

MASTER of science

in "SECURITY of COMPUTER SYSTEMS"



Nancy

VILLE PRÉFÉRÉE
DES ÉTUDIANTS*

RESEARCH in COMPUTER virology

COMPUTER SECURITY SCIENCES

TOOLS AND TECHNOLOGIES in SECURITY

SECURITY of hybrid systems

Adjoint Training offered by Mines Nancy, TELECOM Nancy and ENSEM
Degree accredited by the French Ministry of Higher Education and Research

**TELECOM
nancy**
Ingenieurs du numérique • Inspiring your digital future


MINESnancy
ARTEM


ensem

MASTER OF SCIENCE

in “Security of computer systems”

FOREWORD

There is no doubt anymore, computer systems are pervasive. Securing them is no longer a choice, it is compulsory. Our three ‘Grandes Ecoles’ have shared their talents to provide you the most valuable program in computer security.

In French Higher Education, the ‘Grandes Ecoles’ are renowned for the top quality of their technical education. Students are offered the opportunity to pursue their studies at university, or directly to get hired within the industrial field.

This master’s program relies on a strong relationship with the LORIA, a top-level research laboratory in computer science. The LORIA hosts the ‘High Security Lab’, one of the very rare academic places to do research in computer virology and network security.

Nancy is a city with a strong university tradition. The University of Lorraine was founded in 1572 by the Dukes of Lorraine. It gained year after year a long-standing renown in Science, Law, Humanities and Medecine. Its current student population is 55,000, the majority being in Nancy. This is almost one student for seven inhabitants. Some 6,000 international students study on various campus in Nancy.

François ROUSSEAU, Director General
of Mines Nancy

Olivier FESTOR, Director of Telecom Nancy

Mostafa FOURAR, Director of Ecole Nationale
Supérieure d’Electricité et Mécanique



CONTEXT

Computer systems have in the last decades become the core of our companies, of our institutions and of our every-day life. All of them depend on the security of their information system infrastructure. Computer attacks have undergone a fundamental shift: they were hacker’s game and serve now to steal money, to collect strategic information and are used for blackmail and even for sabotage. Malware writers now provide sophisticated scenario sustained by high-level technologies.

PROGRAM AIM

In a standard master program, students learn to use properly a computer system. But this is inoperant in computer security. Indeed, Black hats have changed the rules: they try that which should not be done, usually using some low level system layers.

Our motto is that security in computer science involves both high expertise and skills in low level technology layers and a capacity to deal with high level theoretical models and abstraction.

CAREERS

This diploma offers a large spectrum of opportunities. Firstly, companies (from banks to the aerospace sector) as well as government institutions increasingly need to ensure the robustness of their information infrastructure. The young graduate will typically work as a software engineer or as a network security manager. Every graduate will be offered on average 10 job offers ! After a while, he will become a project manager or a systems architect.

Secondly, security has become an active topics in Higher Education. PhD positions worth being considered.

who’s concerned

Any student wishing to learn about security in computer science is welcome. We do not expect students to be hackers, but a taste for computer technicalities is suitable.

To ensure their success, we require students to have a high level in computer science and mathematics. Applicants must be fluent in at least one programming language among C, C++, Java, etc.

PROGRAM

1ST YEAR – M1

TOOLS AND TECHNOLOGIES IN SECURITY



The first semester is mostly dedicated to the main technical tools that one will meet in computer security. In particular, emphasis is placed on the behavior of machines at the Operating System level.

unit	COURSE TITLE	CLASS HOURS	ECTS
Scientific courses		210 hrs	25
TU-1	Networks	42hrs	5
TU-2	Operating systems	42hrs	5
TU-3	C programming language	42hrs	5
TU-4	Mathematics for computer science	42hrs	5
TU-5	Compilation	42hrs	5
Humanities: one optional course within:		42hrs	5
FU-1	French for foreign students		
OU-1	Another language or French civilization		



The second semester is mostly dedicated to the main concepts in computer security at the abstract level. Another course covers the industry's point of view on security. These lectures involve people from the industrial world.

unit	COURSE TITLE	CLASS HOURS	ECTS
Scientific courses		210 hrs	25
TU-6	Logics in computer science	42hrs	5
TU-7	Ambiant and embedded systems	42hrs	5
TU-8	Computability and complexity	42hrs	5
TU-9	Code verification	42hrs	5
TU-10	Technical project	42hrs	5
Humanities: one optional course within:		42hrs	5
FU-2	French for foreign students		
OU-2	Another language or French civilization		

2ND YEAR – M2

COMPUTER SECURITY SCIENCES



The third semester addresses hot topics in computer security. These lectures will introduce students to the deepest scientific topics in the area: we present computer virology, cryptography, protocol analysis, network monitoring, and industrial processes verification.

unit	COURSE TITLE	CLASS HOURS	ECTS
Scientific courses		210 hrs	25
TU-11	Information flows security	42hrs	5
TU-12	Security of computer infrastructures in industry	42hrs	5
TU-13	Computer virology	42hrs	5
TU-14	Network security	42hrs	5
TU-15	Security of hybrid systems	42hrs	5
Humanities: one optional course within:		42hrs	5
FU-3	French for foreign students		
OU-3	Another language or French civilization		



The second semester is entirely spent doing an internship, writing the internship report and defending the report at the end of the semester. The 6-month internship takes place in a company or in a research laboratory.



PRACTICAL informations

On the Diploma

The Master's degree of Science (MSc) has been recognized by the French National Ministry of Higher Education and Research. It is a two years program corresponding to 120 ECTS.

General entry requirements

To be eligible, an applicant must either be holder of a Bachelor's (or the equivalent of) degree in Computer Science, Computer Engineering, Electrical Engineering or Applied Mathematics.

English Language Proficiency is compulsory. Students are required to have a minimum B2 level (Common European Framework of Reference for Languages) in English communication prior to starting the course.

How to apply

Please, visit:
www.mines-nancy.univ-lorraine.fr
section "MS - Masters internationaux"

You have to fill in the application form and send it by e-mail to: mines-nancy-dfsc@univ-lorraine.fr or by mail (for the attention of the DFSC department).

Language

All the scientific courses are given in English. Students may also follow some optional courses in French.

Tuition fees

- M1 (First year): 8,000 €
- M2 (Second year): 6,000 €
- M1+M2 : 14,000 € for two years



ARTEM

Arrival at Mines Nancy

On arrival in Nancy, the international students will be welcomed at Mines Nancy and the DFSC department will help them regarding the administrative issues (visa proceedings, payment of tuition fees, French health-care cover, insurance...) and the schedule of their courses.

The DFSC's team will also advise them on the best way to find suitable accommodation (student hall of residence or private rented accommodation).

Nancy, a place to live in

The city's outstanding cultural feature is the world-famous Place Stanislas, listed as part of UNESCO's World Heritage. The visitor may also enjoy the medieval treasures of the Old Town and delight in the "École de Nancy" (Art Nouveau) architectural work. Nancy also boasts its own opera, philharmonic orchestra, theatre and ballet company plus museums or international festivals.



CONTACT

Audrey BURTARD
Assistant - Office of Lifelong Learning & Postgraduate Education
International Master's degree Programs

Mines Nancy - Campus Artem
92, rue du Sergent Blandan
54 042 Nancy cedex - France

t. +33 (0)3 55 66 26 81
f. +33 (0)3 83 96 02 46
mines-nancy-dfsc@univ-lorraine.fr
www.mines-nancy.univ-lorraine.fr

MINES nancy

Mines Nancy trains engineers who will be able to become innovative leaders. Thanks to their intellectual and scientific competences, their creativity, their responsibility and ethical standards, they will, not only, be prone to understand the requirements of various professional contexts, but also be ready to manage businesses and organizations.

TELECOM nancy

TELECOM Nancy is a public institution created in 1990. The school trains high profile engineers able to inspire, design and master the digital future through a strong 3 year graduate programme in IT, digital sciences and technologies.

ENSEM

ENSEM is the graduate school in Nancy in the mechanical and electrical field. ENSEM is a component of the "Université de Lorraine".

INSTITUT MINES-TÉLÉCOM

Created in March 2012, the "Institut Mines-Telecom" is one of the leading Higher Education and Research strengths in engineering in France with 12,000 students and 1,700 PhD students. Mines Nancy is a strategic partner of the Institute and the National School of Geology is one of the associated schools involved in this public institution.

UNIVERSITÉ DE LORRAINE

All three Schools are components of the "Université de Lorraine," a university which boasts 52,000 students, 3,700 lecturers and professors and 82 research laboratories. The "University of Lorraine" is one of the top 300 institutions in the Shanghai ranking.