit) in the spring of the first study year in a guided group that convenes in a computer room using WebOodi's (<https://weboodi.uef.fi/weboodi/>) OodiHops tool. Students can also contact their tutor (<https://www.uef.fi/fi/intra/metsa/tuutorit>) before the student events organised in the spring if they need help with planning their studies.

Students are urged to review the minor subject options for their degree prior to the guided events organised in the spring. Students can feel free to contact their tutor whenever necessary. The selection of a minor subject should take into account the area of forest sciences in which the student intends to specialise, so that the minor subject course content will be in support of the Master's degree programme. Recommended minor subjects that support specific fields of specialisation in forest sciences are provided on the school's Intranet pages at: <https://www.uef.fi/intra/metsa/erikoistumisaloja-tukevat-sivuaineet>. The minor subject does not

necessarily have to be one of the recommended subjects. However, it is advisable to discuss the suitability of such minor subjects in supporting the major subject with the tutor or the person in charge of the academic subject. If the student chooses an unusual minor subject, the teacher is advised to make a record of it in the student's OodiHops. Students submit their Bachelor's degree student PSP to their tutor for approval at the end of the guided PSP meeting, or by the end of April at the latest. All meetings related to supervising studies are organised by the tutor in charge of the academic subject.

### **Study plan for a Master's degree**

Students begin drafting a personal study plan for their studies towards attaining the degree of Master of Science in Agriculture and Forestry (worth 1 ECTS credit) well before completing their Bachelor's degree studies. Defined in the Master's degree student PSP are the courses and study modules that the student is required to complete before specialising in a specific field of forest sciences (forest management and forest ecosystems; forest mensuration and forest planning; forest economics and forest policy; forest, energy and wood technologies). If the topic of the Master's thesis has been decided, then the thesis instructor will also supervise the Master's degree studies. If the thesis instructor has not been decided yet, the student can get in touch with the person in charge of the study module, or any other teacher, for the purpose of deciding the thesis topic and finding an instructor. The specialisation modules must supplement the student's other courses and study modules in such a way that, as a whole, they provide a solid foundation for writing a Master's thesis on the selected topic. The supervising teacher will also help the student select a minor subject that will support his or her major subject studies. Master's degree students draft their PSP using the WebOodi's OodiHops tool. The plan is subject to approval by the teacher supervising the Master's degree studies.

Students who have been admitted to the University of Eastern Finland directly as Master's degree students are required to draft a PSP for their supplementary studies (worth 1 ECTS credit). The instructions for drafting a PSP for supplementary studies are available in Finnish on the School of Forest Sciences' Intranet pages at: <https://www.uef.fi/intra/metsa/hops-taydentavat-opinnot-ohjeet>. Students pursuing a degree under international Master's degree programmes are provided with separate instructions on how to draft a PSP for Master's degree studies (and a PSP for supplementary studies) by their programme coordinator.

### **Documentation practices for OodiHops**

If there are any issues with the planning of studies or any matters related to the substitution of studies or transfer of credits to which supervising teachers or the administrative staff cannot find a solution, the situation will be resolved by the person in charge of the academic subject. These – and any other arrangements made with teachers – should be recorded in the student's OodiHops. In this way, information will stay safe and the study administration officials, among others, will have access to it during the application for the degree phase.

## **3 BACHELOR'S THESIS AND PROSEMINAR**

### **3.1 Goals**

The proseminar introductory lectures and examination (1 ECTS), proseminar attendance, acting as opponent and own proseminar presentation (1 ECTS) and the Bachelor's thesis (8 ECTS) comprise a study module worth 10 ECTS credits. Proseminar work commences in the autumn of the third academic year with an introductory lecture, during which potential topics for seminar work will be

presented. The actual series of seminars continues to the spring of the third academic year. In the proseminar, students familiarise themselves with the history of their major subject, including the related theory and methodology, give a presentation on their Bachelor's thesis when it is nearly finished, and act as an opponent to another student's Bachelor's thesis. The proseminar and Bachelor's thesis are aimed at providing:

1. skills for conducting independent research on a specific theme
2. skills to obtain and use literary and other types of source materials without breaching copyright
3. an opportunity to practice statistical analysis and interpretation techniques on limited materials
4. experience in drafting a consistent written presentation
5. the presenter with experience in oral and audio-visual communication
6. the participants with experience in presenting arguments and taking part in a public discussion in an encouraging learning environment, and
7. an opportunity to produce a scientific report, i.e. a Bachelor's thesis, in accordance with the conventions of scientific writing.

### 3.2 Bachelor's thesis

The student agrees the topic of the Bachelor's thesis together with the thesis instructor(s), one of whom has to be a member of the school's permanent teaching staff. A notification of the commencement of work on the Bachelor's thesis must be completed together with the thesis instructor. The form is available at: <http://www.uef.fi/en/lumet/lomakkeet2> (Appointing instructor(s) for Bachelor's and Master's theses). The form is submitted to the office of the School of Forest Sciences. The normal length of a Bachelor's thesis is 20–40 pages. The instructions concerning the layout of written works, presented in section 5 of this guide, also apply to the Bachelor's thesis. It is recommended to write part of the manuscript in parallel with the progress of the research work (material and methodology) and part of it after the outcome of the research work is known (results and conclusions).

The following factors must be taken into consideration when drafting a Bachelor's thesis:

1. how to select, use and interpret sources of information; understanding the limits
2. the amount and quality of factual information, the weighting of information, and how to evaluate and combine conflicting pieces of information
3. conducting one's own calculations, if necessary; how to present the conclusions and the reasons behind them
4. presentation and processing of results and the overall structure of the presentation (section 5), and
5. format and layout, clarity of expression and linguistic correctness (section 5).

Particular emphasis is placed on *compliance with high ethical standards*, avoiding plagiarism (which means presenting someone else's ideas, research results, words and pictures as one's own). To ensure this, sources and references must be indicated clearly, and the use of unnecessary direct quotes, even those presented in quotation marks, should be avoided. The university uses plagiarism detection software to check theses, if necessary.

A maturity test is a compulsory component of the Bachelor's thesis (section 6). With the test, students demonstrate their language skills (Finnish or Swedish, whichever is the student's mother tongue) and how well they know the topic of their thesis.

The topic of the Bachelor's thesis may belong to the same theme as the Master's thesis, but the work must form a separate entity. One option is conducting a literature review. If a student decides to do a literature review for the Bachelor's thesis, the work must be analytical and original, and include theoretical reflection. In addition, its length must be close to the recommended upper limit for the total number of pages in a Bachelor's thesis.

Written work that has been published previously or used towards a Bachelor's degree cannot be presented as a Bachelor's thesis without making any changes to it. Such written work can, however, be used as reference in terms of the topic, material and/or method of analysis. This must be agreed separately and guided by one of the school's teachers.

The school will store a paper copy of each Bachelor's thesis in its archives for at least six months. Since the school cannot guarantee long-term storage of Bachelor's theses, it is recommended that the authors save one complete version of their Bachelor's thesis.

### 3.3 Proseminar

The scheduling of the proseminar process and the distribution of written work to seminar participants will be handled via the Moodle learning environment. A password required for self-registration can be obtained from seminar leaders. The student agrees on a preliminary date for the proseminar presentation with the seminar leader and thesis instructor. The leader of the seminar is responsible for keeping the proseminar calendar up to date on Moodle. **The person presenting their work must ensure that the instructor(s) attend the presentation. If the instructor(s) cannot attend the presentation, it will not be held.**

The proseminar participant is responsible for the transcription of his/her thesis. The work must be uploaded onto Moodle no later than **one week before the seminar**, and also delivered to the thesis instructors. The seminar participants will retrieve the work from Moodle and read it prior to the seminar. The work can also be copied to a personal laptop, which is brought to the seminar.

After the presentation, everyone present engages in an in-depth discussion on all the issues raised by the students, seminar leader and thesis instructor(s) attending. A previously agreed opponent (another student) will in advance prepare feedback on the work from different perspectives and present it at the seminar with the purpose of raising a discussion. All the students attending the seminar are expected to familiarise themselves with the work in advance in order to take an active part in the discussion. After the proseminar, the work is edited and finalised on the basis of possible suggestions for corrections.

Once the main instructor of the thesis concludes that the work is ready and provides oral permission to submit it for grading, **two** bound copies of *the final version of the Bachelor's thesis* are submitted to the office of the School of Forest Sciences. The thesis instructor, who is a member of the school's teaching staff, will grade the thesis. The thesis will be graded on a scale of 1–5. The grading criteria and process for a Bachelor's thesis are described in more detail (in Finnish) on the School of Forest Sciences' Intranet pages at: <https://www.uef.fi/intra/metsa/opinnaytteet>.

#### 3.3.1 Proseminar attendance

The proseminar includes:

- introductory lectures and an exam. Lecture materials are available for downloading on the proseminar's Moodle pages.

- active participation in six seminars, including the presentation of one's own work and acting as an opponent to another student's work. One introduction forms one seminar, which means that several separate seminars can be held at one time.

An integral part of the proseminar work and the drafting of the Bachelor's thesis is the Forest Sciences Information Search course (1 ECTS), organised by the university library. This course is taken at the time of commencing proseminar work in the autumn of the third academic year. A prerequisite for taking this course is having decided the topic of the Bachelor's thesis, so that full advantage can be taken of the materials obtained during the course.

### 3.3.2 Progress of presentations

One seminar session can be broken down as follows:

1. The leader of the seminar series opens the seminar.
2. The presenter presents his/her work (20 minutes).
3. The opponent speaks and the presenter responds to the opponent (10 minutes).
4. The leader of the seminar series opens the discussion.
5. The topic is discussed by everyone attending the seminar (15 minutes).
6. The leader of the seminar series ends the discussion and the seminar session by commenting briefly on the presentation (the written work and introduction to the seminar) and the discussion.

When presenting the work, the **presenter** makes use of AV equipment, usually a video projector. It is recommended to learn the basics of Microsoft PowerPoint and use the software to create the presentation.

The opponent reads the thesis in advance and presents feedback on it at the seminar. The opponent's remarks should focus on the same factors to which the author has been advised to pay attention when drafting the thesis. The opponent's task is to critically evaluate the written work and oral presentation, but in a kind and constructive manner. The opponent is allowed to present subjective opinions when commenting on the themes of the written work. The relevant page numbers are given by the opponent when commenting on the thesis. In this way, it will be easier for other participants to follow the discussion. The opponent asks the presenter to explain any deficiencies in the work. The opponent can also suggest how to correct or otherwise handle the deficiencies. The opponent is also tasked with evaluating the relationship between the oral presentation and the written work, and commenting on how easy it was to follow the presentation and how well the presentation was constructed.

**Seminar participants** are provided with the thesis in advance so that they have enough time to study the topic and theme of the work and come up with any questions or improvement suggestions. The participants are free to make constructive comments on the written work and how it is presented. The seminar is an opportunity to practice active discussion in a familiar and encouraging learning environment without unreasonable pressure to perform. Getting a mark for attendance requires active participation in the discussion during the seminar.

## 4 MASTER'S THESIS AND LAUDATUR SEMINAR

### 4.1 General

The Master's thesis included in advanced studies is usually the first scientific work that a student carries out independently. Writing a Master's thesis is an opportunity to take one's own ideas and creativity further in a more comprehensive context compared to the written work included in earlier studies. A Master's thesis is part of the specialisation studies included in a Master's degree programme or the major subject studies of an international Master's degree programme. Once the instructor and topic have been agreed, the commencement of work on a Master's thesis is notified using a form that can be found at <http://www.uef.fi/en/lumet/lomakkeet2> (Appointing instructors for Bachelor's and Master's theses). A one-page work plan must be attached to the form. This form is used as basis for determining the field of specialisation of the Master's degree which means that, **in addition to the topic of the thesis, the form must indicate under which field of specialisation and study module or which international Master's degree programme the thesis is being produced.**

The finished work, delivered to the faculty, represents the thesis work required for completing a Master's degree. The thesis must show evidence of the author's in-depth knowledge of the theme of the thesis and their capacity for scientific thinking, mastering the necessary research methods and scientific communication in the author's own field of expertise. The thesis is written in accordance with the School of Forest Sciences' instructions for written work, provided in section 5.

Deciding on the topic of a Master's thesis usually takes place in the spring of the third academic year or the beginning of the fourth academic year. For the international Master's degree programmes, the corresponding times are the spring of the first academic year or the beginning of the second academic year. Students are free to ask their teachers for thesis topics; in such cases, the thesis work is usually related to the research conducted at the School of Forest Sciences. Students are also free to take the theme of their Bachelor's thesis and expand it into a Master's thesis. No page limits have been set for Master's theses; the content of the work is what counts. In recent years, a usual length for a Master's thesis has been between 40 and 60 pages. If the student decides to take advantage of his/her own Bachelor's thesis, the share of the earlier work must be significantly less than half of the Master's thesis: the Master's thesis has to be able to stand alone as an independent written work.

### 4.2 Research plan

After the research topic has been agreed with the teacher, **a research plan is drafted in cooperation with the thesis instructor(s).** One of the thesis instructors has to be a member of the school's permanent teaching staff. A carefully drafted research plan will help clarify the research question and determine the analytical methods, materials and schedule. It will also help avoid unnecessary work and adopt a systematic approach to the theme. The plan represents an agreement between the instructor and the student. A research plan is required to comprise, if applicable, the following information:

- background and theoretical framework
- research objectives
- how the research material is obtained
- which analysis methods are used
- suggestions for further application of the results

- the site and schedule for conducting the research
- instructor(s) for the research work, and
- reference literature used for drafting the plan.

### 4.3 Practical guidelines

Master's theses are submitted in PDF format to the Office of the School of Forest Sciences as an email attachment addressed to Anne Tikkanen (anne.tikkanen@uef.fi). This is done for the purpose of appointing examiners, but only after the thesis instructor has given permission to submit the work for evaluation. At this stage, the student must also discuss with an instructor whether to allow the publication of the approved work in open access format. A Finnish-language thesis must include one-page abstracts written in Finnish and English. The abstracts can be used by the university for communication purposes, for example. After submitting the Master's thesis for evaluation, before the final approval of the work, the student must complete the maturity test (section 6). In some international Master's degree programmes, the maturity test is not a compulsory component.

The Head of School appoints two examiners for the Master's thesis. The examiners then have one month to provide a statement on the work, including a grade suggestion. The Dean of the Faculty grades the Master's thesis on the basis of the examiners' statements, if the grade suggestions are consistent and the student has no objections. Otherwise, the work will be graded by the Faculty Council. The examiners will present their statement on the thesis using an evaluation form included in the thesis evaluation guidelines provided on the School of Forest Sciences' Intranet pages at: <https://www.uef.fi/intra/metsa/opinnaytteet>.

Each thesis work produced at the University of Eastern Finland is a public document. All Master's theses are published in electronic format in the database of the university library. If the student does not sign and submit an agreement for ePublishing his/her Master's thesis, the work will only be made available in electronic format on location at the campus library. The Master's theses of students who sign and submit an agreement for ePublishing their work will be published online in open access format. The publishing of a Master's thesis in open access format by the university library may prevent the publication of the work in a scientific series. Many scientific series require that research is unpublished, as does good scientific practice. Therefore, students who intend to publish their Master's thesis should not conclude an open access publication agreement with the University of Eastern Finland. Decisions on publication should be discussed with thesis instructors.

The necessary forms (Agreement for ePublishing Master's thesis) and the instructions concerning the evaluation and publication of Master's theses are available on the Faculty of Science and Forestry's website at: <http://www.uef.fi/en/lumet/lomakkeet2>.

### 4.4 Laudatur seminar

The studies towards completing a Master's degree include a laudatur seminar, which is aimed at supporting the drafting of a Master's thesis. In the laudatur seminar, more emphasis is placed on independent work compared to the proseminar. Students usually participate in the Master's thesis seminar after they have completed their Bachelor's thesis and have made a start on their advanced studies. The usual time to take part in a laudatur seminar is during the fourth or fifth academic year, or during the second year of an international Master's degree programme. The purpose of the laudatur seminar is to go through a student's written work when their Master's thesis is near com-



pletion. The aspects of the written work discussed at the seminar can be exploited in the finalisation of the Master's thesis.

When a student starts to work on a Master's thesis, it is recommended to complete the advanced studies that support the thesis work at an early stage. It is also recommended to discuss with the professor or senior researcher acting as thesis instructor the best ways to support the Master's thesis when taking the methodology and theoretical literature parts included in the final examination.

In some international Master's degree programmes, the laudatur seminar is in the form of a Master's thesis seminar, organised either fully or partly on the web (further information is provided by the programme coordinator and/or in the programme's study guide).

## **5 STRUCTURE AND FORMAT OF WRITTEN WORK**

### **5.1 General**

The ability to produce and present written works is a key element of scientific interaction. Good communication skills are also required in working life. Students are, therefore, throughout their studies provided with opportunities to obtain experience in drafting and presenting written works.

Not everyone is a natural born performer or writer, but practice makes perfect. Opportunities to give presentations and practice writing should be eagerly exploited throughout the studies to boost one's communication skills, which are necessary in a profession. Before the transition to working life, seminars provide students with an opportunity to put their communication skills into practice in a safe and encouraging learning environment. Information on managing performance anxiety is provided on the website of the Finnish Student Health Service ([www.yths.fi](http://www.yths.fi)) and in literature. Courses for enhancing one's performance skills, organised by the Language Centre, are also worth exploring.

This guide is intended to harmonise the layout of all the written works produced at the School of Forest Sciences. The instructions in the guide can, therefore, also be followed, where applicable, when drafting other reports for other courses and study modules offered by the school.

### **5.2 Structure**

In written works, the following basic structure must be observed in the body of text:

- title
- author(s)
- introduction
- materials and methods
- results
- discussion
- literature cited

In short written works (e.g. coursework and reports), these are usually all the sections that are needed; more detailed instructions are always provided by the teacher supervising the work. In addition to these sections, thesis work, such as the Bachelor's and Master's theses, comprise a cover page, abstract, foreword and table of contents. Sometimes there are also appendices. They must be in the following order:

- cover page
- abstract
- foreword
- contents
- body of text (introduction, materials and methods, results, discussion)
- literature cited
- appendices (if any)

**The cover page** (title page) is printed in colour on paper that carries the university name and logo and the name of the faculty (Appendices 1–3). The template for the cover page can be downloaded for personal use from the School of Forest Sciences' Intranet pages at: <https://www.uef.fi/intra/metsa/lomakkeet>. The font used on the title page must be the same as that used in the work itself. The font size must be 14 point. The major subject must be indicated on the cover page of a thesis. With Master's theses, the field of specialisation is included on the cover, if necessary (e.g. Master's thesis, Forest Sciences, Forest Mensuration and Forest Planning). The fields of specialisation include:

- Forest Management and Forest Ecosystems
- Forest Mensuration and Forest Planning
- Forest Economics and Forest Policy
- Forest, Energy and Wood Technologies

International Master's degree students write the name of their degree programme on the cover page.

A one-page **abstract** ('tiivistelmä' in Finnish), a summary of the work, is appended to all Bachelor's and Master's theses. An abstract is a self-contained statement that describes a larger work. It cannot contain any references to the text, figures, tables or literature, or any non-standard abbreviations explained in the work. An abstract provides the reader with an overall understanding of what the thesis is about. The following information must be indicated on the abstract page: the name of the author, year, the title of the thesis, the institutional affiliation, and the total number of pages (Appendix 4). An abstract is a short description of the objectives, research materials, methodology, main results and conclusions of a larger work. The maximum length for an abstract is 300 words. Keywords describing the content of the written work (3–7) are listed at the bottom of the abstract page.

A Finnish-language Master's thesis has two one-page abstracts: one in Finnish and one in English. The same rules apply to the content of the English-language abstract (required information: author, year, title, University of Eastern Finland, School of Forest Sciences, Master's thesis in Forest Science, specialisation Forest Mensuration and Forest Planning, xx p.) (Appendix 5). The content of the English-language version corresponds with the Finnish-language abstract. Keywords are listed at the bottom of the abstract page.

The **foreword** (if any) includes the background to the research work and its possible correlation with a larger work. The foreword section is also a good place to list the thesis instructors, and to thank them and any other persons and organisations who helped the author complete his/her work. The storage location of the work's empirical data, if any, is given in the foreword section or some other appropriate part of the written work.

The abstract and foreword will not be included in the **table of contents**, because their place is before the content page. The unnumbered title page is page number one.

The actual **body of text** follows the structure presented here. The first main section in the body of text is the **introduction**. The introduction is for presenting background to the research question (previous knowledge on the topic, lack of knowledge on the theme, the theoretical framework). The introduction concludes with the definition of the research objectives. The theoretical framework can also be presented in its own section, if necessary. The main sections that follow the introduction are materials and methods, results and discussion, unless otherwise required by the nature of the research. It is important that the materials and methods used in the research are described in as much detail as possible for the research to be repeatable. **Results** are presented in their own section using tables and graphs, the content of which is also presented verbally. **Discussion** is the section for linking the research findings to previous knowledge on the topic and reflecting on the new information the work has contributed to the research area in question. The research questions presented in the introduction section are answered in the discussion section.

**Literature cited** must be compiled carefully to ensure that all the citations correspond with the list.

The final part of the written work is the **appendices**, which are optional and may include, for example, materials about obtaining research materials, such as data collection forms. Appended to the work are materials that do not have to be included in the text to get the message across, but need to be referred to in the text, or the reader needs to add them in order to be able to verify the correctness of the results. Appendices are optional. Appendices are numbered (appendices 1–9) and placed last in the work.

### 5.3 Layout

The following instructions related to the layout and settings of written works apply to all the written works mentioned in this guide. If the tradition of the scientific field (e.g. Master's theses focusing on forest legislation) so requires, exemptions from observing these instructions can be agreed with the thesis instructors.

#### Language

The primary languages of written works are Finnish and English, but in some cases Swedish can also be used. The Bachelor's thesis and Master's thesis are drafted in Finnish, and the essay of the maturity test is written in Finnish, if the student's mother tongue is Finnish. If students whose mother tongue is Finnish wish to draft their Master's thesis in a language other than Finnish, they have to apply for permission from the person in charge of the academic subject before commencing the thesis work. English is the only language used in the international Master's degree programmes.

#### MS Word settings

Microsoft Word has certain auto-correct features that will lead to errors in the written work. The most disturbing error is replacing a hyphen with a dash, which is a spelling mistake. Here is how to insert some necessary hyphens and such:

Hyphen (-)	Num-	(pro gradu -tutkielma)
Dash (–)	Ctrl+Num-	(1–5, 1999–2002)
Em dash (—)	Alt+Ctrl+Num-	(Rarely needed, but can be used, for example, when the same author appears repeatedly in the literature cited list.)

Non-breaking hyphens (Ctrl+Shift+-) prevent words or parts of words from shifting to a new line after a hyphen, if hyphenation is not preferred. To keep parts of a (Finnish-language) compound word together, the hyphen is bound to the latter part of the compound word, meaning it will move

with the word to a new line. Non-breaking spaces (Ctrl+Shift+Space) are recommended to be used between a numerical value and a unit to prevent them from printing on different lines.

### **Text**

To enhance the readability of the text, the recommended font type is Roman (e.g. Times New Roman or Calibri). Use font size 12. Use spacing 1.5. In the list of literature cited, use spacing 1.0 in the captions of the figures and tables. Spacing 1.0 is also used in the abstracts. The same font type is used in the captions of figures and tables and inside the tables as in the body of text. The recommended font type for texts inside figures is sans serif (e.g. Arial).

### **Margins**

The page size of written works is always A4. The margins are 3 cm on the left, and 2 cm on the right, top and bottom of the page.

### **Headings**

Write section headings in bold. Use uppercase for the title of the work and main headings, and lowercase for other headings. Number the sections and subsections. Use the standard format when numbering subsections: 1.2 (not 12 or 1.2.). Leave two line spaces above main headings and one line space above subheadings.

### **Text alignment and paragraphs**

Justify the text on both sides. Leave one line space between paragraphs. Do not indent the first line of a paragraph. Use hyphenation on Finnish-language texts.

### **Page numbers**

Page numbers are centred at the top of the page. The same font is used in the page numbers as in the body of text. The title page is page 1, but the page number is not shown on the title page. Apply page numbering to the literature cited, contents and foreword sections. Continue the page numbering also to the appendices.

### **Headers and footers**

Using headers and footers enhances the readability of written works. Headers are separated from the body of text with a thin line across the page. When a header is used, the page number goes to the upper right corner of the page.

### **Figures, tables and formulas**

Figures, tables and formulas are used to supplement and clarify the text, but their descriptions need to be detailed enough for them to be examined and understood individually. Every table and figure must be referred to in the text. Figures and tables are placed in the body of text – rather than presenting them under a separate section at the end of the work. The numbering follows the order in which the figures and tables are referred to in the text. Example: "The difference between juniper and bird cherry was notable and statistically significant ( $P=0,006$ ; Figure 4), but no differences were detected between juniper and pine (Figure 5)." and "Linear optimisation led to better results than non-linear optimisation (Table 7)." Whenever possible, figures and tables should be placed at the top or bottom of the page.

Avoid unnecessary lines in figures and tables. The frames of word-processing programs are usually unnecessary; it is OK to remove them. Avoid using vertical lines in tables. The correct placement of captions is below figures and above tables. Write "Figure 1." or "Table 1." in bold, but not the text of the caption. Use spacing 1.0 in the captions of figures and tables. Whenever possible, use the

same type and size of font in the texts inside tables and figures as in the body of text. Use spacing 1.0 in texts inside tables. It is recommended to use an Arial-type font in texts inside figures describing axis, for example.

**Table 1.** Write the table caption here using spacing 1.0. The caption is always placed above the table.

Type of seedling	Seedling height cm	Basal diameter cm	Growth cm
Large root ball	23.2	1.6	6.4
Small root ball	19.1	1.2	5.2



**Figure 1.** Write an exhaustive caption here using spacing 1.0. The caption is always placed below the figure. Tables and figures are numbered consecutively throughout the written work. (Figure: Kaisa Laitinen)

Formulas are created using a specific tool in the word-processing program. The SI base or derived quantities are used in formulas. The placement of formulas is based on the left-hand alignment of the body of text, and the numbering follows the order in which the formulas are referred to in the text. Example: The exact concentration of the sodium hydroxide solution must be determined prior to titration (formula 1). Name all the quantities and the corresponding units used in the formulas.

Example:

$$c_{NaOH} = \frac{n_{NaOH}}{V} \quad (1)$$

where

c = concentration of solution [mol l<sup>-1</sup>]

n = moles of solute [mol]

V = volume of solution [l]

Numerical values with four or more digits are usually presented in groups of three, starting with the first digit (e.g. 1,200 m<sup>3</sup>, 1,500,000 €). A different decimal mark is used in Finnish (comma) and English (full stop). Measurement results are usually presented using 2–4 significant digits. Units are chosen to avoid unnecessary zeros; e.g. nitrogen content 12.3 g kg<sup>-1</sup>, boron content 8.73 mg kg<sup>-1</sup>. The SI base units and derived units are used in the formulas and results. Some of the base units are listed below.

Mass (m): 1 kg = 1,000 g = 10<sup>6</sup> mg = 10<sup>9</sup> µg  
 Area: 1 m<sup>2</sup> (1 ha = 100 m x 100 m = 10,000 m<sup>2</sup>)  
 Volume (V): 1 l = 1 dm<sup>3</sup> = 1,000 cm<sup>3</sup> = 1,000 ml = 10<sup>6</sup> µl  
 Amount of substance (n): 1 mol = 1,000 mmol = 10<sup>6</sup> µmol  
 Molar mass (M): 1 g mol<sup>-1</sup>  
 Concentration (c): 1 mol dm<sup>-3</sup> = 1 M  
 Pressure (p): 1 Pa = 10<sup>-3</sup> kPa = 10<sup>-6</sup> MPa

Units (not SI) that are widely used:

- bar is an old unit of pressure, 1 bar = 0.1 MPa = 100 kPa
- ppm: parts per million is used for expressing the concentration of hazardous substances in environmental analytics and by the industry (e.g. mg kg<sup>-1</sup>)

### Binomial nomenclature

The scientific name of a species must be given when a species is mentioned for the first time in the text. Binomial names composed of two parts, the genus and species, are written in *Italics* (the authority is not), except in the literature cited section. For example, *Pinus sylvestris* L.; the family of pine, Pinaceae, is not written in *Italics* (and neither are the order, class and division).

### In-text citations

Various reporting guidelines define when the scope of an in-text citation at the end of a sentence covers only that last sentence, a few preceding sentences, or the whole paragraph. In scientific writing, however, the common practice is to indicate the scope of the citation through the sentence structure. Referring to a whole paragraph is not desirable, but if the text of a paragraph nonetheless refers to a single source, the recommended citation style from the options presented below is number 2. Direct quotations are normally avoided, but if they are used, they need to be separated from the body of text by using quotation marks. The use of source literature means analysing information obtained from various sources in one's head and then using that information to independently produce content for one's own written work. *It is not about piecing together other people's ideas and presenting them as one's own.* The reader must be able to differentiate the author's original text from the cited parts of the written work. As a rule, the publication guidelines of scientific series favour in-text citations.

There are two styles for citing original sources, of which the first one below is the recommended option (note the placement of the period in example 1):

1. Based on the travelling speed of a camel caravan, Eratosthenes estimated that the distance between Aswan and Alexandria was 5,000 stades (Kakkuri 1974).
2. According to Kamppila (1980), the occurrence of *Pinus kesiyana* in the mountains of North Vietnam has not been fully established.

If there are two authors, the citation in example 1 is formed as follows: (Kakkuri & Kukkola 1974). If there are more than two authors, the form of the citation is (Kakkuri ym. 1974) in Finnish, and (Kakkuri et al. 1974) in English. If a citation covers more than one publication by more than one

author, the literature cited is presented in chronological order. This practice is based on the assumption that the authors of more recent sources are familiar with the earlier literature. For example, “This has been noted in several studies (Virtanen 1977, Mäntynen 1982, Aho 1996)”.

If a citation covers more than one publication by the same author, the placement of the citation is determined on the basis of the author's oldest publication. It is cited first, followed by the year of the more recent publications, separated with a comma (Harstela 1985, 1999). Citations covering more than one author are placed on the basis of the name of the first author, and are therefore separate from single-author publications by the same author (Tuomi 2012, Tuomi & Paju 2014). Citations to more than one publication by the same author(s) published in the same year are distinguished by using lowercase letters (a, b, c, etc.). If the author or editor of a publication is not known, the citation is formed by using the first 2–3 words of the title of the publication and its year of publication as follows: ”...and pine is grown in barren lands (Guidance letter to forest... 1981)”.

There is no need to add 'see' in front of the citation. Nor is the use of the abbreviation 'cf.' recommended. In principle, it can only be used if the source contains information or ideas that conflict with what is presented in the written work. The preferred solution is to describe the conflict in the written work rather than use the cf. abbreviation and oblige the reader to compare several sources. It can be arduous, and frankly, it is the author's job.

Authors are increasingly citing sources found on the Internet. Some of them are in the form of books, and therefore the citation style is the same as for printed books, such as “Tamminen (1998) has noted that...”. Because eBooks are easy to update, it is necessary to indicate the date on which the work was retrieved from the Internet in the literature cited section. If an online source is also available in printed format, only the printed version is included in the literature cited section. It is especially important to document the date on which information was viewed on the Internet when citing online databases, websites of organisations and other such sources of information that is frequently updated. Since checking information that is frequently updated is impossible afterwards, these types of sources should only be used if they are deemed to be absolutely imperative.

### **Literature cited**

The literature cited section of this guide serves as an example on how a literature cited section should be formed. In the literature cited section, all source publications are listed in alphabetical order according to the name of the author(s). Publications by the same author(s) are listed in chronological order. Single-author publications take precedence over group publications in which the same name comes first in the list of authors; such works are listed according to the number of authors. If the author or editor of a publication is not known, the publication is listed according to its title. When citing a single article included in a collection of articles, the name of the author and the title of the article are followed by the editor(s) (abbreviated 'toim.' in Finnish and 'ed./eds.' in English) and the title of the whole publication. The number of pages in the article, not the whole publication, is included in the citation entry. Below are some examples of how to list different source publications in a literature cited section.

#### ***An article published in a series or a periodical***

Mannerkoski, H. & Möttönen, V. 1990. Maan vesitalous ja ilmatila metsäaurausalueilla. [In Finnish] Summary: Soil water conditions and air-filled porosity on ploughed reforestation areas. *Silva Fennica* 24(3): 279-301.

Martikainen, P. & Kouki, J. 2003. Sampling the rarest: threatened beetles in boreal forest biodiversity inventories. *Biodiversity and Conservation* 12: 1815-1831.

***A single article included in a collection of articles***

Hänninen, H. 1990. Modelling the annual growth rhythm of trees: conceptual, experimental, and applied aspects. In: Jozefek, H. (ed.). Modelling to understand forest functions. *Silva Carelica* 15: 35-45.

***A monograph included in a volume of a series or in the form of a book***

Harstela, P. 1993. Forest work science and technology, Part I. *Silva Carelica* 25. 113 p.

Kärkkäinen, M. 1985. Puutiede. Sallisen Kustannus Oy, Sotkamo. 415 p. [In Finnish]

***Presentation at a conference***

Saastamoinen, O. 1987. Multiple use and Forest 2000 programme. In: Hänninen, R. & Selby, J.A. (eds.). Proceedings of the Biennial Meetings of the Scandinavian Society of Forest Economics, Porvoo, Finland, May 1987. *Scandinavian Forest Economics* 29: 39-47.

***Electronic sources***

Talven 2004-2005 lumet. 2005. [Online document]. Ilmatieteen laitos. Available at: [http://www.ilmatieteenlaitos.fi/saa/tilastot\\_156.html](http://www.ilmatieteenlaitos.fi/saa/tilastot_156.html). [Cited on 13 Dec 2005].

Moen, J., Aune, K., Edenius, L., & Angerbjörn, A. 2004. Potential effects of climate change on treeline position in the Swedish mountains. *Ecology and Society* 9(1): 16. [Online journal]. Available at: <http://www.ecologyandsociety.org/vol9/iss1/art16/>. [Cited on 4 Nov 2005]. [In Finnish]

***Unpublished sources***

Hyttinen, P. 1988. Maa- ja metsätalouden yhteissuunnittelu suomalaisella maatilalla lineaarisen optimoinnin avulla. Metsätalouden suunnittelun lisensiaatintutkimus. Joensuun yliopisto. 132 p. [In Finnish]

**6 MATURITY TEST**

Included in the Bachelor's thesis and Master's thesis study modules is the maturity test. By writing an essay, the student demonstrates his/her knowledge in the field of expertise of the thesis and how well he/she masters the Finnish language (or Swedish, if it is the student's mother tongue). Taking the maturity test in the same language in which the degree student has been educated demonstrates the student's proficiency in that language, as provided by the government decree concerning the demonstration of language proficiency. If the student has taken the maturity test, which is also proof of language proficiency, during first degree studies or degree studies at a university of applied sciences, the maturity test taken in conjunction of a Master's thesis will only be used to evaluate the student's knowledge in the field of expertise of the thesis.

Subject to the approval of the School of Forest Sciences, Master's degree students not studying under an international Master's degree programme may take the maturity test in a language other than Finnish or Swedish if they are not required to demonstrate their language proficiency, as referred to in Section 6 of the Government Decree on University Degrees (a student who has been educated in a language other than Finnish or Swedish or a student who has been educated abroad). In this case, the maturity test is taken to demonstrate knowledge in the field of expertise of the thesis.



The author of a Bachelor's thesis is required to take a maturity test, in writing, on the topic of the thesis before the thesis is graded (after the thesis has been submitted for evaluation). The author of a Master's thesis is required to take a maturity test, in writing, after the examiners have been appointed, but before the thesis is graded. Taking the maturity test is agreed with the School of Forest Sciences' teacher who supervised the thesis work.

## **7 PROFESSIONAL TRAINING AND ADVANCED SPECIALIST TRAINING**

### **7.1 Professional training**

The professional training included in a Bachelor's degree is part of the study module Orientation of working life and professional training. The goal of professional training is to teach students how to apply the knowledge and skills they have obtained prior to the training when working in the field of forest science. The training comprises four weeks of full-time work, but it can be taken in more than one part and at more than one workplace.

Students apply for training positions themselves. The place of training is submitted for approval to the senior researcher of wood science, who is the person responsible for professional training. After completing the training, a professional training report (approximately 500 words) is submitted to the senior researcher of wood science, in addition to presenting the original certificate of employment. The required components of the professional training report include descriptions of 1) the job search process (What methods did the student use in the job search and did the process go according to plan?), 2) the place of training (name, selection criteria, duration of employment) and 3) work tasks, and also 4) discussing how the training experiences (information, skills, practical learning, other benefits) are related to existing knowledge and skills, and how they can be exploited in future studies and a career in forest sciences.

A period of employment completed before the commencement of studies at the School of Forest Sciences can be counted towards the degree as professional training based on the principles of recognition and accreditation of prior learning. In this case, the student must be able to verify that the duration and content of the employment period correspond to the professional training requirements by presenting the necessary documentation (certificate of employment or equivalent).

### **7.2 Advanced specialist training**

The advanced specialist training included in Master's degree studies is aimed at providing students with hands-on experience of what the work tasks, job market and working life are like in their field of specialisation. Students will hone their skills to become experts in their field of specialisation. The recommended time to complete advanced specialist training is during the summer following the first academic year of Master's degree studies. The training can also be done after completing the Bachelor's degree, but before commencing other Master's degree studies.

The training period is eight weeks of full-time work (in some international Master's degree programmes, the duration is twelve weeks). Students search and apply for the training position themselves. Training abroad is recommended. After completing the training, students draft an advanced specialist training report in accordance with the relevant course description. The report and certificate of employment are submitted to the teacher in charge of the student's specialisation studies.

The international Master's degree programme in wood materials science includes a compulsory advanced specialist training period, Practical Training in Wood Materials Science. The place of training is required to operate in the field of wood materials science, and it is subject to the approval of the person in charge of practical training. Students are provided with more detailed instructions on how the training period and reporting are carried out in practice at the beginning of the training period. Some international Master's degree programmes have also set more specific guidelines on how to successfully complete a training period. Further information is provided by the programme coordinator and/or in the programme's study guide.

## **8 RULES OF CONDUCT FOR EXAMINATIONS**

Below are the rules of conduct for examinations organised by the School of Forest Sciences:

1. Permission to enter the examination hall is given by the proctor. Examinations begin on the hour (e.g. at twelve noon, not 12.15 like the lectures), and the total duration of a course examination is two hours (120 minutes), unless stated otherwise. The total duration of a general examination is four hours (240 minutes). The earliest possible leaving time is half an hour (30 minutes) after the examination begins. After this point, late arrivals will no longer be accepted. The times will be written on the notice board of the examination hall immediately after the examination time has begun, based on the examination hall's clock.
2. Any communication between those attending the examination is prohibited after entering the examination hall.
3. Leave your coat, bag and other belongings beside the wall of the examination hall. They must not be within the reach of others attending the examination, e.g. on the seat next to you or on the table or floor. Cell phones must be switched off and left beside the wall, not in your pocket. The seating arrangement is to leave at least one empty seat between two persons.
4. You are only allowed to bring a (propelling) pencil, an eraser, a sharpener or lead refills, and a ruler (not in a pencil case). You will also need to bring your student card or other proof of identity. The use of a dictionary is only allowed by special permission, if 1) the dictionary is shown to the proctor before the exam, and if 2) it is mentioned in the paper with the exam questions. The use of a calculator is also allowed only by special permission, if 1) the memory and software of the calculator have been reset, and if 2) it is mentioned in the paper with the exam questions. Drink bottles without any text on them and snacks (in a package without any text on it) may also be allowed.
5. Do not look at the examination questions before the proctor has given permission to do so.
6. Ask about any ambiguities in the course examination at the beginning of the examination, if the proctor is the teacher in charge of the academic subject. If the proctor is not the teacher in charge of the academic subject, and always in connection with a general examination, remarks about the examination questions can be presented afterwards to the person in charge of the examination.
7. Try to minimise your movements in the examination hall in order to avoid disturbing others.
8. If you need more paper, raise your hand and stay seated. The proctor will bring the paper to you. Do the same, if you need a new pencil or eraser (but try to bring enough writing materials with you).
9. All papers – including the paper with the examination questions – must be returned. At least one of the papers must include your name and student number and the name of the examination, even if you have not answered any of the questions.

10. Show your student card or other proof of identity when you return the papers, and write your name, student number and signature on the list of participants.
11. You are not allowed back into the examination hall before the last person taking an examination has left. It is, therefore, important to make sure you have all your belongings with you when you leave the examination hall.

Failure to follow these rules of conduct and any other form of cheating will lead to removal from the examination hall and the necessary follow-up measures pursuant to the Degree Regulations of the University of Eastern Finland.

## **9 BOTTLENECKS FOR STUDENTS**

Studies do not always go according to plan, and students do not always know who to turn to when they are facing problems. If you feel that you have come to a point in your thesis work or degree programme where the situation cannot be resolved by discussing the problem(s) with your instructor, you can express your concerns to the person in charge of the academic subject or the coordinator of your international Master's degree programme. They will help you find a solution to your problem. If you have any questions about courses and study modules (for example, how to take them and whether distance learning options are available), the teacher in charge of the course or study module can provide you with further information and advice.

When planning your studies (e.g. deciding on a minor subject), you are free to contact the tutors, but also any other member of the teaching staff. You can also turn to the academic coordinator if you have any questions regarding the degree requirements or need technical support with OodiHops. The coordinator and the person in charge of the academic subject will be able to help you with issues related to the transfer of credits and the recognition and accreditation of prior learning.

The **Guide for Students** (<http://www.uef.fi/en/studies/practical-guide-for-international-students>), available on the University of Eastern Finland's website, is a comprehensive compilation of information on studying at UEF, the university's services, and other important study-related issues. The Guide for Students comprises information on the right to study, the Degree Regulations, procedures for handling cases of bullying or harassment, accessibility information and appeal instructions, as well as ethical principles and plagiarism explained.



ITÄ-SUOMEN  
YLIOPISTO

*University of Eastern Finland*

*Luonnontieteiden ja metsätie-  
teiden tiedekunta*

*Faculty of Science and Forestry*

## VISAKOIVUN TILAVUUSYHTÄLÖT

Visa Koivikko

METSÄTIETEEN  
KANDIDAATINTUTKIELMA

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JOENSUU 2014



*University of Eastern Finland*

*Luonnontieteiden ja metsätie-  
teiden tiedekunta*

*Faculty of Science and Forestry*

## HIILIDIOKSIDIN VAIKUTUS PUUN KASVUUN

Maija Meikäläinen

METSÄTIETEEN PRO GRADU,  
ERIKOISTUMISALA METSIEN HOITO JA METSÄEKOSYSTEEMIT

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JOENSUU 2014



*Faculty of Science and Forestry*

THE EFFECT OF CARBON DIOXIDE ON TREE GROWTH

John Smith

MASTER'S THESIS  
WOOD MATERIALS SCIENCE

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JOENSUU 2014

Koivikko, Visa. 2014. Visakoivun simultaaninen runkokäyrästä. Itä-Suomen yliopisto, luonnontieteiden ja metsätieteiden tiedekunta, metsätieteiden osasto. Metsätieteen pro gradu, erikoistumisala metsänarviointi ja metsäsuunnittelu. 45 p.

## **TIIVISTELMÄ**

Tähän kirjoitetaan tiivistelmä, joka on itsenäinen esitys julkaisun sisällöstä. Siinä ei saa olla viittauksia tekstiin, kuviin, taulukoihin eikä kirjallisuuteen eikä epätavallisia, itse työssä selitetyjä lyhenteitä. Lukijan tulee saada tiivistelmän perusteella kokonais käsitys tutkimuksesta.

Tiivistelmässä on esitetty lyhyesti tavoitteet, tutkimusaineisto, käytetyt menetelmät, tärkeimmät tulokset ja päätelmät. Tiivistelmän pituus on korkeintaan 300 sanaa ja sen on sovittava yhdelle sivulle. Tiivistelmän alareunassa ilmoitetaan avainsanat.

**Avainsanat:** visakoivu, runkokäyrästä, simulointi

Koivikko, Visa 2014. Simultaneous stem curve of curly birch. University of Eastern Finland, Faculty of Science and Forestry, School of Forest Sciences. Master's thesis in Forest Science specialisation Forest Mensuration and Forest Planning, 45 p.

## **ABSTRACT**

This is the body of text of an abstract, which is a self-contained statement that describes a larger work. It cannot contain any references to the text, figures, tables or literature, or any non-standard abbreviations explained in the work. An abstract provides the reader with an overall understanding of what the written work is about.

An abstract is a short description of the objectives, research materials, methodology, main results and conclusions of a larger work. The maximum length for an abstract is 300 words, and it must fit on one page. Keywords are listed at the bottom of the abstract page.

**Keywords:** curly birch, stem curve, simulation