PhD Candidacy Exam Overview

[link: phd.epfl.ch/edic/requirements]

EDIC
Doctoral Program in Computer & Communication Sciences
Candidacy Exam: the Big Picture

3 background papers

student write-up (4-8 pages)

Exam contents: this + fundamental background

90 min oral exam

30 min talk + Q&A

3 (or 4) - member Committee

Advisor (+ co-advisor if applicable) + two faculty in related areas
Candidacy Exam: the Philosophy

• **After one year of PhD you can**
  – read, understand and explain technical papers
  – present them briefly and explain how they influence your work
  – Answer questions about the papers, your write-up and BS/MS basic background material in the area

• **Exam focused on**
  – Presentation, submitted material + basic background
  – Both depth and breadth

• **What this exam is not**
  – A comprehensive exam for all work in an area
  – Anything the faculty feel “you ought to know”
3 Background Papers

• 3 papers providing background for your work
  – Defining the context, general problem, alternative solutions and plans for extension

• Paper selection guidelines
  – You select with advisor’s input
  – Conference/journal papers, thesis chapters, tech. reports
  – No paper with examinee as co-author
  – Two papers max. with authors from EPFL
  – One paper max. with a committee member as an author
  – Total length of 3 papers not to exceed 60 pages
Student’s Write-up

phd.epfl.ch/edic/requirements

• Explain background (3 papers) + your work for committee
  – 4 to 8 pages
  – to evaluate your writing skills
  – to see how your work is related to the background

• Format
  – IEEE conference standard, two-column format to
    – describe the area
    – relate solutions in papers to your work
    – present your own work
  – Must be delivered with a cover page “research plan” to be uploaded from ISA

  – Serves as EDOC research proposal requirement
Write-up: Suggested Format

First page

Abstract + introduction – Describe briefly the context, the problem, shortcomings in prior approaches, and your proposed approach and solution. Forecast results.

In-between pages

Background – Describe the three papers in more detail, the problem they tackle, the solutions and results, and their shortcomings, and how they relate to your work.

Last one or two pages

Your own work + summary and references – write how you propose to advance the state of the art given the background, what is new technically, how it improves over prior work, and present evaluation. Summarize and list references.

Define your own notation and use it throughout!
Committee & Date/Time

• Your advisor(s) + 2 faculty in the or a related area
  – Faculty to read your papers and write-up
  – Listen to your presentation, ask questions
  – Evaluate your write-up, presentation, and answers

• Your advisor with your input must set date & time
  – Make sure committee members are available and commit
Committee Selection Process

3 (or 4 with a co-advisor):

- Your advisor (thesis director), and co-advisor if applicable
- Two members, selected by you and your advisor:
  1. The exam president - must be selected among the EDIC thesis directors
     See [http://phd.epfl.ch/edic/jurypresidents](http://phd.epfl.ch/edic/jurypresidents)
  2. The co-examiner - must be professors or MER (senior scientists) at EPFL

Both must be chosen outside your lab.
Candidacy Exam Proposal Form

[link]

- Upload the “Candidacy exam proposal form” from IS-A
- Examinee announces exam to EDIC
  - two months prior to exam day
  - after having selected
    - committee
    - date/time/room
    - three papers
    - write-up title
- Has to be signed by examinee and advisor(s)
- Submit to cecilia.chapuis@epfl.ch
Candidacy Exam: the Exam Day

90-min oral exam

– First 30 minutes: public
  • Give a presentation
  • Committee may ask clarification questions
  • Public can ask questions
– Followed by up to 60 minutes: private
  • Questions from the committee
  • About the write-up, 3 papers, basic background
  • This part of the exam is private
– Result announced same day

Scheduled for 2 hours

– Exam allowed to stretch a bit
– Discussion among the committee after the exam
Exam Evaluation Criteria

- Writing skills
- Oral skills
- Breadth of knowledge
- Depth of knowledge
- Ability to interpret results
- Critical thinking & problem-solving skills
Scheduling the Exam

Schedule exam

Last day to submit proposal form: June 30

7 weeks minimum after submitted form

Earliest date to schedule If you haven’t passed depth in the Fall
July 17

Send write-up to committee

Exam

Last day to hold exam: Aug 31

Start scheduling exam

Submit exam proposal form declaring committee members, exam date/time & write-up title; send copies of 3 papers to committee

NOTE: We strongly recommend that you schedule your exam before July to avoid work permit issues
Scheduling the Exam (Cont.)

• **Submit proposal form any time**
  – from beginning of spring semester
  – by June 30
  – i.e., last day to take the exam: **August 31**

• **Schedule as early as possible**
  – get faculty to commit to time/day
  – waiting causes scheduling conflicts
  – if failing the exam, must pass retake within three months!
Scheduling the Exam (Cont.)

Haven’t passed a depth course yet?

• Must pass one in spring (last chance)
  – Need a grade of 5
  – No retake

• Must choose an exam date after grades are available (2017: July 17)
Candidacy Exam Retake

• May change most info on proposal form
  – 2\textsuperscript{nd} (or 3\textsuperscript{rd} if there is a co-advisor) committee member, papers, write-up

• Must retake and pass by November 30
  – Student contract extended up to November 30

• Advisor financially responsible after August 31
  – Signing the proposal form indicates commitment to support student up to end of retake
Reminder on Course Requirements

You will graduate with both depth & breadth

• Depth: Want you to be expert in your area
• Breadth: Want you to know a bit outside area

Depth:
• 1st year, focus on research, depth course, semester projects, candidacy exam
• after 1st year, research + breadth
Course Areas: Depth & Breadth

Candidacy Areas: AI, Systems, Theory

1. Depth (1st year)
   - Choose a depth area (one of above 3)
   - Pass a depth course with a 5
   - Pass the candidacy exam

2. Breadth
   - The other 2 areas are breadth areas
   - Pass 4 credits from each of the breadth areas
Course Requirements: Credits

Need a total of 30 credits to graduate
• Semester projects (1st year) = 12 credits
• Depth course = all are 6-7 credits
• Breadth courses = 8 or more credits
• 4 other credits (flexible)
Course Requirements: Credits
Students with an EPFL MS

- Most likely depth grade of 5 passed
- 1st year credit requirements:
  - 12 credits of projects
  - At least 4 credits of courses in first year
Depth Courses

AI
- COM-514: Mathematical foundations of signal processing
- CS-430: Intelligent agents
- CS-433: Pattern classification & machine learning

Systems
- COM-503: Performance evaluation (spring)
- CS-422: Database systems (spring)
- CS-471: Advanced multiprocessor architecture (not in 2016-2017)
- CS-472: Design technologies for integrated systems
- CS-522: Principles of computer systems

Theory
- COM-401: Cryptography & security
- COM-404: Information theory & coding
- COM-417: Advanced probability and applications (spring)
- CS-450: Advanced algorithms (spring)
- CS-550: Synthesis, analysis & verification (spring)
<table>
<thead>
<tr>
<th>AI</th>
<th>Systems</th>
<th>Theory</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIO-465 Biological modeling of neural network</td>
<td>COM-407 TCP/IP networking</td>
<td>COM-401 Cryptography &amp; security</td>
</tr>
<tr>
<td>COM-415 Audio signal processing and virtual acoustics</td>
<td>COM-413 Real-time networks</td>
<td>COM-404 Information theory &amp; coding</td>
</tr>
<tr>
<td>COM-514 Mathematical foundations of signal processing</td>
<td>COM-414 Satellite communications systems and networks</td>
<td>COM-405 Mobile networks</td>
</tr>
<tr>
<td>COM-502 Dynamical system theory for engineers</td>
<td>COM-503 Performance evaluation</td>
<td>COM-417 Advanced probability &amp; applications</td>
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List online at phd.epfl.ch/edic
FAQ: Course Requirements

• Do I need to complete any courses for credits before I take the exam?
  – No
  – As part of PhD qualification though, you must take one of the courses indicated at [phd.epfl.ch/edic/requirements](http://phd.epfl.ch/edic/requirements) by end of first PhD year
  – Exam scheduling is orthogonal to when you take this course
FAQ: How many times?

• How many chances do I get to pass the exam?
  – Two
  – If you fail twice, you have to leave the PhD program

• If I fail once, what happens?
  – You must schedule another exam within 3 months
FAQ: Background Papers

• What should I pick for background papers?
  – Consult with your advisor
  – Pick papers that provide a good foundation for your write-up and talk
  – Pick one “basic” paper that is tutorial or survey of the main ideas in the area, and two papers that are closer to the specific work
  – Pick at least one recent paper
FAQ: Area, Research

• Does exam have to be in my PhD research area?
  – Yes
  – Your write-up and presentation point to what area and problems you are likely planning to pursue
  – Your actual PhD plan may change over time
  – The exam is on topics where you can demonstrate depth and breadth within the scope of the background papers and write-up
FAQ: Preparation

• Can my advisor(s) help me with my slides and/or the write-up?
  – No
  – Your advisor(s) helps you with the selection of the committee members and the paper choice
  – Your advisor(s) does not correct your slides or write-up before the exam and does not participate in dry runs with you

• Can my EDIC Contact be part of the committee?
  – No
Last but not least: remember you must take your vacation

Five weeks legal holiday per year

Take your vacation days before you are transferred to a lab and enter them in the online tool

http://absences.epfl.ch
Thank you for your attention