PhD Program Handbook for the Faculty of Informatics of Masaryk University

Brno
2016–2017

Contents

List of Abbreviations

AMSE Advanced Master's State Examination
DB Doctoral Board
DC Doctoral Committee
DSE Doctoral State Examination
FI Faculty of Informatics of Masaryk University
FSR Fire Safety Rules
IS Information System of Masaryk University
MU Masaryk University
ORDD Office for Research & Development & Doctoral Studies
SER Study and Examinations Regulations *The SER are approved by the Ministry of Education, Youth and Sports with effect from 1 September 2006. Several amendments to the SER were approved with effect from 1 February 2012 and from 10 June 2013, however these only adjust certain aspects of SER and thus need to be understood in the context of the original SER.*
TOEFL Test of English as a Foreign Language
WSR Work Safety Rules

Dear prospective and present doctoral students,

this handbook is intended to provide you with relevant information on the Doctoral Program at the Faculty of Informatics of Masaryk University. The Handbook is divided into two parts: the first is primarily intended for prospective students of the Doctoral Program, while the second is intended for present doctoral students. The authors of this handbook did their best to focus on areas and subjects which are or will be important for doctoral students during their studies, to provide an understandable explanation of the formal regulations which govern doctoral studies at the Faculty of Informatics, and to describe the usual procedures and standards at the faculty. On the other hand, it is necessary to understand that this handbook is not a replacement of formal regulations, which represent the primary source for resolving any and all ambiguities or doubts.

The authors
prof. RNDr. Luděk Matyska, CSc.
doc. RNDr. Tomáš Brázdil, Ph.D.
doc. RNDr. Petr Holub, Ph.D.
doc. RNDr. Pavel Matula, Ph.D.
Mgr. Eva Mráková, Ph.D.
Ada Nazarejová, DiS
Mgr. Jan Obdržálek, PhD.
RNDr. Vojtěch Řehák, Ph.D.

Latest update of the handbook: October 3, 2016.

The most up-to-date version of the handbook is available at the Doctoral Program website: `http://www.fi.muni.cz/studies/doctoral/index.xhtml.en`
The handbook was created within the Innovation of Doctoral Study at Faculty of Informatics MU (IDSnaFI) project (CZ.1.07/2.2.00/15.0196).

Part I

For Prospective Students

1 Basic Information about the Program

The purpose of the Doctoral (Ph.D.) Program is to learn and subsequently demonstrate skills in research and development in the given field, i.e. in informatics or in computer science. Unlike the Bachelor and Master's Programs, the Doctoral Program is by nature an individual program managed by an advisor, whose professional know-how and expertise will ensure the professional growth of his or her students. The Doctoral Program is monitored by the Doctoral Board appointed by the dean of the faculty. The Doctoral Board is also the body which is responsible for the Doctoral Program.

The standard length of the Program is 4 years, whereas after the 4th year it is possible to apply for an extension of the program in its full-time form and the scholarship for at most one year. The maximum duration of the Program is 8 years for students who entered the program in the spring semester of 2012 or later and 7 years otherwise. The program comprises the following parts: *(a)* orientation in the field, learning additional skills as required by attending lectures and obtaining first results (1-2 years), *(b)* submission of a PhD thesis proposal (end of the 2nd year of the Program), defense of the proposal and the state doctoral exam, *(c)* creation of a PhD thesis (1-2 years), *(d)* submission and defense of the thesis. The steps listed above are mandatory, however their exact time schedule may be adjusted following an agreement with the advisor. If the student manages to obtain significant original results already before the submission of the thesis proposal, it is possible to simultaneously submit the proposal as an Advanced Master's ("Rigorozni" in Czech) thesis. After successfully defending an Advanced Master's thesis and passing the State Doctoral Examination, the student is entitled to receive the RNDr. title.

The following legal conditions and conditions following from the internal regulations of FI and MU must be met for the student to receive a Ph.D.:

1. successfully passing the doctoral state examination,
2. at least two peer-reviewed international publications,
3. meeting the credit requirements and passing the mandatory and mandatory elective courses,
4. successful defense of the thesis (which is related to the above-mentioned peer-reviewed international publications).

The program is available in full-time and combined (i.e. part-time) form. Active participation in teaching is expected (e.g. in the form of organizing exercises for courses), which will provide students with a basic practical experience with

pedagogical activities. In case of the full-time form, the student is also expected to be present in the extent agreed upon with the student's advisor (usually over 20 hours per week). Full-time students usually receive a Ph.D. stipend (as of 1 January 2016 this is 7,300 CZK for the first four years of the Program), which can additionally be non-trivially increased from grant and project resources depending on the resources available to individual advisors. Stipends are not subject to tax. The state also covers health insurance and social security of students aged up to 26 and students who do not live in Brno are also offered the possibility of staying at the dormitories.

Students of the combined program are not required to be present at the faculty, however they are not eligible to the Ph.D. stipend and are not entitled to a room at the dormitories. It is, however, necessary to take into account that the program requirements (e.g., the number of earned credits per semester and the whole program) as well as the requirements to finish the program are the same for both forms of the program.

Program fees The program fees depend on the studied field and only apply to English programs. The fee is 2,000 EUR per year. This also applies to foreign students: if they study in Czech, then no program fees are required and if they additionally enroll as full-time students, they will receive the Ph.D. stipend.

Application of graduates The intended goal of the doctoral program is to prepare its graduates for a future career in academia or a career in industrial research and development. The academic perspective promises the potential of further growth – either at a Czech or foreign university (typically this constitutes a combination of teaching and research), or in a purely research-based academic environment (e.g. the Academy of Sciences of the Czech Republic, or foreign institutes such as INRIA in France).

In the industrial environment, typical positions of graduates include leaders of development teams or employees and leaders of research teams. The skills and know-how obtained during the doctoral program may also be applied in demanding analytical positions.

2 Choosing an Advisor

The choice of advisor will have an enormous impact on your studies. The whole program is based on the interaction between the student and his/her advisor. To ensure that this interaction remains efficient even when an advisor has several doctoral students, students may also be assigned a consultant who will help the advisor in advising his/her students. The choice of advisor should depend both on the field the student wishes to focus on as well as the working style and habits of the advisor; it is assumed that the student has had some interaction with his/her advisor during previous studies. Advisors who participate in large-scale projects and grants will allow you to work in teams which often exceed the scope of a single institution or country. The possibility of supplementing a student's stipend above its basic level also depends on the advisor's projects and/or grants.

It is thus advisable to ask a potential advisor and/or consultant for a meeting to discuss possible fields and areas of doctoral study, even if you have not yet decided to enroll in the program. The list of advisors with a description of their fields of interest is provided in Annex B on page 43 of this handbook.

If you are studying at the Faculty of Informatics of Masaryk University (FI MU) and if the advisor is also the head of a laboratory, it is a very good idea to begin interacting with and working in the laboratory already during your master studies. If you are currently studying at another university, you could instead try to find a laboratory at your university with a similar focus or contact the advisor and ask about the possibility of external cooperation with his/her laboratory at FI MU.

3 Admission Procedure

The admission procedure takes place twice a year, whereas the program then begins at the start of the spring or autumn semester. The accredited *doctoral program* of the Faculty of informatics is Informatics, which is then divided into two *Fields of study:* Informatics and the more practice-focused Computer Systems and Technology. Both fields of study may be studied in Czech or English language.

The following requirements must be met for the admission procedure:

1) choice of advisor and his written consent with advising the student,
2) submission of an electronic application in the information system of MU (IS),

3) payment for the electronic application,
4) delivery of two personal recommendations for study to the Office for Research & Development & Doctoral Studies (ORDD), preferably from individuals who are active in academia or university professionals in practice, not from current doctoral students (the form is available online[1]).
5) graduation from a master's program before the day of enrolment.

Your application in IS will be confirmed only after fulfilling points 1) to 5).

Conditions for admission to the doctoral program

- proper graduation from a master's program before the day of enrolment,
- submission of an electronic application,
- delivery of a professional CV,
- two personal recommendations, each at most 4 months old, and an explicit standpoint of the expected advisor on advising the student. One of the recommendations may be from the expected advisor, and in such case the recommendation may also include an explicit standpoint on advising the student,
- delivery of the master's diploma and the Diploma Supplement, or a certificate of successful state examination (also bring the original or a certified copy if MU does not have a record of the document—only for inspection),
- if the date of the admission procedure is earlier than the date of the proper graduation from your master's studies, delivery of a complete list of enrolled and completed courses including scores (confirmed by the appropriate university – usually via its department for studies). In this case, the master's diploma and Diploma Supplement need to be delivered by the day of enrolment,
- If providing graduation or study documents in a different language than Czech, Slovak or English, the faculty may request the delivery of a certified translation of these documents into Czech or English,
- If applying for an English program, it is also necessary to deliver a document demonstrating sufficient language skills (a declaration of the applicant in case of native speakers, a state examination, TOEFL etc.). In exceptional cases, the admission committee may acknowledge that the applicant has sufficient language skills based on the interview,
- payment of the fee for the admission procedure,

[1] `http://is.muni.cz/do/fi/formulare/PhD_studium/35653494/Recommendation_letter.doc?info`

- passing an oral admission examination—the admission committee reserves the right to cancel this condition at its own discretion.

Admission examination The admission committee assesses skills for creative work in computer science as a scientific discipline and the ability to communicate in English. The chairman and the committee members are proposed by a Doctoral Board of FI MU and appointed by the dean.

On the basis of evaluation of written documents committee decide whether or not it is necessary to invite the applicant to an oral examination. The committee may waive an oral interview especially if the applicant has achieved excellent results during his/her previous master's study (excellent grade point average, outstanding master's thesis, etc.). During an interview, which lasts 15–30 minutes, the applicant has to demonstrate general knowledge of computer science and also depth knowledge in areas related to the planned focus of study. They must also demonstrate the good ability to communicate in English. An oral interview consists of questions asked by committee members. The interview can be at the discretion of the admission committee also performs through video conference, especially in the case of foreign applicants.

The admission committee will propose an applicant to be or not to be accepted to a doctoral programme according to a comprehensive assessment of written documents and an oral interview. If an oral interview is pardoned, the admission committee suggests an applicant's admission.

About the admission procedures and proposal of admission committee is informed the Doctoral Board FI MU, which draw up to the proposal a written opinion. Then the proposal of admission committee and the statement of the Doctoral Board are forwarded to the Dean FI MU, who will decide on the acceptance or rejection of each applicant.

Part II

For Students

General information about the program, checks during the program and requirements for successful graduation from the program are specified in Section 1 of the previous part of the handbook.

4 PhD Program Courses

The doctoral program, similarly as the bachelor and master's programs, utilizes a credit system. Enrolment into a new semester requires the fulfillment of at least one of the following conditions:

1. the minimum number of credits earned during the previous semester is 20,
2. 45 credits earned in the past two semesters,
3. earning more than "30 times the number of previously finished semesters" credits during the standard duration of the program (this is equivalent to earning at least 30 credits per semester in total),
4. earning the minimum credit value of the whole eight-semester program (240 credits) during the standard duration of the program.

We recommend that students enroll in courses amounting to at least 30 credits per semester. Courses are divided into mandatory, mandatory elective and elective. Students may enroll in courses repeatedly (unless an exception applies). The credit system in the doctoral program however focuses on the activities which are expected from doctoral students. Of the total number of 240 credits, 220 credits are required to be earned from mandatory and mandatory elective courses (of which at least 185 credits will be earned for mandatory courses, predominantly including the 160 credits earned for DPDIS – Dissertation preparation). Enrolment into courses takes place during the enrolment period, which is fixed for all of MU. In case of problems with finishing a course, following an agreement with the advisor the student may submit a request to cancel the obligation of repeating a course, in compliance with SER.

The following list of mandatory and mandatory elective courses does not include syllabi—these are available in IS MU—and is intended first and foremost to provide a general overview of the courses and their focus. Credits per semester are provided in brackets.

4.1 Mandatory Courses

1st semester:

DUVOD – Introduction to PhD study (2) Must be taken in the first semester of the program. The course provides students with information on financing and evaluation of research and development, publications on conferences and in journals (including the reviewing process) and on how the doctoral program should work in general. Scoring is carried out by the lecturer.

DACSE – Academic Communication Skills in English (2) Scoring is carried out by the lecturer.

Next semesters (possible in the 1st one as well):

DTEDI – Thesis proposal (7) This course can only be taken once. Scoring is carried out by ORDD based on the submitted proposal (see Section 10).

DPDIS – Dissertation preparation (160) The basic and most important course of the doctoral program, credits are listed for the whole program. It is possible and in fact necessary to enroll into this course repeatedly, in 5–40 credit parts (only multiples of 5 are allowed) per semester up to the total number of 160 credits. The number of credits per semester should increase over the course of the studies. Scoring is carried out by the advisor.

DPUBL – Preparation of a publication (5) The course needs to be completed at least twice during the program. It comprises writing an article for an international conference or an international journal; the article must be sent for publication or at least presented to the advisor in the semester of the course. Scoring is carried out by the advisor.

DCIPR – A lecture in a foreign language (5) A specialized lecture/presentation in a foreign language, typically on an international conference or at the Seminar on Informatics (IA068). In case of co-authored publication it is necessary to agree on who will be actually presenting – only this student will be rewarded with the credits. Scoring is carried out by the advisor or the lecturer of IA068.

DPRPO – Poster preparation (1) Scoring is carried out by the lecturer based on the prepared poster.

DPOMV – Class-work cooperation (2–8) This predominantly includes the management of exercises for courses at FI. 2 credits correspond to one hour of

teaching per week. One can gain at most 8 credits: it is possible to teach more, but it will not be awarded with credits. Aside from the credits, helping with courses is usually also remunerated at a rate of 120 CZK/hour. Scoring is carried out by the advisor.

Special credit-less courses:

DSZK – State doctorate exam. A condition for taking this course is passing at least the courses DTEDI, DPUBL, and DCIPR or DTEDI, DPUBL, and DACSE or DTEDI, DCIPR, and DACSE. Additional information is provided in Section 11. May be repeated once. Scoring is carried out by ORDD.

DODIS – Dissertation defense. Information is provided in Section 13.3. May be repeated once. Scoring is carried out by ORDD.

4.2 Mandatory Elective Courses

Group A – at least two courses once during the program:

DVVVT – Research team leadership (7) The course is mandatory elective for the Computer Systems and Technology field of study and elective for the Informatics field of study. Scoring is carried out by the advisor.

DVBDP – Diploma thesis supervision (2–4) 2 credits per supervised thesis and semester. Scoring is carried out by the advisor.

DZAST – Internship abroad (5) As the 5 credits are awarded for *each* month of the internship, no further credits are awarded for eventual courses taken during the internship. Scoring is carried out by the advisor.

IA067 – Informatics Colloquium (1) Lectures of renowned experts. Scoring is carried out by the lecturer.

IA068 – Seminar on Informatics (2) The seminar includes presentations of doctoral students on their research. The presentation may also be used for the DCIPR course. Scoring is carried out by the lecturer.

VV041 – English for Academic Purposes (post-graduate) (2) A student favorite, this is an English course specifically designed for doctoral students. Scoring is carried out by the lecturer.

VV043 – Academic Writing in English (5) A students' favorite, this is an English course specifically designed for doctoral students. Due to the extensive individual work required during the semester, the course awards more credits than the previous one. Scoring is carried out by the lecturer.

FMDSA – Seminar on Formal Models, Discrete Structures and Algorithms (2) Scoring is carried out by the lecturer.

DSOKL – Soft Skills (8) Realized in the form of block courses and regular consultations, scoring is carried out by the lecturer. One of the requirements of the course is regular attendance.

Group B – one course at least twice during the program (research seminars with the advisor within a specific workgroup; each of them is credited with 3 credits):

- **DEMBSY – Research project in embedded system design**
- **DFOME – Formal Methods in Theory and Practice**
- **DMKZI – Quantum Information Processing Methods**
- **DPGZO – Computer Graphics and Image Processing**
- **DMPOS – Computer Networks Methods**
- **DMZDD – Digital Data Processing Methods**
- **DPITS – Enterprise IT Systems and Services**
- **DZPJUI – Advanced Methods for Natural Language Processing and Artificial Intelligence**
- **DPOSO – Advances in Concurrency**
- **DRPSEC – Research project in computer security**

4.3 Elective Courses

DEXTPR – External course (3) Following an agreement with the advisor, a student is eligible to enroll into a course from another university, however at most 3 × during the program. Scoring is carried out by the advisor.

DBLOK*n* – Lecture of a foreign expert (2–4) Typically, this is realized as a block lecture. Scoring is carried out by the lecturer, or in exceptional cases by the guarantor of the course (or whoever is in charge of organizing the lecture on behalf of FI). These courses are usually named DBLOK1, DBLOK2, etc.

Following an agreement with the advisor, a student may enroll into any course for master students as a voluntary course; typically this is carried out early in the program to supplement the student's knowledge of the target field.

4.4 Example of Taken Courses

Table 1 below provides an example of taken courses for a student who is writing a dissertation on New Approaches to the Creation of Cryptographic Protocols. It includes a total of 256 credits, of which 190 are from mandatory courses, 58 from mandatory elective courses and 8 from elective courses.

5 Semester Enrolment and Academic Calendar

Students are obliged to enroll into each subsequent semester of the program through the IS, and to do so during the period specified in the Academic Calendar. Non-fulfillment of this obligation may lead to the termination of studies.

All important data related to the doctoral program are available in the Academic Calendar. The current calendar is always available at `http://www.fi.muni.cz/studies/doctoral/harmonogram.xhtml.en`. To provide a rough example of a typical academic calendar, Table 2 contains the Academic Calendar for the doctoral program in 2016/2017 (autumn semester of 2016).

6 Study Plans and Checks

Studies within the doctoral program follow the General program plan (drafted at the beginning of the program) and the more detailed Annual program plan which is submitted once per year. These plans require approval by the Doctoral committees (DC) and the Doctoral board (DB), which also assess whether these plans are followed. If a student does not follow his/her program plans, DB and/or DC can recommend that the student does not continue in the program. The decision of the DB is also based on the assessment of the student provided by his/her advisor.

Practical information

- The program plans and assessments are only entered into IS.
- *Before starting Semester 1* – it is necessary to create a General and Annual plan (at the latest during the first month following enrollment into the program).

1st semester		
Introduction to PhD study	required	2 credits
Academic Communication Skills in English	required	2 credits
Dissertation Preparation	required	5 credits
Class-work Cooperation	required	4 credits
Quantum Information Processing Methods	selective	3 credits
Informatics Colloquium	selective	1 credit
Informatics Seminar	selective	2 credits
English for Academic Purposes (post-graduate)	selective	2 credits
External Course	elective	3 credits
Lecture of Foreign Expert	elective	2 credits
2nd semester		
Dissertation Preparation	required	10 credits
Preparation of a Publication	required	5 credits
A Lecture in a Foreign Language	required	5 credits
Academic Writing in English	required	5 credits
Quantum Information Processing Methods	selective	3 credits
Informatics Colloquium	selective	1 credit
Informatics Seminar	selective	2 credits
Diploma Thesis Supervision	selective	2 credits
3rd semester		
Dissertation Preparation	required	15 credits
Thesis Proposal	required	7 credits
Quantum Information Processing Methods	selective	3 credits
Informatics Colloquium	selective	1 credit
Informatics Seminar	selective	2 credits
Diploma Thesis Supervision	selective	4 credits
External Course	elective	3 credits
4th semester		
Dissertation Preparation	required	20 credits
Poster Preparation	required	1 credit
Quantum Information Processing Methods	selective	3 credits
Soft Skills	selective	8 credit
State Doctoral Examination and Defence of theses	required	0 credits
5th semester		
Dissertation Preparation	required	30 credits
Preparation of a Publication	required	5 credits
A Lecture in a Foreign Language	required	5 credits
Quantum Information Processing Methods	selective	3 credits
6th semester		
Dissertation Preparation	required	40 credits
Quantum Information Processing Methods	selective	3 credits
7th semester		
Dissertation Preparation	required	40 credits
8th semester		
Internship abroad (3 months)	selective	15 credits
Dissertation Defence	required	0 credits

Table 1: Example of taken courses

Registration for autumn 2016	23 May – 31 Jul 2016
Enrollment in the 1st semester	1 Sep 2016
Deadline for the submission of: *- assessment of students, annual and general plans* *- applications to the DSE (will take place in January 2017)* *- thesis proposals* *- requests for stipends and the full-time form in the 5th year*	until 5 Sep 2017
Deadline for the submission of: *- theses and applications to the thesis defenses (for defenses in the semester Autumn 2016)*	1 May – 31 Oct 2016
Doctoral committee: *- assessment of students* *- approval of annual and general plans* *- discussion of stipend requests and full-time programs*	9 Sep 2016
Doctoral board (incl. advisors of assessed students): *- discussion of conclusions and suggestions of Doctoral committees* *- determining reviewers for proposals* *- proposal of committees for DSE (will take place in January 2017)*	15 Sep 2016
Enrollment in the semester	1 Aug – 18 Sep 2016
Enrollment and changes of courses	1 Sep – 2 Oct 2016
Courses/teaching	19 Sep – 16 Dec 2016
Registration for Spring 2017	21 Nov – 31 Dec 2016
DSE incl. defense of proposals (applications from September 2016)	9 Jan – 13 Jan 2017
Submission of applications for the doctoral program	until 18 Jan 2017
Doctoral board: *- preparation of admission proceedings*	21 Jan 2017
Deadline for submission of: *- assessment of students, annual and general plans* *- applications to the DSE (will take place in May 2017)* *- thesis proposals* *- requests for stipends and the full-time form in the 5th year*	until 23 Jan 2017
Doctoral committee	26 Jan 2017
Admission exam	31 Jan 2017
Doctoral board (incl. advisors of assessed students): *- assessment of the admission proceedings* *- assessment of students* *- approval of annual and general plans* *- discussion of stipend requests and full-time programs* *- determining reviewers for proposals* *- proposal of committees for DSE (will take place in May 2017)*	2 Feb 2017

Table 2: Academic Calendar for the doctoral program, semester Autumn 2016.

- *During the program* – the Annual plan and Assessment are regularly filled in and submitted (always when proceeding to the next year of the program). Both are entered into IS within the next upcoming semester (either autumn or spring). This means that the assessment for the previous two semesters (e.g. Autumn 2015 and Spring 2016) and the Annual plan for the next two

semester (Autumn 2016 and Spring 2017) will both be entered into IS within the Autumn 2016 semester. Please adhere to this procedure—it has been approved by the DB and will significantly expedite the following checks and navigation when working with groups of students.

All of these data must be entered at the latest on the date specified in the Academic calendar for the doctoral program. Usually, this is about 5 days before the DC meeting and 8 days before the DB meeting. (The date is usually during the first week of September for students who enrolled in an autumn semester and in mid-January for students who enrolled in a spring semester).

6.1 General Program Plan

The General plan is used first and foremost as a means of premeditating and approximately specifying the student's activities in the program. It is put together by the advisor following a consultation with the student. The advisor must enter it into IS at the latest within the first month after registering into the program. The main part of the General part should comprise systematic creative research in the field of the thesis. Emphasis is placed on the primary stages of the doctoral program: especially the completion of the thesis proposal, authoring at least two publications, passing the DSE, submission of the thesis. More specific dates are then provided within the appropriate Annual plan.

6.2 Annual Program Plan

The Annual plan contains a plan for the student during two semester, and specifies which obligations the student must fulfill in the given period and how will the fulfillment of these obligations be checked. A proposal of the Annual plan is processed by the advisor in the presence of the student and is then submitted to the DC and DB for approval. It is filled in electronically into the appropriate application in IS, always within the next following semester. The Annual plan must be formulated in a way which ensures that it is possible to check and determine whether the student is/has fulfilled his/her prescribed obligations.

The Annual plan specifies the concrete activities of the student for the next year. It may for instance include:

- courses which the student intends to take/complete during the upcoming two semesters,
- projects which the student will participate in,
- planned participation in conferences and summer schools,
- planned internships in the upcoming year.

6.3 Student's Evaluation by the Advisor

The annual evaluation/assessment of the results of the student's creative research is carried out by the advisor, usually with respect to the student's annual report, and the result of his/her assessment is presented to the DB. The assessment needs to be entered into the appropriate application in IS, always within the upcoming semester, i.e. the semester of the DB meeting.

The assessment must include the following data:

- obtained research and development results
- publications (for publications with several authors, please specify the student's share)
- presentations at conferences, workshops, seminars etc.
- participation in research projects and intents,
- fulfillment of tasks specified in the Annual plan,
- overall evaluation of the student's performance in the past period,
- whether the student will be able to successfully continue in his/her study
- evaluation of progress in fulfilling the General plan,

6.4 Program Checks

The DB will perform a program check for each student in compliance with SER. During the check, the DB will take into account first and foremost the evaluation presented by the advisor and the student's results obtained within the Annual plan.

The DB may for instance issue a warning if a student does not fulfill the plan. The results of the check are provided to the student in the form of the minutes from the DB meeting, available to doctoral students in IS.

7 Internships, Summer Schools, Conferences

When setting up the program plans, it is generally advised to consider internships, summer schools and conferences. These usually have a significant positive impact on the student's successful completion of the doctoral program.

Summer schools usually last for several days or a week and often take place during the summer holidays. Generally, these focus on one or several specific topics. They are held by universities, include lectures by experts from the selected field and allow students to obtain skills and know-how which is not taught anywhere else. It is advised to plan participation in summer schools mostly in the early part of the program. The costs for attending a summer school are typically covered from the project funding of the advisor or from specialized stipend programs.

Internships usually take place for a longer period of time (often several months) at a foreign university. During the internship, the student works on a pre-specified agreed upon subject in cooperation with the partner institute. The goal is to obtain new impulses and new perspectives on the problem. The possibility of an internship is a fundamental and extremely valuable experience, and the DB will usually allow the student to make changes to his/her program plans if required due to the internship. Internships are most frequently financed by the Erasmus program. More information about internships and summer schools for FI is available at Ing. Radka Brolíková[2]

What to do if you're leaving for an internship: Ideally, your Annual plan already includes the internship. Since the possibility of an internship may appear even unexpectedly at any time during the year, the non-inclusion of the internship in the plan is not a significant obstacle. Changes of the plan can later be explained within the Evaluation for the year of the internship. Once you know the dates of the internship, enter it into the IS (under Student -> Scholarships and Internships) and

[2] <brolikov@fi.muni.cz> or at the website of the Office for International Studies of MU (http://cic.muni.cz/en/).

let ORDD know (an email suffices). Stays within the Erasmus program are recorded separately, more information about these is available at the faculty website[3]. Do not forget to also enroll in the DZAST course (5 credits per month of internship).

Stays via Erasmus: if the student did not use up his/her two Erasmus stays or internships, these may also be taken during the Doctoral program. Unlike in the case of academic internships, Erasmus stays require the student to participate in regular courses at the partner institute.

Conferences are primarily used to present new results and to follow-up as well as strengthen important contacts. In some situations it may be advantageous to let the student participate in a conference even if he/she will not be presenting his/her results; this may especially be the case early in the program. It is suitable to consult the choice and possible participation in a conference with the student's advisor, since the associated costs are most frequently covered from the advisor's project funding. The choice of a suitable conference can be made e.g. with the help of various scales and measures of the quality of individual conferences (more information about this is provided within the DUVOD course).

8 Other Obligations of Students

Working hours, presence at the institute Students who are not employed at the faculty do not have fixed working hours and their presence at the faculty depends only on a mutual agreement with the advisor. However, in compliance with the *Dean's Instruction*[4] *01/2012*, the student is obliged to, jointly with his/her advisor, discuss and designate certain days/hours when the student will be present at the institute. The student is then obliged to inform ORDD of this and also to specify these days/hours on his/her website. If the student is not present during this specified period, he/she is obliged to inform his/her advisor. The student's website should also specify his/her room number at the faculty and the phone no. for this room.

Since doctoral students are not employees, they do not have vacations and instead they will receive the same holidays as other students as specified in the Academic Calendar. In case of illness, it is not necessary to present proof of incapacity for work

[3] `http://www.fi.muni.cz/international/erasmus.xhtml.en`

[4] `https://is.muni.cz/auth/do/fi/predpisy/Pokyn_dekana_01_2012_pro_PhD_studenty.pdf`

unless the illness affects the fulfillment of the student's obligations (e.g., teaching or lectures/courses with mandatory attendance). In this case, it is necessary to present proof of incapacity for work at the ORDD.

Assistance to the Faculty during the doctoral program, students will participate in teaching and activities related to teaching. Assistance with teaching and with bachelor's or master's theses is reflected by the DPOMV and DVBDP courses. Assistance with teaching is additionally also remunerated with a standard teaching rate. Additionally, the student is obliged to help with the supervision of exams or final state exams in a minimum scope of 10 hours per semester. A student can arrange this assistance individually or reply to regular e-mail requests from lecturers. One advantage of this is flexibility in the selection of possible dates for supervising/assisting with exams. If the student has not completed this obligation, he/she may be assigned a fixed date/time for assistance by ORDD. Faculty assistance is tracked via a specialized form, which lists the scope and type of activities and which is signed by each lecturer of the course which received assistance (or the chairman of the committee in the case of state exams). The amount of faculty assistance provided by individual students may be taken into account during the payment of extraordinary stipends.

WSR and FSR training Each doctoral student is obliged to participate in WSR (work safety rules) and FSR (fire safety rules) training seminars. The date and time of training seminars are advertised by the faculty and reported to students sufficiently in advance. Full-time students must participate in these seminars during the first semester and then once every two years. Combined (i.e. part-time) students are obliged to participate in the first semester. In case of interruption of the program for more than 18 months, the student is obliged to participate in the seminar(s) again on the next available date.

Update of information in IS Students are obliged to keep their personal data in IS up to date, especially including:

- account no. (very important – used to automatically send stipends),
- contact address,
- phone no. (we will only contact you in the utmost urgent of situations, e.g. if you forgot to provide vital information in a project submitted just before the deadline or if you oversleep on the day of your DSE :)).

9 Material and Financial Contributions

Material contributions are specified in the *Dean's Instruction*[5] *01/2012*:

1. Full-time students may ask, through their advisor, for allocation of a workplace and suitable technical equipment.
2. Full-time students are provided with a common office PC with OS Linux which is funded by financial means of the advisor's department.
3. If the student's advisor is the head of a research laboratory at FI, he/she is expected to provide the student a workplace in the laboratory. Otherwise the faculty allocates the student a table and a chair in a shared office.
4. Full-time students may ask for an access to other faculty technical equipment (e. g. copy machines).
5. FI is not obliged to provide technical equipment to those full-time students, whose presence at the faculty is shorter than 20 hours per week or whose participation in teaching is shorter than 4 hours per week.
6. Equipment funded by department financial means beyond the above mentioned basics is provided primarily to the students of higher years of the program depending on their results, their advisors' recommendations and available financial resources of the department. The advisors are expected to participate by their grant and other financial means.
7. All demands for extension of the technical or other equipment are to be submitted with the advisor's approval to the head of the department.

ISIC Full-time students are entitled to receive an ISIC student's card. The card itself or a revalidation seal is issued for free at the beginning of the program, and for each subsequent year it is possible to purchase a new seal. The price of a new seal was 150 CZK in 2016. It is also possible to buy a new card in case of its loss or damage. The card is also used as a MU student's ID card, and allows access to the computer room, library etc. – these functions do not require an up-to-date seal. Part-time students will receive a separate MU student card upon request.

Financial contributions Full-time students who are enrolled in the standard duration of the program usually receive a doctoral stipend of 7,300 CZK. The OB may decide to increase or reduce this stipend. Students who enter the 5th year of the doctoral program may, along with an application for the extension of the program, also submit an application for a continuation of the payment of stipends

[5] `https://is.muni.cz/auth/do/fi/predpisy/Pokyn_dekana_01_2012_pro_PhD_studenty.pdf`

within the stipend program for supporting the completion of studies of perspective doctoral students. The stipend is not subject to tax.

Students who participate in teaching (e.g. who lead exercises or correct exams) receive remuneration for these activities via a standard rate for teaching, in the form of a Contract of Services, which is subject to tax.

Students may receive additional funding from so-called project resources. These resources are provided to students whose research activities at the faculty are associated with / belong to a specific project (e.g. GACR, EU FP7 or MSMT projects), and are managed by the project investigator. If these resources are paid in the form of a stipend, then they are not subject to tax; otherwise they are subject to tax.

Additional sources of financing may be discussed with your advisor or the ORDD.

10 PhD Thesis Proposal

The PhD thesis proposal represents a rigorous check and control mechanism, the goal of which is to verify whether the student will be able to successfully continue working on his/her thesis during subsequent studies. Its primary goals are to determine whether *(1)* the student is well-versed in the studied field, *(2)* is aware of the open problems in the field and *(3)* has a good idea of how he/she will contribute to the solution of these problems. The defense of the proposal is part of the DSE (see Chapter 11).

Aside from consultations with his/her advisor, the *DTEDI (Thesis Proposal)* course should help students with preparing their proposals. This course will provide students with exemplary proposals from previous years and will discuss these. During the course, students will also participate in practice as well as actual defenses of proposals and will also try out their own defense and receive immediate feedback from their colleagues.

Students can also take a look at past proposals which were accepted as Advanced Master's ("Rigorozni") theses, as well as their reviews, within IS MU in the thesis archive[6].

[6] `http://is.muni.cz/thesis/`

10.1 Contents of the Proposal

Depending on the nature of the student's research, his/her proposal will either have a theoretical, applied, or mixed (theory and applications) character. The general contents of the proposal should be discussed with the advisor, and the same also applies to gradually created version of the work. It is certainly useful to procure (e.g. based on the advisor's recommendation) another consultant who would be willing to read the proposal before it is completed/submitted and who will provide feedback. Thesis proposals may be written in English or Czech, whereas most proposals of late were submitted in English.

The recommended structure of the proposal including the scope of individual chapters has been approved by the DB and is available at the appropriate website of the faculty [7]. A more in-depth description of what individual parts of the proposal should contain is specified within the study documents of the DTEDI course[8]. The total recommended size of proposals is 15 to 30 pages, whereas the upper limit applies especially to proposals which are submitted also as an Advanced Master's thesis.

Here we provide a very brief and limited summary of the contents of a proposal: first there is a relatively short introduction which introduces the research area, its current open problems and the expected contribution to their solution. The key and longest chapter is the description of the current state of the art of the area. In the next chapter, the student will specify the new results he/she plans to obtain, which methods he/she intends to use and what is the expected timeline. If a proposal is to also be accepted as an Advanced Master's thesis, it must also contain a list of the student's results to date and must include attached at least one reviewed publication. Finally, the proposal should contain a list of the student's publications, references and annexes (if any).

10.2 Formal Requirements

The formal requirements associated with the submission and defense of proposals are provided and updated at the above-listed faculty website. Here we have selected and commented only a few key points:

[7] http://www.fi.muni.cz/studies/doctoral/thesis.xhtml.en

[8] https://is.muni.cz/auth/el/1433/podzim2016/DTEDI/um/58741242/index_en.html

- The thesis proposals defense is part of the DSE, and thus the proposals must be submitted along with an application to the DSE. The deadline for the submission as well as for the defense of proposals adheres to the Academic Calendar. Typically, 4 calendar months pass between the submission of theses and their defense.
- Submissions (to ORDD) contain three copies of the proposal in spiral binding. Additionally a short text summary in Czech and English is required for the submission (max. 1 page).
- If the student plans to submit the proposal as an Advanced Master's thesis (see page 29 for more information), he/she must have already obtained some research results. These results must be listed in the proposal and selected publications must form a part of the proposal (typically in the form of an annex). In this case, the proposal is also submitted electronically (as a PDF which will be available in IS MU, in the thesis archive).

10.3 Defense of the Proposal

Submitted proposals are reviewed by at least two reviewers. Reviewers are proposed by the advisor and approved by the DB after the submission of the proposal. Reviewers typically come from areas which are closely related to the subject of the proposal, and thus it may be useful for the student to have at least some idea of their results and publications. This will allow him/her to better react to the questions they ask within the review or during the defense.

There is no regulation on when the student should receive these reviews. Usually they are available even more than a month before the defense, and it generally does not happen that they only become available e.g. a week before the defense.

The defense of the proposal is part of the DSE. The defense of the proposal adheres to the same general rules as any other defense. The DTEDI course will provide an overview of these general rules, as well as include visits to practice defenses as well as actual defenses and students will be able to try out the defense of their theses. Here we will list some of the important points of defending a proposal:

- The defense is a certain type of a presentation and it is necessary to respect this (the defense should not resemble a lecture or a presentation of a result at a conference). It is useful to focus on presenting the area of interest, the open problems the student will focus on and the proposed methods. It is necessary to list other published solutions of or methods for the solution of

the selected problem, and to compare these with the student's approach. At the end of the presentation, it is generally a good idea to list the student's (selected) publications.

- When preparing slides as well as during the defense, it is necessary to take into account that some members of the committee may not be experts in the presented field. Unnecessarily complex formulas and extensive definitions/formulations should be avoided, while easy-to-understand figures and brief phrases are recommended.
- The duration of the presentation (currently 12 minutes) should not be exceeded. This presentation should not include slides with answers to specific questions of reviewers; those should be presented after reading the reviews.
- The presentation should not mix different languages unless this is necessary – a typical problem is the mixing of English and Czech sentences. If the student isn't fully confident in his English oral skills and everyone in the committee speaks Czech, then it is better to use Czech. Currently students usually do their defenses in Czech with the use of English slides.

After the presentation of the proposal itself, the committee will briefly summarize the reviews, then the student should comment on the remarks and questions in the reviews and answer the questions (if any) of the committee members.

11 Doctoral State Examination

The student should undergo the DSE by the end of the fourth semester of the program. The examination is carried out by a committee, is oral, and consists of the defense of the proposal and an examination from two topics. The student should demonstrate knowledge exceeding the scope of the Master's program in the selected topics. The deadlines are fixed and specified in the Academic Calendar.

Formal requirements Before submitting an application for the examination, it is necessary to fulfill the requirements specified in SER. This includes especially the successful passing of the courses DTEDI, DPUBL, and DCIPR or DTEDI, DPUBL, and DACSE or DTEDI, DCIPR, and DACSE. The application also contains a thesis proposal. Applications to DSE are submitted at the beginning of the semester of the examination, i.e. applications to a DSE which will take place in January need to be submitted in September of the preceding year, and applications to a DSE taking

place in May need to be submitted in January of the same year. The application is available in IS[9].

It is not recommended to only start working on the application just before its deadline, since it is, among others, necessary to obtain signatures from the guarantors of the selected topics. It is also useful to make a copy of the part of the application which specifies the selected topics and recommended literature for each topic.

Contents of the examination The SDE consists of an oral examination from two topics selected from the areas, a list of which is provided in Annex C. Each of these areas has a specialist guarantor. More information for individual areas and topics are available at the faculty website: `http://www.fi.muni.cz/studies/doctoral/sdz/index.xhtml.en`.

Selection of topics The selection of topics of the doctoral examination is approved by the Doctoral board based on a recommendation from the advisor and the focus of the student's program. The selection of topics should be directed towards demonstrating wider expertise within the field.

After selection of the topics, the student should contact their respective examiners and with each of them discuss the details. After specifying the topic and the literature in the application, the student has to seek for the area guarantor's signature expressing his/her acceptance of the selected topic and the extent of the study literature. In case of applications during the autumn semester, it is necessary to take into account that many people may be on vacation during the summer and contact the guarantors of topics sufficiently in advance.

Preparation for the examination The recommended approach to preparing for the DSE is to consider it an excellent opportunity to really get a deep understanding of the selected topics. The selection of the topics should then be based on this approach: either the topics can be directly or indirectly related to your program, or they can be topics which are outside of the focus of your program but which you consider interesting. Reserve sufficient time to prepare for the examination, it is a good idea to ensure that the semester of the exam is not too busy and that you will have time to prepare. In the examination, you will be expected to demonstrate good orientation in the field and the ability to hold professional discussions about the specified areas of the given topic. You will not be expected to know all the

[9] `http://is.muni.cz/do/fi/formulare/PhD_studium/35653494/`

details of every proof in the pre-agreed area, but you need to understand the proofs and how they proceed.

DSE process The DSE is a public examination which usually takes 75 minutes. The examination takes place in front of a committee nominated by the dean. Its members include the chairman of the committee, the examiners, the advisor and other members including at least two members from other universities or reviewers.

The DSE begins with the defense of the thesis proposal. The student first presents the contents of his/her proposal within a 12-minute presentation, followed by the defense itself. The examination from the two selected topics follows. The examination topics are chosen in an arbitrary order, and each usually takes about 25 minutes.

SDE scoring, possibility of repeating The whole SDE (including the defense and the examinations) is evaluated jointly, with a single grade. The committee first decides, via secret voting, whether the student passed – at least more than one half of the present members of the nominated committee must agree that the student passed. If the student passes, the committee decides on the specific grade given to the student. If the student does not pass, he/she may retake the whole SDE once; in this case the committee will specify whether it is necessary to rewrite the proposal.

11.1 Applying for an Advanced Master's Degree within DSE

Graduates of master's programs who have received the "Magister" (Mgr.) title may take an Advanced Master's State Examination (AMSE) which also includes the defense of an Advanced Master's Thesis (AMT).

If you include an application to the AMSE in your DSE, then you will only need to undergo the equivalent or joint parts of the AMSE and DSE once.

If you intend to apply for an AMSE, the proposal must also include the results of your original research which satisfy the publication standards in the field. During the submission of proposals, you may also apply for the AMSE if you have an article but the article has not been published/accepted yet. It is up to you to consider the chances of the article being accepted by the day of the defense.

If the student applied for an AMSE, then the defense of the proposal will be replaced by a defense of the AMT. Due to the fact that the defense of the AMT is part of the AMSE by law and due to the requirement of submitting the thesis together with applications to the DSE, it is possible to regard passing a DSE as also passing a AMSE.

The secret voting of the committee will in this case consist of two rounds. First the committee decides whether the student passed the DSE and the proposal defense, and agrees on the grade. If the student passed, the committee will vote again to decide whether the student passed the AMSE.

It may thus happen that the student passes the DSE but does not pass the AMSE. In this case, the student will continue in the doctoral program and will still receive his/her Ph.D. after he graduates, but will not receive the RNDr. title.

However, this does not prevent the student from rewriting the AMT and taking the AMSE one more time.

Exact information about these matters is available in SER, article 34–37.

12 Requirements for Successful Completion of Studies – Publications

The university law specifies that the doctoral program is considered completed upon the passing of the DSE (see Chapter 11) and the defense of the thesis, which demonstrates the student's skills and preparedness for his/her autonomous work in development or research. The law also specifies that the thesis must contain a certain number of original and published results or results accepted for publication.

The practice at FI MU is that the minimum number of original and published results in the thesis is two internationally peer-reviewed publications of sufficient quality. Here sufficient quality means publications in impacted journals as well as publications in proceedings of high-quality conferences—i.e., especially international conferences recognized by the given research community. For instance, MEMICS is not considered to be a conference of sufficient quality with this respect, since it is intended especially as a training experience for doctoral students before more significant conferences. Assessing the quality of conferences is not a simple task despite the existence of various measures and charts for conferences (see e.g.

DUVOD). Thus it is usually expected and recommended that at least one of the publications should be an article in an impacted journal.

13 Thesis

The doctoral program is ended by the elaboration and successful defense of the doctoral thesis, which is basically the main tangible output from the doctoral program. The thesis is used to assess whether the student has sufficient qualifications and expertise to receive a Ph.D. The thesis must contain original results of research in the given field and should have a form (both professional and presentational) which meets the highest standards.

13.1 Contents of the Thesis

The goal of the thesis is to present the student's results obtained during the doctoral program. The thesis must contain original results which were already published or accepted for publication, either at an international conference or in an impacted journal. Most doctoral theses defended at FI MU were monographs, i.e. had the form of a book on a unified topic. The usual scope of doctoral theses of this type submitted for a defense at FI MU is 100 pages or more. Doctoral theses are usually written in English.

In compliance with SER, it is also possible to accept a list of previously published papers as long as this includes a comprehensive introduction and commentary. In this case it is necessary to also document the student's contribution in papers with several authors, including a declaration of the student's coauthors confirming his/her contribution.

From a practical perspective, the preparation of the thesis in the form of a monograph is one of the most difficult parts of the program and it is necessary to take into account that this will take a significant amount of time (the preparation of the thesis usually takes between 6 and 12 months). In most cases, this is the first larger monograph written by the student, which makes it even more demanding especially with respect to proper structuring of the work and proper presentation of a large number of results in an understandable form. If the thesis is written based on a number of scientific publications, it is a good idea to begin by searching for the elements which consolidate them. This often leads to the discovery

of new connections, unification of terminology and notation etc. In general, it is a good idea to proceed in a top-down fashion, i.e. from general principles and structure to specific technical details. It is a good idea to take into account that the goal of the thesis is to demonstrate to the reviewers and to the committee that the results presented in the work are novel and of sufficient importance. This should be apparent especially in the introduction of the thesis, which should formulate the most important results in an easy-to-navigate manner. Additional information and advice can be obtained in the seminar which forms part of the DPDIS course.

13.2 Thesis Proceedings

The thesis proceedings officially begin by the submission of an application for the defense of the thesis. The process of this submission at FI MU is described in detail on the faculty website: `http://www.fi.muni.cz/studies/doctoral/obhajoba.xhtml.en`

The necessary requirements which need to be fulfilled before the defense are listed below:

- fulfilled credit obligations for the doctoral program (see page 11),
- at least two peer-reviewed publications (either in the proceedings of a high-quality international conference or in an international journal) (see page 30),
- successful completion of the DSE and successful defense of the thesis proposal (see pages 27 and 24).

Along with the application for the thesis defense and a sufficient number of copies of the thesis, the student needs to also provide the following documents:

- the standpoint of the internal reviewer and of the advisor,
- a recommendation for the choice of at least 2 reviewers written by the advisor,
- an abstract, a professional cv and a list of publications. If the thesis is written in English, then these three documents must be provided in Czech and in English.

Notice that the application also includes the standpoint of an internal reviewer. The internal reviewer will assess whether the thesis in preparation is free of any obvious

formal shortcomings. The student should notify ORDD that he/she intends to submit the thesis about one semester before submission. Specifically, the student needs to send an email to ORDD which contains the following information: name of the thesis, an abstract, and a list of publications. The chairs of the DB and DC will then specify an internal reviewer for the thesis within four days. During two weeks after obtaining the current version of the thesis, the reviewer will write an internal review with his/her remarks. The student may (or may not, at his/her discretion) make the necessary changes.

When submitting an application for the defense, the DB will propose a committee and reviewers for the thesis (usually based on the recommendations of the chair of the proposed comittee, the chair of the respective DC and the advisor) to the dean, who then officially nominates these. The work is then sent to the reviewers, who have two months to deliver their reviews. If each of the reviewers provides a negative review of the thesis in any of the points specified in SER, the student may decide not to submit the thesis for the defense, and this will not count as an unsuccessful defense. This is followed by an individual arrangement of the date of the defense.

13.3 Defense of the Thesis

The doctoral program officially ends with the defense of the thesis. If successful, the graduate immediately receives the title of Ph.D., and the appropriate legally valid documents may be issued, thus if the student is not willing to wait for the graduation ceremony (usually at the beginning of December and at the end of May), it is possible to obtain the Diploma and the Diploma Supplement at the MU Rectorate in ca. 3–4 weeks. If unsuccessful, it is possible to repeat the whole procedure at most one more time. The graduation ceremony is held twice a year and is only of symbolic significance.

The defense of the thesis has the same rules as the defense of the thesis proposal, and so most of the recommendations of Section 10 also apply here. The thesis defense also includes a very short presentation (15 minutes) of a very extensive monograph, and so it is necessary to choose a suitable level of abstraction for this presentation. To this end, it is generally advised to focus especially on:

- A brief and informal specification of the field,
- Substantiation of the originality and contribution of the results for the scientific community,

- A very brief description of the new solutions or methods contained in the thesis, together with a description of the structure of the thesis. Here it is a good idea to proceed in a top-down fashion, i.e. from general principles to details (most or all of which are usually omitted).

It is very important to adhere to the time limit and to avoid presenting too many details instead of the general significance and overview of the results. As with any other defense, the primary goal is to actually defend the thesis, i.e. demonstrate that it fulfills the criteria of a dissertation/thesis (in the sense of its scientific contribution, originality, generality, rigidity and scope). Keep in mind that your goal isn't to give a lecture to the committee about your field or to present your results to experts in the field.

14 Miscellaneous

Interruption of the program The student may decide to interrupt the program if he/she has fulfilled the conditions for enrolling in the next semester. The duration of the interruption is counted towards the maximum length of the program (7 or 8 years). However, interruptions due to maternal or parental leave or due to serious health reasons are not counted towards the maximum length of the program.

Cotutelle doctorates and European doctorates The doctoral program may be studied jointly in cooperation with a foreign institution. There exist two methods to achieve this: a) Double degree – a doctorate with joint supervision (a so-called Cotutelle doctorate) and b) European doctorate. In-depth information about these are available at ORDD. In general, the procedures for both of these are highly individual and it is thus impossible to specify the detailed conditions for these programs. In general, one may roughly say:

Ad a The student will be regarded as a student at both MU and the foreign institution. However, it is necessary to fulfill the conditions of both universities simultaneously. The following variants for the issuance of the diploma are possible: (1) only from MU, and the foreign institution will acknowledge the diploma, (2) joint diploma issued by MU and the foreign institution, or (3) each institution will issue their own diploma.

Ad b The student is only considered a student at MU. After successfully completing the program, the student will receive a diploma from MU which will

explicitly state the fact that the program was studied jointly with the selected foreign institution.

Please contact ORDD in case of any questions or doubts during your studied: <veda@fi.muni.cz>.

Part III

Annexes

A Contacts and Faculty Bodies

A.1 Office for Research & Development & Doctoral Studies

Contact persons Doctoral students are in charge of Ada Nazarejová, who will gladly answer any questions or help solve problems during your studies. Contact information is updated regularly on the faculty website.

Office hours Mon–Fri 9:00–11:00, otherwise based on agreement

Adresa
Faculty of Informatics, Masaryk University
Office for Research & Development & Doctoral Studies
Botanická 68a
602 00 Brno
E-mail: <veda@fi.muni.cz> (preferred contact method)
Phone no.: +420 549 494 963
Fax: +420 549 491 820

Location in the building left wing (B), 5th floor, office B501

Personal contacts
Vice-dean:
prof. RNDr. Petr Hliněný, Ph.D.
C418, tel. +420 549 493 775
Department head:
Ing. Dana Komárková
E-mail: <dkomar@fi.muni.cz> (projects)
B533, tel. +420 549 491 806
Responsible person:
Ada Nazarejová, DiS.
E-mail: <nazarej@fi.muni.cz> (Ph.D. studies)
B501, tel. +420 549 494 963

A.2 Doctoral Board

The responsibilities of a doctoral board include primarily the following:

a) Approving doctoral thesis topics,

b) Assessing individual students' study plans in terms of compliance with programme content,

c) Providing the dean with recommendations regarding admission committee members and chairpersons and specifying entrance examination requirements,

d) Providing the dean with recommendations regarding the appointment or dismissal of supervisors,

e) Assigning supervisors to students while observing the student's right to choose both a supervisor and doctoral thesis topic in accordance with section 62, subsection 1, letters c) and f) of the Act,

f) Initiating, discussing and coordinating the programming of lectures, seminars and other study-related matters,

g) Discussing and assessing – at least once a year – each student's course of studies along with the supervisor, providing a transcript of the matter and filing the transcript among the required documentation in the IS MU; if so requested by the doctoral board, the supervisor shall presents a student's progress report in written form,

h) Providing the rector or dean with recommendations regarding the appointment or dismissal of state examination committee members and chairperson,

i) Providing the rector or dean with recommendations regarding the appointment or dismissal of a thesis reader, chairperson and committee members for a doctoral thesis defence,

j) Providing the dean with recommendations regarding dates and deadlines for doctoral state examinations and doctoral thesis defences,

k) Providing recommendations regarding doctoral committee establishment and membership.

In case doctoral committees have been established, the authority to execute some or all of the responsibilities specified under letters b), c) and e) to j) with respect to a given field may be delegated to the doctoral committee by the dean following a recommendation made by the doctoral board.

Members of the specialist board

Chair

- prof. RNDr. Jozef Gruska, DrSc.

Internal members

- prof. RNDr. Petr Hliněný, Ph.D.
- prof. RNDr. Jaroslav Koča, DrSc.
- prof. RNDr. Michal Kozubek, Ph.D.
- prof. RNDr. Antonín Kučera, Ph.D.
- prof. RNDr. Václav Matyáš, M.Sc., Ph.D.
- prof. RNDr. Luděk Matyska, CSc.
- prof. Ing. Pavel Zezula, CSc.
- prof. RNDr. Jiří Zlatuška, CSc.

External members

- prof. RNDr. Milan Češka, CSc.
  (Faculty of Information Technology TU Brno)
- prof. Ing. Miroslav Švéda, CSc.
  (Faculty of Information Technology TU Brno)

A.3 Specialist Committees

Members of the specialist committee for Informatics

Chair

- prof. RNDr. Antonín Kučera, Ph.D.

Internal members

- doc. RNDr. Jiří Barnat, Ph.D.
- doc. RNDr. Tomáš Brázdil, Ph.D.
- prof. RNDr. Luboš Brim, CSc.
- prof. RNDr. Ivana Černá, CSc.
- doc. RNDr. Vlastislav Dohnal, Ph.D.
- prof. RNDr. Petr Hliněný, Ph.D.
- prof. RNDr. Mojmír Křetínský, CSc.
- prof. RNDr. Luděk Matyska, CSc.

External members

- prof. RNDr. Alexander Meduna, CSc.
  (Faculty of Information Technology TU Brno)
- prof. Ing. Tomáš Vojnar, Ph.D.
  (Faculty of Information Technology TU Brno)

Members of the specialist committee for Computer Systems and Technology

Chair

- prof. RNDr. Luděk Matyska, CSc.

Internal members

- doc. RNDr. Petr Holub, Ph.D.
- prof. RNDr. Antonín Kučera, Ph.D.
- doc. RNDr. Pavel Matula, Ph.D.
- prof. RNDr. Václav Matyáš, M.Sc., Ph.D.
- doc. PhDr. Karel Pala, CSc.
- doc. RNDr. Tomáš Pitner, Ph.D.
- doc. Mgr. Hana Rudová, Ph.D.
- doc. Ing. Jiří Sochor, CSc.

External members

- prof. Ing. Lukáš Sekanina, Ph.D.
  (Faculty of Information Technology TU Brno)
- prof. Dr. Ing. Pavel Zemčík
  (Faculty of Information Technology TU Brno)

B List of Advisors at FI MU

An up-to-date list of advisors and consultants is available at `http://www.fi.muni.cz/studies/doctoral/tutors.xhtml.en`.

doc. RNDr. Jiří Barnat, Ph.D. Software tools for automated formal analysis and verification of large-scale systems.

Dr. rer. nat. Achim Blumensath Logic, Algorithmic Model Theory, Automata Theory, Formal Language Theory.

doc. RNDr. Jan Bouda, Ph.D. Randomness, Cryptography, Information theory, Quantum Information Processing.

doc. Ing. Michal Brandejs, CSc. Information systems.

doc. RNDr. Tomáš Brázdil, Ph.D.

prof. RNDr. Luboš Brim, CSc. Formal methods for verification and analysis of computer systems (model checking, equivalence checking, performance analysis, model-based testing). Algorithms, techniques and tools for efficient verification and analysis of large-scale systems (parallel or distributed verification using multi-core computers or multiple computers, disk-based verification).

Formal methods in molecular and systems biology (analysis of genetic regulatory networks and signaling pathways).

prof. RNDr. Vladimír Bužek, DrSc. Quantum information processing and communication.

doc. Ing. Pavel Čeleda, Ph.D. Network traffic measurement in high-speed networks, traffic analysis in computer networks and critical network infrastructures, computer networks security, detection of attacks and anomalies using behavioral methods.

prof. RNDr. Ivana Černá, CSc. Formal methods for verification of computer systems. Algorithms and tools for efficient analysis, design, and verification of properties of large-scale (concurrent) systems. Application of formal verification in component-based design. Application of formal methods in systems biology. Design and analysis of algorithm.

doc. RNDr. Vlastislav Dohnal, Ph.D. Similarity data management. Organizing and searching image databases. Indexing structures.

doc. RNDr. Ladislav Dušek, Ph.D.

prof. RNDr. Jozef Gruska, DrSc. Methods of quantum information processing. Basic concepts and techniques; quantum automata, algorithms and protocols. Quantum computation and communication complexity. Methods and techniques of broadly understood quantum cryptography.

Classical cryptography. Cryptographic protocols and their security. Randomized algorithms

Foundations and history of informatics as of fundamental science with similar goals as that of physics. Basics and history of informatics as basis of a new, third, methodology of science (next to theoretical and experimental methodology).

Relations between informatics, physics and mathematics.

doc. RNDr. Eva Hladká, Ph.D.

prof. RNDr. Petr Hliněný, Ph.D. Combinatorial and parameterized algorithmics: parameterized complexity, combinatorial optimization, FO and MSO model checking, metatheorems.

Topological and structural graph theories: graph minors, width and depth parameters, sparsity, graph crossing number, drawings and representations of graphs.

doc. RNDr. Petr Holub, Ph.D. Computer networks: protocols for high-speed networks, self-organizing networks systems, data transfer planning, forward error correction and its efficient computations, smartgrids.

Multimedia processing: acceleration of multimedia coding and compression on GPU, multimedia transfers in computer networks, low-latency data processing and distribution.

Collaborative environments: network-based collaborative environments using multimedia, human-computer interactions in collaborative environments.

doc. RNDr. Aleš Horák, Ph.D. Natural language processing (syntactic analysis, semantic analysis, knowledge extraction), knowledge representation and reasoning, artificial intelligence, multiagent systems.

prof. RNDr. Jiří Hřebíček, CSc. Information Systems in biology and environment (ICT of their design, implementation and maintenance)

Mathematical modeling in biology and environment (ICT of design, implementation and verification of solving biological and environmental problems).

prof. RNDr. Jaroslav Koča, DrSc. Computer modeling and simulations in chemistry and biology. Chemoinformatics and bioinformatics.

doc. RNDr. Ivan Kopeček, CSc. Speech synthesis, speech recognition, dialogue systems. Applications for visually impaired people, assistive technology.

prof. RNDr. Michal Kozubek, Ph.D. Digital image acquisition and analysis, automation of these processes and biomedical applications using optical microscopy. Optimization of critical algorithms with respect to output quality and/or quantity. Simulation of image formation in optical systems: blur, noise, artifacts and their correction using hardware and/or software means. Analysis of multi-dimensional image data. Segmentation of cells and their components. Tracking of moving objects in live cell imaging.

prof. RNDr. Mojmír Křetínský, CSc. Concurrent and distributed systems; concurrency theory; modeling; analysis and verification of infinite state systems, semantics, process algebras/process rewrite systems, (un)decidability; concurrent constraint systems

prof. RNDr. Antonín Kučera, Ph.D. Formal modeling and verification of computer systems (model checking, equivalence checking). Modal and temporal logics and their probabilistic extensions. Game theory and its applications in computer science (Markov decision processes, stochastic games). Effective analysis of stochastic systems with infinitely many states. Methods, algorithms and tools for analysis and verification of programs written in imperative languages.

Fotis Liarokapis, Ph.D. Procedural Simulation of Natural Phenomena, Procedural Generation of Cultural Heritage Environments, Crowd Modelling Techniques for Virtual Environments.

Capacity: 2 phd students.

prof. PhDr. Pavel Materna, CSc. Logic as related to Logical Analysis of Natural Language.

doc. RNDr. Pavel Matula, Ph.D. Digital image analysis and biomedical applications using optical microscopy. Analysis of higher-dimensional image data. Image segmentation using mathematicaly well founded methods (active contours, graph-cut minimalization, etc.). Object tracking in live cell imaging.

doc. RNDr. Petr Matula, Ph.D. Analysis of multi-dimensional biomedical image data mostly acquired using optical microscopes.

Mathematical morphology.

prof. RNDr. Václav Matyáš, M.Sc., Ph.D. Applied cryptography, computer and communications security, privacy.

prof. RNDr. Luděk Matyska, CSc. Parallel and distributed systems (Grids, metacomputers), infrastructure,monitoring and management, including implications for robustness and fault tolerance; parallel and distributed applications.

High performance networks and their transport protocols, multimedai transports, including use-in (e-)learning support

Scheduling in distributed systems, primary based on constrain (logic) programming.

doc. RNDr. Ladislav Nedbal, DrSc. I am interested in interaction between a complex biological system and its dynamic environment. The interaction is typically far from equilibrium with strong non-linear features. We apply multidimensional (e.g., 3-D space, time, spectrum) experimental methods to capture the resulting dynamics. Systemic approach is used to construct models exhibiting dynamic features homologous to the experiment (e-photosynthesis). The dominant model process of my research is plant photosynthesis with chlorophyll fluorescence emission used as a reporter signal.

doc. PhDr. Karel Pala, CSc. Natural Language Processing, especially: text corpora, morphological, syntactic and semantic analysis of natural language, dialogue systems, computer lexicography, machine translation.

doc. Mgr. Radek Pelánek, Ph.D. Intelligent tutoring systems, computerized adaptive practice, recommendation systems (with applications in education), educational data mining, machine learning, student modeling. Examples of projects: "Problem solving tutor" (tutor.fi.muni.cz), adaptive practice of geography (slepemapy.cz).

doc. RNDr. Tomáš Pitner, Ph.D. Monitoring systems, Intelligent buildings and Smart-grids, Large software architectures, Person-Centered Approach in Technology-enhanced Learning.

doc. RNDr. Lubomír Popelínský, Ph.D. Data mining, text mining, machine learning.

prof. Ing. Václav Přenosil, CSc. Design and architecture of the digital systems. Dependability and diagnostics of the digital systems. Fault tolerant systems. Embedded systems. Training systems.

doc. Mgr. Hana Rudová, Ph.D. Scheduling, timetabling, planning. Educational timetabling. Job scheduling in parallel and distributed environments. Data

transfer planning. Solution approaches: constraint programming, metaheuristics, search algorithms, integer programming.

doc. Mgr. Pavel Rychlý, Ph.D.

doc. Ing. Jiří Sochor, CSc. Computer Graphics: Modelling, rendering and visualization. Human computer interaction. Virtual reality. Haptic based interaction.

doc. RNDr. Petr Sojka, Ph.D. Digital typography, electronic publishing, visualization. Natural language processing, especially for electronic publishing, machine learning and classification of [mathematical] texts. Digital libraries, digitisation, recognition (OCR) and indexing of texts, including mathematical ones. Information retrieval, text corpora.

doc. Ing. Jan Staudek, CSc. Information technology security.

doc. RNDr. Jan Strejček, Ph.D. Formal methods for program analysis: algorithms and tools for test generation, automatic bug finding, and software verification. Properties of modal and temporal logics (especially LTL) and their fragments, translation of LTL to automata.

prof. Ing. Pavel Zezula, CSc. Database systems, storage and search structures, multimedia and XML data, distibuted index structures, similarity search, performance evaluation.

doc. Mgr. Mário Ziman, Ph.D. Quantum information theory. Quantum cryptography. Quantum algorithms and complexity. Quantum randomness. Conceptual role of information in physics.

prof. RNDr. Jiří Zlatuška, CSc. Electronic publishing. Information society.

C Topics for the Doctoral State Examination

An up-to-date list of topics is available at `http://www.fi.muni.cz/studies/doctoral/sdz/index.xhtml.en`.

Computer Graphic and Image Processing
guarantor: doc. RNDr. Petr Matula, Ph.D.

Data Processing
guarantor: prof. Ing. Pavel Zezula, CSc.

Security of Computer and Communication Systems
guarantor: prof. RNDr. Václav Matyáš, M.Sc., Ph.D.

Computer Processing of Natural Language
guarantor: doc. PhDr. Karel Pala, CSc.

Computer Systems and Networks
guarantor: prof. RNDr. Luděk Matyska, CSc.

Quantum Information Processing and Bioinformatics
guarantor: prof. RNDr. Jozef Gruska, DrSc.

Formal Methods for Analysis and Verification
guarantor: doc. RNDr. Jiří Barnat, Ph.D.

Theoretical Foundations of Computer Science
guarantor: prof. RNDr. Petr Hliněný, Ph.D.

Social Aspects of Computer Science
guarantor: prof. RNDr. Jiří Zlatuška, CSc.

Design of Embedded Systems
guarantor: prof. Ing. Václav Přenosil, CSc.

D Graduates

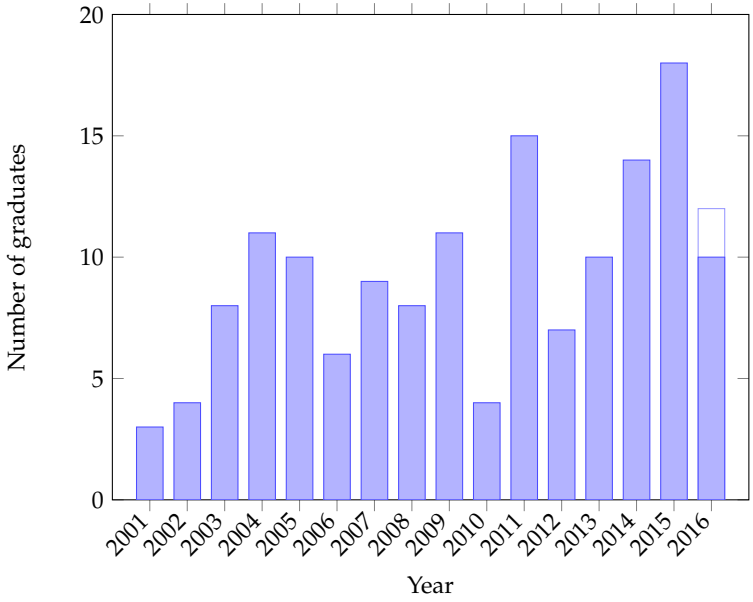

Figure 1: Statistics of graduates of the doctoral program. More details are available at `http://www.fi.muni.cz/studies/doctoral/alumni.xhtml.en` Data for 2016 include an estimated number of graduates (in the white rectangle).

Interesting facts about graduates and examples of their application in practice

doc. RNDr. Jiří Barnat, Ph.D. associate professor, vice-dean for curricula at FI MU.

Mgr. Robert Batůšek, Ph.D. Senior Java developer & agile coach in Y Soft.

doc. RNDr. Tomáš Brázdil, Ph.D. associate processor at FI MU, awarded the E. W. Beth Dissertation Prize in 2008.

RNDr. Mgr. Sylvie Luisa Brázdilová, Ph.D. Research & Development Scientist at Honeywell International s. r. o.

RNDr. Václav Brožek, Ph.D. awarded a Newton Fellowship, currently employed as a Software Engineer at Google.

RNDr. Vojtěch Forejt, Ph.D. awarded a Newton Fellowship, currently a Royal Society Research Fellow at the Department of Computer Science, University of Oxford.

doc. RNDr. Eva Hladká, Ph.D. associate professor at FI MU.

doc. RNDr. Petr Holub, Ph.D. head of the communication infrastructure division of ÚVT MU, awarded the Best Open-Source Software Award by ACM Multimedia SIG, co-founder of Comprimato Systems.

prof. RNDr. Michal Kozubek, Ph.D. professor at FI MU.

Mgr. Aleš Křenek, Ph.D. head of the computation and storage infrastructure division of UVT MU.

Mgr. Petr Kuba, Ph.D. Chief Technology Officer at OptimSys.

prof. RNDr. Antonín Kučera, Ph.D. professor at FI MU.

doc. RNDr. Pavel Matula, Ph.D. associate professor, vice-dean for bachelor and master studies at FI MU.

doc. RNDr. Petr Matula, Ph.D. associate professor at FI MU.

prof. RNDr. Václav Matyáš, M.Sc., Ph.D. professor, vice-dean for foreign and external relations at FI MU.

Mgr. Pavel Moravec, Ph.D. Senior Software Maintenance Engineer at RedHat.

Mgr. Miloslav Nepil, Ph.D. CRM Analysts Team Leader at Home Credit International.

Mgr. Jan Pazdziora, Ph.D. Principal Software Engineer at RedHat.

doc. Mgr. Radek Pelánek, Ph.D. associate professor at FI MU.

doc. RNDr. Tomáš Pitner, Ph.D. associate professor at FI MU.

doc. Mgr. Hana Rudová, Ph.D. associate professor at FI MU.

Mgr. Radek Sedláček, Ph.D. Head of Business Line Multimedia Solutions (CMT CZ) at Siemens.

doc. RNDr. Petr Sojka, Ph.D. associate professor, vice-dean for quality, public relations and lifelong learning at FI MU.

Mgr. Marek Veber, Ph.D. Solution Architect at Ryant, s. r. o.