

EMNantes



GSI
**Information Systems
Engineering**



ECOLE DES MINES DE NANTES

The GSI option



Launched at the time of the explosion of the Web in 1998, the GSI option trains engineers who build computing and communicating systems. To stay robust and agile, information systems, which are now an essential component of business strategy, must evolve and adapt, and to stay competitive, new products must embed high added value computing components. GSI engineers have expert skills in concepts and technologies to meet these two challenges, offering global solutions that are safe, reliable, robust, innovative, easy to integrate and upgradeable.

> Career Opportunities

The GSI option does not target any one field in particular, but instead provides the fundamentals to build a solution in any sector as needed. GSI engineers have skills that are in high demand in all types of industrial and financial business. Consulting firms are the leading recruiters of GSI graduates, but there are other types of employers as well: Software developers and publishers, R&D labs, both in major corporations and innovative SMEs.

- **Large corporations** (Air France, Dassault, EADS, PSA, TFI, Thalès, Total)
- **Finance and Banking industry** (BNP Paribas, GAN, Société Générale),
- **Consulting firms** (Accenture, Improve, SII, Sodifrance, SQLI, Teamlog, T-Systems, Unilog)
- **Software Publishers** (ILOG, IST, Microsoft, PolySpace, VirtualLogix, **WindRiver**)
- **Research labs** (INRIA, France Telecom R&D, IBM, Nokia Research).

> Jobs for Tomorrow and the Future

GSI engineers generally start out as design and development engineers. They then move quickly into architecture positions (applications integrator, then technical architect) to design and implement technical infrastructures for information system integration in a distributed and mobile context.

If they are interested in communication, they may become IT project leaders or managers.

GSI engineers interested in innovation may join companies with high growth potential to develop expertise in cutting edge, innovative technologies.

Target jobs:

- Applications integrator, Technical architect
- IT Manager
- Technical expert



Hervé Grall
Program Head

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“Information technology is a field that is constantly undergoing innovation, so it is important to regularly update our program. Two years ago, we added a module on embedded information systems. Mobile systems are a highly promising area, with diverse applications such as vehicle fleet management by GPS and inventory management using disposable microchips.”



> The Program

The 2-year program consists of an academic portion lasting three semesters, including an internship abroad, followed by an industrial project in a company during the final semestre. Generally speaking, the program focuses on developing IT projects, with an emphasis on situation scenarios. More than half of the instruction is in the form of hands-on work or mini-projects, and 60% of the teachers come from outside the School (two-thirds are business professionals and one-third are researchers from INRIA).

The scientific and technical curriculum is composed of three main areas.

Software engineering to facilitate the production and reuse of software components:

- Software development (from model-driven development to aspect-oriented programming), software quality (from testing to agile development methods), etc.

Integration infrastructures to guarantee interoperability between distributed software components:

- Distributed systems, middleware, service-oriented architecture, Web 2.0, object-relational mapping, etc.

Mobile information systems to provide knowledge on the convergence of the physical and digital worlds:

- Mobility, embedded systems, ad hoc networks, pervasive computing systems, etc.

Finally, **the option project** is an opportunity to consolidate the knowledge: At the request of a business, the students work as a team to develop a software solution, from the needs analysis phase through to delivery of the product.

SOFTWARE ENGINEERING

Using development methods, standards and tools

Developing programs based on abstract models

Large scale programming

Using advanced programming techniques

INTEGRATION INFRASTRUCTURES

Assembling diverse components on an integration platform

Designing the technical architecture of a complex application

MOBILE INFORMATION SYSTEMS

Developing mobile solutions based on embedded systems and wireless networks

Guaranteeing quality of service

PROJECT

Understanding customer requirements

Understanding the strategic and organizational impact of IT in business

Implementing a quality assurance system

Managing a project

Technology watch

> Beyond Borders

Information technology knows no borders. Exchanges with international partners are encouraged starting in the third year. Double degree programs are already in place with Georgia Tech in Atlanta, Ecole Polytechnique de Montréal, and Shanghai Jiao Tong University.



> Double degrees



“The best recruits”

Jean-François Crépeau,
director of innovation at T-Systems France

“We have been taking at least one intern per year from the Ecole des Mines de Nantes for the past 10 years or so. I like to work with them because they are well trained. They have an excellent grounding in computer science, and more importantly, in algorithmics, which is essential, plus expertise in new technologies. They are all operational, at least in terms of skills. Some of the more mature ones are totally operational, because they already know how to manage projects independently. Others still need one or two years of experience, but never more. In any case, for us they are really the best recruits, with the greatest potential. They also represent the highest proportion of recent graduates who move into systems architecture.

And that’s not all: In our business you need to be skilled technically, but also good at communicating. Customer relations are very important. When a business has to make a major decision, there’s no point in developing the best architecture if you don’t know how to sell it. Your good idea would just go to waste, because no one would be interested. The students from the Ecole des Mines de Nantes are also good at communicating. I think that’s because of the way the program is organized, with a lot of presentations after projects or internships are completed. They already know how to present what they have done convincingly.”

> Research

Research promotes the development of new computing systems. Today, it has become an essential factor for innovation. While completing the GSI option, students can acquire valuable experience in research. 10 to 15% of the students choose to do a research master during their final year leading to a Doctorate in Information Systems after another 3 years of study. Their research training is done with the Obasco research group (www.emn.fr/x-info/obasco) that focuses on programming and software engineering. Research experience is an asset when it comes to joining innovative start-ups such as spin-offs from the INRIA or major IT companies (IBM, Microsoft), as well as for participating in high added-value Open Source projects.



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