

# Advanced Master in Computing: for discussion

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## 1 Background and aims

Next year, we will not make offers any more for the MEngSc. This degree has never given us satisfaction, in particular because it is too close to the MIT, and the differences have even been further reduced with the last Faculty revision to the MEngSc. A common query has been "what is the difference between the MIT and the MEngSc?" and it has always been difficult not to provide a slightly embarrassed answer. The similarity between both degrees has not helped us market them well. Also, the MEngSc is not very popular; about 90% of our coursework Master students are in the MIT.

We believe that there would be some interest for an advanced Master degree. At the beginning, we might only compensate for the very few students who would have enrolled in the MEngSc and would not opt for the MIT, but we can also hope and attract high quality students, and make the degree more and more successful over the years. We also believe that the image of the School would benefit from offering an advanced Master degree.

Designing a genuinely advanced Master, a degree that is significantly different to the MIT, necessitates to create specialised courses. Many Schools in Europe and the US propose very specialised courses. Just for an example, here are some of the courses on offer at the EPFL (Lausanne, Switzerland):

- Applications for convex optimization and linear program
- Random walks
- Statistical analysis of genetic data
- Unsupervised and reinforcement learning in neural networks
- Color reproduction
- Digital 3D Geometry Processing
- Computational motor control

Even our most advanced courses go significantly for breadth and not into so much depth.

## 2 What we would need to do

We would need to teach a bit more, preferably and most easily in our area of research. Here is a suggestion that would require minimal work from us:

Four academics team up to offer 1 course once a year, increasing our teaching load by 0.25 course a year. Each of the four academics who make up a team could select one topic covered in at most one week in one of our courses (may be a course that he or she teaches himself or herself) and expand it to three weeks' material.

That would allow us to offer about 10 specialised courses every year.

Of course we could push things a bit further: team up in groups of three and cover a topic in four weeks... Cover half a session of material on our research...

Such courses would also be very valuable for our research students.

## 3 Outline of the degree

### 3.1 Name:

Masters in Advanced Computing

### 3.2 Duration:

One year

### 3.3 Entry criteria:

A bachelor degree honours 1 in science or engineering, or equivalent

### 3.4 Structure:

- Four courses from the list of *Specialised advanced courses*, to be created...
- Four courses from the list of *Advanced disciplinary knowledge courses with exposure to research* (this list is from the last revision to the MIT), two, three or four of which could be replaced by a research project in the second semester.

COMP4121 Advanced & Parallel Algorithms

COMP4161 Advanced Topics in Software Verification

COMP4411 Experimental Robotics

COMP4418 Knowledge Representation and Reasoning

COMP6714 Information Retrieval and Web Search

COMP9153 Algorithmic Verification  
COMP9181 Language-based Software Safety  
COMP9242 Advanced Operating Systems  
COMP9243 Distributed Systems  
COMP9315 Database Systems Implementation  
COMP9318 Data Warehousing & Data Mining  
COMP9319 Web Data Compression and Search  
COMP9323 e-Enterprise Project  
COMP9333 Advanced Computer Networks  
COMP9334 Capacity Planning of Computer Systems and Networks  
COMP9335 Wireless Mesh & Sensor Networks  
COMP9336 Mobile Data Networking  
COMP9417 Machine Learning & Data Mining  
COMP9431 Robotic Software Architecture  
COMP9441 Security Engineering  
COMP9444 Neural Networks  
COMP9517 Computer Vision