

Thesis Work at IFD

Version 1.12, June 21, 2017

1. Introduction

Welcome at the Institute of Fluid Dynamics (IFD). You have decided to perform a Bachelor, Semester or Master thesis in one of the research groups at our Institute (Profs. Jenny and Rösgen). This document will offer you some general guidelines and introduce a few rules and regulations so as to simplify your upcoming thesis work.

2. Schedule

There are two time constraints applicable to your thesis project.

First, the overall duration is limited to 14 weeks (one semester) for both Bachelor and Semester theses, while a Master thesis must not take longer than 6 months.

Second, the specific effort differs between the different types of thesis. Bachelor theses should require an effort of approximately 25-30 hours/week, semester theses of 14-17 hours/week, while Master theses are considered full-time work (40 hours/week).

(These figures can be adapted in exceptional cases, requiring a mutual agreement between student, supervisor and the Department administration.)

The start and finish dates of a thesis usually coincide with the semester dates, but can be adjusted if necessary. Remember to register electronically for your thesis at the beginning of your work (myStudies).

There are several milestone events throughout the course of a thesis such as

- the official start event of all thesis projects at IFD (on the first Friday of a new semester),
- individual progress meetings with the supervising assistant or the responsible professor,
- the oral presentation of the thesis results, and
- the final submission, review and revision of the written thesis.

Oral presentations of Bachelor and Semester theses are usually grouped on dates in the last week of the semester. Presentations of Master projects are mostly scheduled on an individual basis.

The final grade will be assigned and submitted to the administration once all of the following steps have been completed.

- Oral Presentation
- Submission of a CD, DVD or memory stick (data limit of 4GB) with the following content:
 - Report with corrections as requested by the supervisor and the signed declaration of originality appended

- Presentation material
- Mini-Poster
- Computer codes
- Results or measured data
- Clearance form returned regarding IFD library, computer and/or laboratory use
- Return of all keys issued (buildings, cabinets, lockers, etc.)

3. Task Description

At the beginning of your work, you will receive a project sheet clearly stating the required work and objectives, indicating the responsible supervisor, and providing the official starting and end dates of the thesis.

4. Final Report

The final report is the centerpiece of your thesis work and should be compiled with great care. Sufficient time should be allocated for this task, and it is advisable to start early with the writing.

There are no strict requirements regarding style, content or length, but certain “good practice” rules should be adhered to. Sample manuscripts are available to indicate the typical form of a thesis. In general, content and clear structure are more important than length. As a guideline, the manuscript should not exceed 80 A4 pages for a Master thesis – Bachelor and semester projects will most likely lead to shorter reports.

Detailed formatting templates have been created and should be used for the layout of your report. Text files based on LaTeX, Open Office or Microsoft Office (Word) are acceptable. The thesis text should be submitted both in source format (e.g. doc or tex file) and in a printable version (pdf file). The title page of the thesis must follow the layout format given in section 13 and contain a fixed set of bibliographic information (title, author, semester i.e. FS or HS, year, supervisor, etc.). The last page of the report should contain a scan of the signed declaration of originality.

The language of the thesis can be either German or English. It is recommended to pick a language in which you are truly fluent because this will facilitate the editorial process.

The thesis manuscript will be proof-read by at least one person familiar with your work (usually the direct thesis supervisor). Any requests for corrections resulting from this review must be worked into the final version before it is re-submitted at the end of the project.

5. Presentation

The presentation should provide an overview of the thesis topic, explain the methods employed (numerical or experimental) to address the assigned tasks and present the achieved results.

Since the presentations are usually held as part of a series of talks, a strict time limit of 25 minutes (=20 minutes talk + 5 minutes discussion) is enforced.

It is recommended to use your own computer for the presentation in order to minimize compatibility problems. A beamer will be available in the lecture room and speakers should try out the hardware before their talk. If you bring your own computer, you should have it up and running before your presentation so as to minimize the change-over times.

The presentation can be held in English or German.

The audience of the presentations is usually composed of IFD researchers (professors, assistants) but fellow students and external guests are welcome as well.

6. Miniposter

At IFD, an attempt is being made to present the results of the students' thesis work to a broader audience. For this, so-called "mini posters" of selected projects are displayed in a prominent location (ML building hall way, H level).

Every student is required to compose a one page (A4) mini poster based on his thesis work. Since the target audience is not necessarily familiar with the detailed study subject, the content of these posters should be kept comparatively general and self-explanatory. Preference should be given to graphical and pictorial content.

Templates (LaTeX or PowerPoint format) are available in order to assure a uniform appearance of the posters. The content and layout of the poster should be discussed with and approved by the thesis supervisor.

7. Declaration of Originality

The ETH study office requires a signed statement from every student regarding the familiarity with ETH rules on plagiarism and the independence of the work performed. These rules are documented at www.ethz.ch → student portal → studies → performance assessments → plagiarism and must be adhered to when citing foreign work.

The declaration of originality is available from the previously indicated weblink and a scan of the signed declaration should be appended to the electronic version of the final report.

8. Archival and Electronic Storage, Publishing

All thesis documents (including the final presentation) will be stored in electronic form on the IFD server for internal use (access controlled).

ETH allows for the storage of Master theses also in the "Research Collection" which is accessible to the general public. Such a publication requires a declaration of consent from the supervising professor or research director. A corresponding template form is available (see section 13).

In exceptional cases, the results of a thesis may lead to a conference publication or a journal paper. In that case, the student's contribution shall be recognized through an explicit acknowledgment, or in case of an essential contribution, with a (co-)authorship.

9. Intellectual Property and Confidentiality Issues

Generally, the final thesis is a document in the public domain which is freely accessible to any interested person. This may sometimes create potential conflicts of interest when the intellectual property rights of third parties are affected.

ETH Zurich does not claim inventions made by its students within the scope of their Bachelor or Master thesis. If there is a contribution by an employed co-inventor (e.g. a supervisor), both parties are joint owners. However, the students may transfer their rights to ETH Zurich and will then be supported administratively and participate in any income on the same basis as ETH employees.

In case of an "external" thesis, that is work performed with an external collaborator (e.g. a company), the student's position regarding confidentiality and ownership of intellectual property must be clarified in advance. Occasionally, non-disclosure agreements will have to be signed. The thesis must, however, still be available for unrestricted public access. IFD has introduced a set of separate, additional rules in order to better recognize the status and claims of the different parties involved.

10. Evaluation Criteria

The quality of the thesis work is evaluated according to a fixed set of evaluation criteria. These criteria and the associated relative weight factors are laid out in an evaluation sheet.

Note that these criteria are the same for all types of thesis work (Bachelor, Semester or Master). The relative "difficulty" of projects is captured in the individual evaluation criteria given in section 13.

Usually, external theses are evaluated by an IFD professor, taking into account the recommendations by the external collaborator(s).

11. Logistics

11.1. Computer Use

The Institute maintains different computer networks with restricted access to students.

Thesis work with a predominantly numerical focus is usually performed on the "Fluidy" client / server subsystem. For individual user accounts on these Linux machines, you should contact your supervisor. A set of rules ("code of conduct") applies for users of these machines because the system has to be available for public access at all times.

Experimental work is in most cases also dependent on computer access. The laboratory machines operate on the Windows operating system. Usually, there are no individual accounts but one

account for all students. While this limits the amount of user “privacy” on these computers, it facilitates access to all machines in the laboratory domain.

The wired networks of the Institute are protected by several firewalls. Thus, computers in the IFD sub-domain are normally not accessible from the outside. However, wireless access is available in many locations across the Institute so that you can often also work with your own laptop computer.

Especially in the “open” laboratory environment, it is very important that a certain professional standard is maintained among computer users.

This means that computers are NOT to be used for private purposes, especially not for storage of private data and/or the installation of programs. Similarly, the printers, scanners and other IT hardware may only be used for thesis-related purposes.

If there is a need for installation of additional software, the supervisor should be contacted.

User data is normally NOT backed up. Please make arrangements with your supervisor if you need backup space on one of the Institute’s file storage servers.

11.2. Laboratory Use

Experimental work in the laboratories takes place in a highly collaborative environment. Computers and scientific instruments are readily available, but certain rules have to be followed in order to maintain visibility of the hardware status at all times.

Equipment Loans

There is a pool of instruments available to all experimenters. If you need to sign out one of the instruments, contact the supervisor or one of the laboratory technicians. Please do NOT borrow instruments without informing Institute personnel – this avoids “loosing” hardware which is not accounted for.

Tools

Normally, a fully furnished toolbox is available at every experiment station. If you need additional tools, contact one of the assistants, technicians or your supervisor. Again, borrowing tools without returning them leads to their effective loss and must be avoided.

Access to Restricted Facilities and Resources

There are a number of facilities in the IFD laboratories which may not be accessed / used without prior explicit instruction and permission by the supervisor. Among those are

- The large IFD wind tunnel
- Laser-based illumination systems
- Machine tools (drill presses, lathes, milling machines, etc.)
- Chemicals (laser dyes, flammable substances etc.)

If you need access to such facilities, contact your supervisor and make sure that you have received proper safety and operations training, as well as the required protective equipment (laser safety goggles, gas masks, working gloves, etc.)

Consumables

Consumables such as gases, chemicals, printer paper are often available in-house. Please contact the supervisor if you need replenishment and / or exchange of such materials – this helps to maintain the inventory and facilitates advance orders.

Purchase Orders

If you need to order external goods, please contact the supervisor. Do not order any items without permission by the supervisor. In exceptional cases and with proper authorization, you can be reimbursed for small purchase items by the Institute secretary.

11.3. Workshops

The Institute maintains an electronic and a mechanical workshop. These are professional facilities and not accessible for your thesis work. In particular, NO equipment in these workshops may be borrowed or operated by students (safety regulations).

You can, however, discuss any technical issues with the professional technicians in order to find professional solutions.

11.4. Workplace Access, Keys, Locks

Access to the ML building and to the computer room ML H41 is via the electronic access system of ETH. The Institute's secretary can help you to fill in the authorization form to receive this electronic access.

If you are working in the second computer room (ML H51.2), you will need a separate key, which can be issued by the Institute's secretary against a refundable deposit of CHF 50.

There are lockers in both computer rooms which can be rented on a "first come" basis for the duration of your thesis. Please contact the secretary for the appropriate keys.

The laboratory facilities are normally locked and not accessible to the public. During normal working hours, Institute personnel can open the laboratories for you.

If you require individual access to the laboratories, you can request a key against a refundable deposit of CHF 50.

Especially when in possession of a key, please take care that the doors to the laboratory are locked when you leave.

There is video surveillance in most laboratories of the Institute to prevent theft and to monitor the access to the laboratory facilities.

12. General Recommendations

12.1. Consultations with the supervisor(s)

As you have seen from the previous documentation, there are many situations where your supervisor will act as the interface between you and the Institute's personnel and facilities.

In order to establish an efficient collaboration, it is good practice to seek regular contact with your supervisor, say, once a week.

Besides these informal meetings, there is at least one formal meeting with the supervisor and the responsible professor, during which the progress of your thesis will be discussed.

12.2. Collaborations with other students

You are encouraged to discuss your work with your fellow students. This will help you to articulate problems and generate insights by looking beyond the constraints of your specific thesis topic.

While such an exchange is useful – and is, as a matter of fact, an integral part of research work – you must not integrate other people's inputs into your work without due recognition. Make sure that any significant contribution from the outside is properly documented and acknowledged.

13. List of Forms and Templates

- Task Description („Begleitblatt or Project Sheet“)

ETH Eidgenössische Technische Hochschule Zurich Swiss Federal Institute of Technology Zurich	Institut für Fluiddynamik
Begleitblatt	
für eine <input checked="" type="checkbox"/> Bachelorarbeit <input type="checkbox"/> Semesterarbeit <input type="checkbox"/> Masterarbeit	
angefertigt im Semester: FS2011	
Von: N.N	
<u>Thema</u>	
Anwendung des synthetischen Schlierenverfahrens (BOS) in Strömungen mit variabler Temperatur	
<u>Aufgabenstellung</u>	
<p>Das synthetische Schlieren-Verfahren („background oriented Schlieren“ – BOS) hat sich als eine robuste Methode zur quantitativen Visualisierung von Strömungen mit variabler Dichte bzw. Temperatur etabliert. Dabei bestehen immer noch Optimierungsmöglichkeiten im Bereich der Datenverarbeitung, der erreichbaren Empfindlichkeit und der Echtzeitfähigkeit des Verfahrens. Diese Fragestellungen sollen exemplarisch im Rahmen dieser Arbeit behandelt werden.</p>	
Im Einzelnen sind die folgenden Teilaufgaben zu bearbeiten:	
<ul style="list-style-type: none">– Einarbeitung in die relevante Literatur– Vermessung einer beheizten Staupunktströmung mittels des BOS Verfahrens– Weiterentwicklung eines effizienten Algorithmus zur Abel-Inversion der erhobenen Messdaten– Identifikation des Rückstaus („back layering“) im Deckenbereich einer Auftriebsströmung (beheizter Freistrahler in einem Querströmungskanal) mit Hilfe des BOS Verfahrens– Implementation eines geeigneten BOS Algorithmus auf einer „smart camera“ zur qualitativen Visualisierung in Echtzeit– Ausführliche Dokumentation der erzielten Resultate; Diskussion der Ergebnisse insbesondere in Hinsicht auf Genauigkeit, Empfindlichkeit und Schnelligkeit des BOS Verfahrens	
Betreuer:	X.Y.
Zuständiger Professor:	T. Rösgen
Unterlagen ausgegeben:	25.2.2011
Unterschrift Professor:	_____
Vortrag gehalten am:	_____
Arbeit abgegeben am:	_____
Original archiviert am:	_____ durch: _____

– Thesis Completion Checklist

IFD Thesis Checklist

Task	Check
Final thesis manuscript submitted (to supervisor)	
Signed plagiarism form submitted (to supervisor)	
Mini poster submitted (to supervisor)	
Thesis presentation submitted (to supervisor)	
Data backup	
Computer account cleanup	
Laboratory and/or computer desk cleanup	
Books returned (to IFD library)	
Keys returned (to IFD secretary)	
Coffee bill paid	

- Declaration of originality
www.ethz.ch → student portal → studies → performance assessments → plagiarism



Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

Declaration of originality

The signed declaration of originality is a component of every semester paper, Bachelor's thesis, Master's thesis and any other degree paper undertaken during the course of studies, including the respective electronic versions.

Lecturers may also require a declaration of originality for other written papers compiled for their courses.

I hereby confirm that I am the sole author of the written work here enclosed and that I have compiled it in my own words. Parts excepted are corrections of form and content by the supervisor.

Title of work (in block letters):

Authored by (in block letters):
For papers written by groups the names of all authors are required.

Name(s):	First name(s):
_____	_____
_____	_____
_____	_____
_____	_____

With my signature I confirm that

- I have committed none of the forms of plagiarism described in the ['Citation etiquette'](#) information sheet.
- I have documented all methods, data and processes truthfully.
- I have not manipulated any data.
- I have mentioned all persons who were significant facilitators of the work.

I am aware that the work may be screened electronically for plagiarism.

Place, date	Signature(s)
_____	_____
_____	_____
_____	_____
_____	_____

For papers written by groups the names of all authors are required. Their signatures collectively guarantee the entire content of the written paper.

– Title Page Template

Simulating Turbulence Modulation with RANS and PDF Methods

Billy G. Taylor

Studiengang Rechnergestützte Wissenschaften

Seminararbeit HS 11

Institut für Fluidodynamik
ETH Zürich

ausgeführt bei

University of Massachusetts
Institute of Aerodynamics

Betreuer: Dr. Oscar B. Peterson

Professor: Ahmad P. Jamal

– Evaluation Criteria

**Kriterien für die Bewertung von
 Bachelor, Semester- und Masterarbeiten
 am IFD**

Name:

Titel:

Betreuer:

Zuständiger Professor:

Es wird kein direkter Unterschied in der Bewertung der verschiedenen Arbeiten gemacht. Die Unterschiede in Komplexität bzw. Länge der Arbeiten werden in den zugewiesenen Teilnoten berücksichtigt.

Kriteriengruppe	Teilnote	Gewicht
1: <i>Technisch-wissenschaftliches Arbeiten</i> - Wissen, Verständnis, Ergebnisse, Schlussfolgerungen		0.25
2: <i>Rahmenaktivitäten</i> - Vorbereitung, Quellenutzung, Literaturstudium		0.1
3: <i>Individuelles Engagement</i> - Interesse, Selbständigkeit, Kreativität		0.15
4: <i>Professionalität</i> - Sorgfalt, Effizienz, Methodik, Termineinhaltung		0.15
5: <i>Bericht</i> - Struktur, Verständlichkeit, Korrektheit, Form		0.2
6: <i>Präsentation</i> - Struktur, Verständlichkeit, Form		0.15
<i>Gesamt</i>		

Bemerkungen:

02/12/2010

- Presentation Template
- Thesis Template

– Mini Poster Template

Title of the student project

Master thesis by <yourself>
Supervised by <your supervisor>

Title

Use a two-column layout if possible. Pictures may span both columns. Try to stay with the given layout as closely as possible. Use the "ETH light" font (downloadable for free from ides.ethz.ch). The template uses a DIN-Ao poster format. For printing out on A4 you must select the option "An Papiergröße anpassen".

Text body

A list:

- i. One
- ii. Two
- iii. Three

Formulas

Formulas look nice if you cut-and-paste from a PDF file ("snapshot tool").

$$\frac{\partial u}{\partial \xi} \Big|_i = 2\pi \sum_{n=-N_\xi/2}^{N_\xi/2} (in) \hat{u}_n \exp\left(\frac{2\pi i n}{N_\xi}\right)$$

$$\beta u'_{i-2} + \alpha u'_{i-1} + u'_i + \alpha u'_{i+1} + \beta u'_{i+2} =$$

$$a \frac{u_{i+1} - u_{i-1}}{2h} + b \frac{u_{i+2} - u_{i-2}}{4h} + c \frac{u_{i+3} - u_{i-3}}{6h}$$

A picture

Use pictures which do not need a lot of explanation. A figure caption is not necessary for posters.

The second column

Some more text

Inset

Use a text inset to highlight a text block, e.g. for definitions, for describing a special application, or to give some background information.

Concluding remarks

In conclusion, ...

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Swiss Federal Institute of Technology Zurich

– Research Collection Consent Form (for Master thesis only)

 Eidgenössische Technische Hochschule Zürich Swiss Federal Institute of Technology Zurich	ETH-Bibliothek Research Collection ETH Zürich Rämistrasse 101 8092 Zurich Phone +41 44 632 72 22 research-collection@library.ethz.ch www.library.ethz.ch
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Declaration of consent

for the publication of a master thesis, bachelor thesis or student paper on the Research Collection, ETH Zurich's publication platform.

ETH Zurich's publication platform allows users to access master theses, bachelor theses and student papers written at ETH Zurich. This offers students and graduate students the opportunity to present their work worldwide. The published theses fulfil the specified formal quality criteria.

Declaration of the author

I hereby declare that I consent to the ETH-Bibliothek making my master thesis, bachelor thesis or student paper which I shall submit to the ETH-Bibliothek as a pdf file, available to the public on the Research Collection publication platform. The rights of third parties are not infringed by this publication. I consent to any subsequent necessary conversions into other data formats being made.

Author: _____
Title of the publication: _____

Department: _____
Publication year: _____
Email/Phone: _____
Private address: _____

Zurich, on _____ Signature _____

Recommendation of the responsible ETH professor or research supervisor

I have supervised this master thesis, bachelor thesis or student paper at ETH Zurich and recommend its publication. In particular, I hereby declare that the publication of this thesis does not infringe the rights of third parties and that any rights to confidentiality are protected.

Zurich, on _____ Signature _____

Declaration of the ETH-Bibliothek

The ETH-Bibliothek guarantees the long-term availability of the thesis as well as the integrity of its content and its authenticity and will make the document accessible via the Internet. The intellectual property rights remain with the author.

Version: 01.05.2017