



Course Guide

Thesis Aquaculture and Fisheries

AFI-80424, AFI-80427, AFI-80430, AFI-80433, AFI-80436, AFI-80439

June 2018



Thesis Aquaculture and Fisheries

General

At the Aquaculture & Fisheries Group (AFI) a student may perform a thesis research Fish Culture and Fisheries with a workload of 24, 27, 30, 33, 36, or 39 credits (ECTS). The purpose of a thesis subject is to train a student's academic skills by means of an in-depth study of a scientific subject.

Choice and planning of the thesis research

- The student consults Dr Marc Verdegem on the subject area, organisation and approximate planning of the thesis research. The consultation should be done well in advance (at least 6 months) to secure the actual start date of the research.
- **A copy of a valid BSc diploma should be handed over in order to start with any MSc thesis.**
- The thesis subject preferably should fit in one of the research fields of the group. Subjects are selected taking into account the interests of the thesis student.
- Once the choice of a subject is clear, a supervisor will be identified who is responsible for the co-ordination of the thesis research. If animal experiments are planned, these have to be approved before the start of the research (see section on **Animal Experiments**)
- Additional information on the thesis can be obtained through the supervisor and secretariat (office.afi@wur.nl).
- Appointments about the content and organisation of the research are laid down in a **thesis contract** by student and supervisor(s). The candidate submits a completed copy of the contract and a (recent) passport photograph (preferably digital) to the secretariat.
- Some specific additional preliminary knowledge is necessary. This knowledge can be achieved by following relevant courses. Some are compulsory, others desired. Detailed information about these topics can be found in the MSc study guide of the University.

Animal experiments

- Please be aware that if the thesis research includes animal experiments, these experiments can only be carried out once approval has been obtained from the Ethical Committee for Animal Experiments (DEC). The supervisor will submit the appropriate forms to the committee.

- Well before the actual start of an experiment with animals (\pm 3 months) a request must be submitted to the management of the research facilities "CARUS-FISH (ARF)". It consists of a working protocol and a research-contract. All requests must be procured through the liaison person with the experimental facilities staff.

Contents of the thesis research

Generally the following activities are included in the thesis research activity:

- prepare a research plan (see section on **Research Plan**);
- perform experimental research, data analysis and/or literature research;
- participate in weekly discussion meeting of the group in which work is performed;
- write a report and discuss the report with the supervisor;
- hold a presentation about the research;
- attend plenary seminars and work discussions of the group;
- a final examination.

Research plan

The thesis study starts with the preparation of a research plan. In some cases the research plan will already have been prepared in a so-called MLO-subject. The plan should contain the following elements:

1. *Title*: Be as brief as possible. If applicable, indicate if it is a pilot study.
2. *Background and Significance*: Presentation of the problem. Provide a literature review that sketches current knowledge of the topic, including previous work, if applicable. Evaluate knowledge gaps, which your project could fill. State concisely the importance of the research described in the protocol. Relate this work to longer-term research objectives.
3. *Bibliography*: List of relevant references with at least two key publications.
4. *Specific Aims and scope*: Main (+secondary) objective(s). What hypothesis(es) or research question is to be tested in this protocol? What do you hope to learn from this research?
5. *Research Design and Methods*: Describe the research design in relation to the following points:
 - Relate the design to your hypothesis(es).
 - A flow chart illustrating your study design is often helpful.
 - An appropriate statement should be included, describing which variables are measured, and how and where they are to be analysed (strategy for statistical analysis, tests and presentations, software and person(s) in charge). Appointments must be made with the person(s) in charge of the analysis.
 - In case an animal experiment is included a form is attached with information on (number of) experimental animals, maintenance conditions, treatments tested (reference, formulation, dosage etc.), study procedure (biological procedures, time schedule) sampling periods and observations (what is done, who does it, when).

- Identify conditions that may be hazardous (e.g. lab-conditions) and describe precautions that will be taken to minimize risks.
- All activities, including dates for presentations and handing in of the final thesis report are stated in a detailed time schedule.

The research plan is to be presented at one of the weekly meetings.

House rules

- Various forms and rules of conduct for the research facilities, computers and laboratories are available on request from the supervisor, and on the website.
- On the first day of the thesis research a candidate reports to the secretariat to acquire access on his/her Key Card to the ZODIAC building.
- A thesis student is expected to work 40 hours/week and is present in the ZODIAC complex during regular office hours (9:00/17:00). Any change in schedule or absence should be reported to the supervisor, research facilities management and laboratory technicians.
- The student should inform the secretariat how to be reached in urgent cases. Please provide (mobile) phone number(s), e-mail address(es) and home address.

Thesis manuscript

The thesis manuscript is written in English (in exceptional cases the examiner can allow Dutch). The text of tables and figures must always be written in English.

Manuscripts should, in general, be organised in the following order:

1. *Title* (should be clear, descriptive and not too long). All students' reports have a similar title page. Name of the author, course reference (code) & credits, supervisor(s), place and date are all included on one page. The second page contains a message on copyrights. Both pages, including the cover of the thesis, are generated by the secretariat after receiving an approved title page from the supervisor.
2. *Table of Content* with maximal 3 levels of the headings.
3. *Abstract/Summary* (should be clear, descriptive and no longer than 600 words). In case the report is written in Dutch, an (extensive) English summary must be included.
4. *Introduction* of the research (including motivation and objectives).
5. *Literature Review* of the subject.
6. *Material and methods* should contain material studied, area description, research methodology, techniques and way of (data) processing.
7. *Results*, reporting and interpretation of information gained from the research.
8. *Discussion*, a scientific and critical evaluation of the results of the research, evaluating the objectives from the Introduction.



9. *Conclusions* (if applicable). A thesis will, generally, not have more than five substantial conclusions. Each conclusion must be succinct and occupy one sentence of less than two lines. Try to avoid modifiers like "however".
10. *References*. An alphabetical range on author of literature references cited in the report. Check a guide for authors of a relevant journal for the appropriate way of citing publications in the text of the report and the reference list. The whole report must be carefully checked to ensure that the spelling of authors names and year of publication are correct and similar in the text and reference list.

After approval of the draft version of the thesis report by the supervisor(s), the student needs to request the secretariat for a thesis number and a front page template. The PDF of the final/approved thesis report and 2 printed and bounded copies needs to be submitted **at least 3 weeks in advance before the final examination** to the secretariat. Documents in Word will *not* be accepted.

Thesis rings

Thesis rings are weekly meetings with students and their ring leader to discuss parts of thesis documents. The aim of thesis rings is to provide the student with the opportunity to give and receive feedback in interaction with the other Master's and Bachelor's students of Aquaculture and Fisheries. Thesis rings help you to improve your document before turning it in to your supervisor who will focus mostly on the content. Not only will this greatly enhance the quality of your work, you will also get the chance to read documents other peers are writing, which might give you inspiration for both writing styles as well as content. Thesis rings are compulsory for your thesis.

Student presentations

- The student presentations are given during regular meetings. The student arranges his/her presentation with the AFI secretariat (office.afi@wur.nl).
- A presentation will take maximally 20 minutes, followed by 10 minutes discussion.
- PowerPoint can be used to illustrate the oral presentations. In such cases the student is responsible for the timely uploading of the presentation to the network
- Group staff members will evaluate the presentation quality (via a **presentation evaluation form**) and the result is communicated to the candidate via the supervisor. This result is part of the final examination of the thesis.



Final examination

Before submitting the final report and completion of the oral presentation of the research, a candidate can make an appointment for the final examination at the secretariat and submit the necessary documents. The final examination is a discussion on the contents of the thesis, in which knowledge, understanding, insight, but also creativity and scientific attitude are evaluated. The final examination will be held by the supervisor and one other staff member.

The final mark of the thesis subject will be based on several criteria such as:

- final report (both contents and form)
- thesis defense during the discussion
- scientific attitude (how does the work fit in the general context of the field)
- student presentations

For a detailed overview of these criteria see the thesis assessment form.

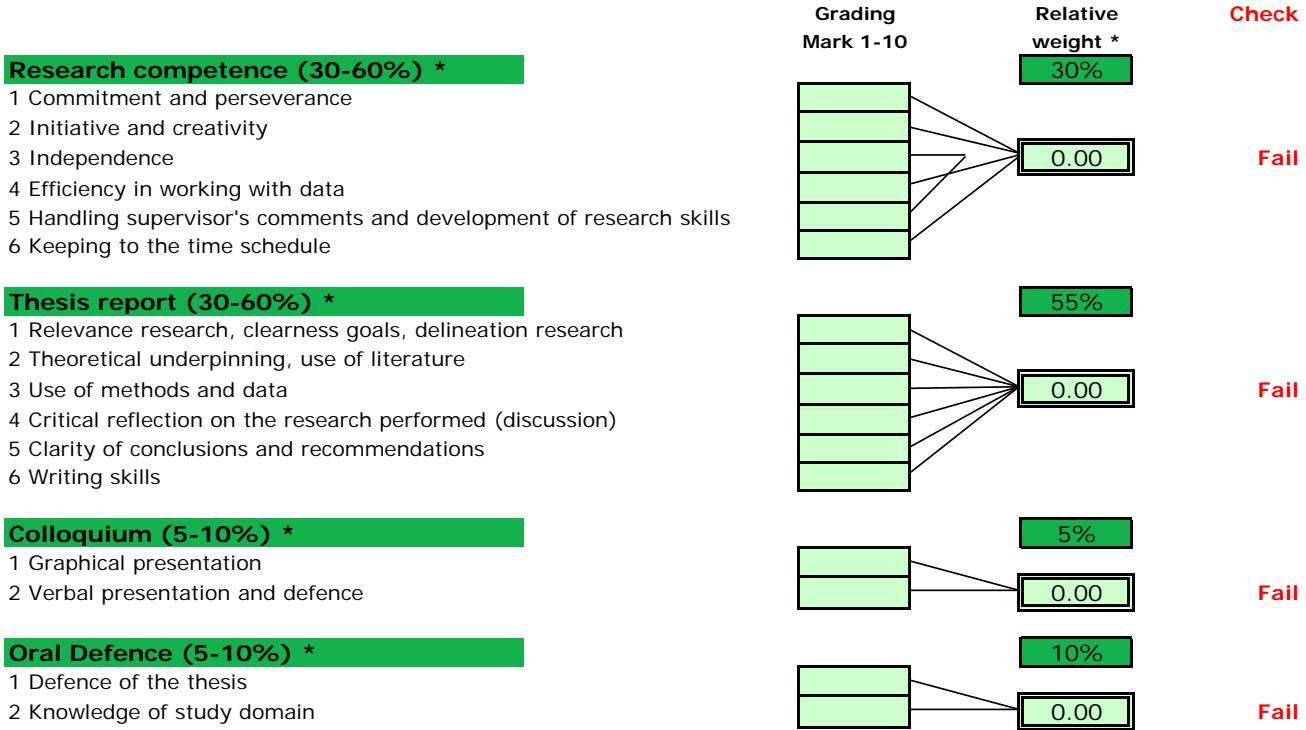
June 2018,

AFI teaching staff

Assessment MSc Thesis Wageningen University: Aquaculture & Fisheries Group

Complete the green fields boxed with a single line. Use a point as decimal sign; the default language is English (UK)

Name chair group	Aquaculture & Fisheries	Fee Percentage per Chairgroup
Name student		AFI ▼ 100%
Registration number		Not applicable ▼ 0%
Study programme	MAM	Not applicable ▼ 0%
Specialisation	Aquaculture & Fisheries	
Code thesis	AFI-804	
Short title thesis		
Country (of fieldwork)	1 Netherlands ▼	
	2 CountryName ▼	
Date examination	Signature	
Supervisor chair group		
Supervisor outside chair group (if any)		
Second reviewer/examiner		



* please choose weights such that their sum is 100.



TOTAL 0.00

FINAL GRADE FAIL! (partially completed)

Fail

Extensive comments by supervisor and 2nd reviewer/examiner on next page

NOTE: this form, including the signatures, needs to be archived for 7 years for visitation purposes

Assessment MSc Thesis Wageningen University: Aquaculture & Fisheries Group

Comment by supervisor (Please use ALT+ENTER to open a new line)

Comment by 2nd reviewer/examiner. (Please use ALT+ENTER to open a new line)



Rubric for assessment of MSc-thesis

Author: Arnold F. Moene, Meteorology and Air Quality Group, Wageningen University

Version: 1.1 (December 15, 2010)

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Item	Mark for item					
	2-3	4-5	6	7	8	9-10
1. Research competence (30-60%) *						
1.1. Commitment and perseverance	Student is not motivated. Student escapes work and gives up regularly	Student has little motivation. Tends to be distracted easily. Has given up once or twice	Student is motivated at times, but often, sees the work as a compulsory task. Is distracted from thesis work now and then.	The student is motivated. Overcomes an occasional setback with help of the supervisor.	The student is motivated and/or overcomes an occasional setback on his own and considers the work as his "own" project.	The student is very motivated, goes at length to get the most out of the project. Takes complete control of his own project. Considers setbacks as an extra motivation.
1.2. Initiative and creativity	Student shows no initiative or new ideas at all.	Student picks up some initiatives and/or new ideas suggested by others (e.g. supervisor), but the selection is not motivated.	Student shows some initiative and/or together with the supervisor develops one or two new ideas on minor parts of the research.	Student initiates discussions on new ideas with supervisor and develops one or two own ideas on minor parts of the research.	Student has his own creative ideas on hypothesis formulation, design or data processing.	Innovative research methods and/or data-analysis methods developed. Possibly the scientific problem has been formulated by the student.
1.3. Independence	The student can only perform the project properly after repeated instructions and well-defined tasks	The student needs frequent instructions and well-defined tasks	The supervisor is the main responsible for setting out the tasks,	Student selects and plans the tasks together with the supervisor and	Student plans and performs tasks mostly independently, asks for help	Student plans and performs tasks independently and organizes his
	No critical self-reflection at all.	No critical self-reflection at all.	Student is able to reflect on his functioning with the help of the supervisor only.	The student occasionally shows critical self-reflection.	Student actively performs critical self-reflection on some aspects of his functioning	Student actively performs critical self-reflection on various aspects of his own functioning and performance.
1.4. Efficiency in working with data Note: depending on the characteristics of the thesis work, not all three aspects (experimental work, data analysis and model development) may be relevant and some may be omitted	Experimental work Student is lost when using data. Is not able to use a spreadsheet program or any other appropriate data-processing program.	Student is able to execute detailed instructions to some extent, but errors are made often, invalidating (part of) the experiment.	Student is able to execute an experiment that has been designed by someone else (without critical assessment of sources of error and uncertainty).	Student is able to execute an experiment that has been designed by someone else. Takes sources of error and uncertainty into account in a qualitative sense.	Student is able to judge the setup of an existing experiment and to include modifications if needed. Takes into account sources of error and uncertainty quantitatively.	Student is able to setup or modify an experiment exactly tailored to answering the research questions. Quantitative consideration of sources of error and uncertainty. Execution of the experiment is flawless.
	Data analysis Student is not able to setup and/or execute an experiment.	Student is able to organize the data, but is not able to perform checks and/or simple analyses	Student is able to organize data and perform some simple checks; but the way the data are used does not clearly contribute to answering of the research questions and/or he is	Student is able to organize the data, perform some basic checks and perform basic analyses that contribute to the research question	Student is able to organize the data, perform commonly used checks and perform some advanced analyses on the data	Student is able to organize the data, perform thorough checks and perform advanced and original analyses on the data.
	Model development Student is not able to make any modification/addition to an existing model.	Student modifies an existing model, but errors occur and persist. No validation.	Student is able to make minor modifications (say a single formula) to an existing model. Superficial validation or no validation at all.	Student is able to make major modifications to an existing model, based on literature. Validation using some basic measures of quality.	Student is able to make major modifications to an existing model, based on literature or own analyses. Validation using appropriate statistical	Student is able to develop a model from scratch, or add an important new part to an existing model. Excellent theoretical basis for modelling as well
1.5. Handling supervisor's comments and development of research skills	Student does not pick up suggestions and ideas of the supervisor	The supervisor needs to act as an instructor and/or supervisor needs to suggest solutions for problems	Student incorporates some of the comments of the supervisor, but ignores others without arguments	Student incorporates most or all of the supervisor's comments.	Supervisor's comments are weighed by the student and asked for when needed.	Supervisor's comments are critically weighed by the student and asked for when needed, also from other staff
	Knowledge and insight of the student (in relation to the prerequisites) is insufficient and the student is not able to take appropriate action to remedy this	There is some progress in the research skills of the student, but suggestions of the supervisor are also ignored occasionally.	The student is able to adopt some skills as they are presented during supervision	The student is able to adopt new skills mostly independently, and asks for assistance from the supervisor if needed.	The student is able to adopt new skills mostly independently, and asks for assistance from the supervisor if needed.	The student has knowledge and insight on a scientific level, i.e. he explores solutions on his own, increases skills and knowledge where necessary.
1.6. Keeping to the time schedule	Final version of thesis or colloquium more than 50% of the nominal period	Final version of thesis or colloquium at most 50% of the nominal period	Final version of thesis or colloquium at most 25% of nominal period	Final version of thesis or colloquium at most 10% of nominal period	Final version of thesis or colloquium at most 5% of nominal period overdue	Final version of thesis and colloquium finished within planned period (or
	No time schedule made.	No realistic time schedule.	Mostly realistic time schedule, but no timely adjustment of time schedule.	Realistic time schedule, with some adjustments (but not enough or not all in time) in times only.	Realistic time schedule, with timely adjustments of times only.	Realistic time schedule, with timely adjustments of both time and tasks.
2. Thesis report (30-60%) *						
2.1. Relevance research, clearness goals, delineation research	No link is made to existing research on the topic. No research context is described.	The context of the topic at hand is described in broad terms but there is no link between what is known and what will be researched.	The link between the thesis research and existing research does not go beyond the information provided by the supervisor.	Context of the research is defined well, with input from the student. There is a link between the context and research questions.	Context of the research is defined sharply and to-the-point. Research questions emerge directly from the described context.	Thesis research is positioned sharply in the relevant scientific field. Novelty and innovation of the research are indicated.
	There is no researchable research question and the delineation of the research is absent	Most research questions are unclear, or not researchable and the delineation of the research is weak	At least either the research questions or the delineation of the research are clear	The research questions and the delineation are mostly clear but could have been defined sharper at some points	The research questions are clear and researchable and the delineation is clear.	The research questions are clear and formulated to-the-point and limits of the research are well-defined.
2.2. Theoretical underpinning, use of literature	No discussion of underlying theory.	There is some discussion of underlying theory, but the description	The relevant theory is used, but the description has not been tailored to	The relevant theory is used, and the description has been tailored partially	The relevant theory is used, it is nicely synthesized, and it is	Clear, complete and coherent overview of relevant theory on the

Item	Mark for item					
	2-3	4-5	6	7	8	9-10
	No peer-reviewed/primary scientific papers in reference list except for those already suggested by the supervisor	Only a couple of peer-reviewed papers in reference list.	Some peer-reviewed papers in reference list but also a significant body of grey literature.	Relevant peer-reviewed papers in reference list but also some grey literature or text books. Some included references less relevant.	Mostly peer-reviewed papers or specialized monographs in reference list. An occasional reference may be less relevant.	Almost exclusively peer-reviewed papers in reference list or specialized monographs (not text books). All papers included are relevant.
2.3. Use of methods and data	No description of methods and/or data.	Research is not reproducible due to insufficient information on data (collection and/or treatment) and analysis methods	Some aspects of the research regarding data-collection, data-treatment, models or the analysis methods are described insufficiently so that that particular aspect of the research is not reproducible.	Description of the data (collection, treatment) or models as well as the analysis methods used is lacking in a number of places so that at most a more or less similar research could be performed.	Description of the data (collection, treatment) or models as well as the analysis methods used is mostly complete, but exact reproduction of the research is not possible due to lack of some details.	Description of the data (collection, treatment) or models as well as the analysis methods is complete and clear so that exact reproduction of the research is possible.
2.4. Critical reflection on the research performed (discussion)	No discussion and/or reflection on the research. Discussion only touches trivial or very general points of criticism.	Only some possible weaknesses and/or weaknesses which are in reality irrelevant or non-existent have been identified.	Most weaknesses in the research are indicated, but impacts on the main results are not weighed relative to each other.	Most weaknesses in the research are indicated and impacts on the main results are weighed relative to each other.	All weaknesses in the research are indicated and weighed relative to each other. Furthermore, (better) alternatives for the methods used are indicated.	Not only all possible weaknesses in the research are indicated, but also it is indicated which weaknesses affect the conclusions most.
	No confrontation with existing literature.	Confrontation with irrelevant existing literature.	Only trivial reflection vis-a-vis existing literature.	Only most obvious conflicts and correspondences with existing literature are identified. The value of the study is described, but it is not related to existing research.	Minor and major conflicts and correspondences with literature are shown. The added value of the research relative to existing literature is identified.	Results are critically confronted with existing literature. In case of conflicts, the relative weight of own results and existing literature is assessed. The contribution of his work to the development of scientific concepts is identified.
2.5. Clarity of conclusions and recommendations	No link between research questions, results and conclusions.	Conclusions are drawn, but in many cases these are only partial answers	Conclusions are linked to the research questions, but not all	Most conclusions well-linked to research questions and substantiated	Clear link between research questions and conclusions. All conclusions	Clear link between research questions and conclusions. Conclusions
	No recommendations given.	Recommendations are absent or trivial.	Some recommendations are given, but the link of those to the conclusions is not always clear.	Recommendations are well-linked to the conclusions.	Recommendations are to-the-point, well-linked to the conclusions and original.	Recommendations are to-the-point, well-linked to the conclusions, original and are extensive enough to serve as project description for a new thesis project.
2.6. Writing skills	Thesis is badly structured. In many cases information appears in wrong	Main structure incorrect in some places, and placement of material in	Main structure is correct, but lower level hierarchy of sections is not	Main structure correct, but placement of material in different chapters	Most sections have a clear and unique function. Hierarchy of sections	Well-structured: each section has a clear and unique function. Hierarchy
	Formulations in the text are often incorrect/inexact inhibiting a correct interpretation of the text.	Vagueness and/or inexactness in wording occur regularly and it affects the interpretation of the text.	The text is ambiguous in some places but this does not always inhibit a correct interpretation of the text.	Formulations in text are predominantly clear and exact. Thesis could have been written more concisely.	Formulations in text are clear and exact, as well as concise.	Textual quality of thesis (or manuscript in the form of a journal paper) is such that it could be acceptable for a peer-reviewed journal.
3. Colloquium (5%) *						
3.1. Graphical presentation	Presentation has no structure.	Presentation has unclear structure.	Presentation is structured, though the audience gets lost in some places.	Presentation has a clear structure with only few exceptions.	Presentation has a clear structure. Mostly a good separation between the	Presentation clearly structured, concise and to-the-point. Good
	Unclear lay-out. Unbalanced use of text, graphs, tables or graphics	Lay-out in many places insufficient: too much text and too few graphics (or	Quality of the layout of the slides is mixed. Inappropriate use of text,	Lay-out is mostly clear, with unbalanced use of text, tables, graphs	Lay-out is clear. Appropriate use of text, tables, graphs and graphics.	Lay-out is functional and clear. Clever use of graphs and graphics.
3.2. Verbal presentation and defense	Spoken in such a way that majority of audience could not follow the presentation.	Presentation is uninspired and/or monotonous and/or student reads from slides: attention of audience not captured	Quality of presentation is mixed: sometimes clear, sometimes hard to follow.	Mostly clearly spoken. Perhaps monotonous in some places.	Clearly spoken.	Relaxed and lively though concentrated presentation. Clearly spoken.
	Level of audience not taken into consideration at all.	Level of audience hardly taken intro consideration.	Presentation not at appropriate level of audience.	Level of presentation mostly targeted at audience.	Level of presentation well-targeted at audience. Student is able to adjust to some extent to signals from audience that certain parts are not understood.	Clear take-home message. Level well-targeted at audience. Student is able to adjust to signals from audience that certain parts are not understood.
	Bad timing (way too short or too long).	Timing not well kept (at most 30% deviation from planned time).	Timing not well kept (at most 20% deviation from planned time).	Timing is OK (at most 10% deviation from planned time).	Timing is OK.	Presentation finished well in time.
	Student is not able to answer questions.	Student is able to answer only the simplest questions	Student answers at least half of the questions appropriately.	Student is able to answer nearly all questions in an appropriate way.	Student is able to answer all questions in an appropriate way, although not to-the-point in some cases.	Student is able to give appropriate, clear and to-the-point answers to all questions.
4. Examination (5%) *						

Item	Mark for item					
	2-3	4-5	6	7	8	9-10
4.1. Defense of the thesis	Student is not able to defend/discuss his thesis. He does not master the contents	The student has difficulty to explain the subject matter of the thesis.	Student is able to defend his thesis. He mostly masters the contents of what he wrote, but for a limited number of items he is not able to explain what he did, or why.	Student is able to defend his thesis. He masters the contents of what he wrote, but not beyond that. Is not able to place thesis in scientific or practical context.	Student is able to defend his thesis, including indications where the work could have been done better. Student is able to place thesis in either scientific or practical context.	Student is able to freely discuss the contents of the thesis and to place the thesis in the context of current scientific literature and practical contexts.
4.2. Knowledge of study domain	Student does not master the most basic knowledge (even below the starting level for the thesis).	The student does not understand all of the subject matter discussed in the thesis.	The student understands the subject matter of the thesis on a textbook level.	The student understands the subject matter of the thesis including the literature used in the thesis.	Student is well on top of subjects discussed in thesis: not only does he understand but he is also aware of current discussions in the literature related to the thesis topic.	Student is well on top of subjects discussed in thesis: not only does he understand but he is also aware of discussions in the literature beyond the topic (but related to) of the thesis.