Master in Mathematics and applications

Cybersecurity

Presentation

The global economic impact of losses due to cybercrime amounts to hundreds of billions of euros per year ($445 billion according to the McAfee/CSIS study of 2014) with a strong increase in attacks, especially for identity theft and digital data theft, as well as malicious attacks.

Protection against these vulnerabilities includes:

• Robustness to cyber attacks of sensitive infrastructure (e.g. stuxnet),
• Robustness of security components against software vulnerabilities and data leaks (e.g. heartbleed),
• Protection of privacy and security of cloud infrastructure,
• Robust design and evaluation of safety components,
• Fault detection in protocols or software and hardware components.

The topics covered in the training cover the complementary areas of Cybersecurity, including cryptology, forensics, and privacy, in particular for embedded systems and distributed architecture.

Objectives

The objective of this programme is to train cybersecurity experts (including data privacy aspects) with a Bac+5 degree, able to evolve immediately in an industrial environment and who can also pursue a thesis.

Registration and scholarships

The first year Master's is accessible to candidates according to their transcripts (and/or interview):
- proof of a national degree conferring the degree of Bachelor in a field compatible with that of the Master's degree- or by validation of studies or acquired experience according to the conditions determined by the university or the training.

The second year Master's is accessible to candidates according to their transcripts (and/or interview):
- having validated the first year of a compatible course (the course is accessible from the two common trunks "General Mathematics" and "Applied Mathematics" provided that the students have taken the appropriate optional courses).
- or by validation of studies or acquired experience according to the conditions determined by the university or the training.

Public continuing education:
You are in charge of continuing education:

• if you resume your studies after 2 years of interruption of studies,
• or if you followed a formation under the regime formation continues one of the 2 preceding years
• or if you are an employee, job seeker, self-employed.

If you do not have the diploma required to integrate the training, you can undertake a validation of personal and professional achievements (VAPP).

Would you like to apply and register?
Please note that the procedure differs depending on the degree, the diploma obtained, or the place of residence for foreign students.

- **You are a non-EU citizen, resident in (you live in one of these countries):**
  
  Algeria, Argentina, Benin, Brazil, Burkina Faso, Cameroon, Chile, China, Colombia, Comoros, Congo, Egypt, Indonesia, Ivory Coast, Lebanon, Madagascar, Mali, Mauritania, Mauritius, Mexico, Morocco, Peru, Russia, Senegal, South Korea, Syria, Taiwan, Togo, Tunisia, Turkey, Vietnam.

  [Apply for studies in France](#)
  and
  [on FSA](#)

- **For other applicants**

  [Apply Now](#)

**Further studies**

Depending on the nature of their practicum, students may wish to pursue research in a doctoral thesis.

**Practicals informations :**

- **School:** Grenoble INP, UFR IM2AG (informatique, mathématiques et mathématiques appliquées)
- **Duration:** 2 years
- **Course type:** Initial and Continuing Education
- **Location(s):** Grenoble - University campus
- **Contacts:**
  
  Programme director
  
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**Program**

<table>
<thead>
<tr>
<th>Master Industrial and Applied Math 1st year Semester 7</th>
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<tbody>
<tr>
<td>UE Algorithms and software tools</td>
<td>3 ECTS</td>
</tr>
<tr>
<td>UE Applied probability</td>
<td>3 ECTS</td>
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<tr>
<td>UE Statistics</td>
<td>3 ECTS</td>
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<tr>
<td>UE Partial differential equations and numerical methods</td>
<td>6 ECTS</td>
</tr>
<tr>
<td>UE Partial differential equations and numerical methods complementary</td>
<td>3 ECTS</td>
</tr>
<tr>
<td>UE Signal and image processing</td>
<td>6 ECTS</td>
</tr>
<tr>
<td>UE Geometric modelling</td>
<td>6 ECTS</td>
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1 option (s) to choose from 2

**UE French as a foreign language**
### Semester 8

**UE Computing for HPC**
- 6 ECTS
- 54h

**UE Numerical optimization**
- 6 ECTS
- 54h

**UE Project**
- 3 ECTS

**UE Internship**
- 3 ECTS

### Semester 10

**UE Research practicum (in company or laboratory)**
- 30 ECTS

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### Master General Mathematics 1st year

#### Semester 7

**UE Algebra 1**
- 9 ECTS
- 71,5h

**UE Holomorphic functions**
- 6 ECTS
- 48,9h

**UE Ordinary differential equations and partial differential equations**

**UE Scientific English**
- 3 ECTS
- 24h

**UE Statistics**
- 3 ECTS
- 33h

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#### Semester 8

**UE Study and research work**
- 3 ECTS
- 25h

**UE Algebra 2**
- 6 ECTS
- 48,5h

**UE Differential and dynamic geometry**
- 6 ECTS
- 48,5h

**UE Functional Analysis**
- 6 ECTS
- 48,5h

**UE Stochastic processes**
- 6 ECTS
- 48,5h

**UE Introduction to cryptology**
- 3 ECTS
- 33h

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### Master 2nd year

#### Semester 9

**UE Security and computer security**
- 3 ECTS
- 39h

**UE Security architecture : network, system, key management, cybersecurity of industrial IT**
- 6 ECTS
- 78h

**UE Cryptographic engineering, protocols and security models, data privacy, coding and applications**
- 6 ECTS
- 78h

**UE Threat and risk analysis, IT security audit and norms**
- 3 ECTS
- 39h

**UE Physical Security : Embedded, Smart Card, Quantum & Biometrics**
- 6 ECTS
- 78h

1 option (s) to choose from 2