EMNantes

# QSF

## Quality and Reliability Engineering

ECOLE DES MINES DE NANTES

# The QSF option

The quality of a product or service is measured by its ability to satisfy a stated need. To achieve quality, businesses have to make sure that the solutions provided are appropriate and that the entire organization is working to improve quality. While quality used to simply consist of a final verification that a product met specifications, it is now a cross-functional issue involving all partners through to the end user. Since 1995, the QSF option has been training engineers capable of assisting businesses and consulting firms implement and improve quality systems, This includes designing management systems in an integrated context involving all types of risks (occupational, industrial, economic and environmental), setting up tools and methods for defining and designing products and quality assurance, and ensuring customer satisfaction.

## Career Opportunities

This program is more methods-than technology-oriented, and seeks to respond both to the traditional concerns of industrial firms and the new aspirations of consulting firms. QSF engineers do not focus on one specific area of activity. Their skills are appreciated in a wide range of industries:

- **Automotive** (PSA, Renault, Valéo…)
- **Aviation** (Airbus, Safran Group…)
- **Banking and Insurance** (BNP Paribas, MAAF Assurances…)
- **Transportation** (SNCF, GEFCO…)
- **Telecommunications** (France Telecom…)
- **Food Processing** (Danone Group…)

... and of course in consulting and service firms.

QSF engineers will be in charge of:

- Organizing and managing the quality of products or production processes (management systems, standards, costs, customer satisfaction, etc.)
- Quality control using statistical tools
- Quality optimization, during the design or improvement phases
- Assessing and improving the reliability of products or production processes
- Defining and implementing a maintenance policy
- Ensuring the safety of products or production processes.

## Jobs for Tomorrow and the Future

Though most young QSF engineers start out as Product or Systems Quality engineers in SME's or major corporations, a number get jobs as consultants in Operational Safety (engineering experts who often work with R&D departments) or in Supply Chain Optimization.

QSF engineers are generally quickly promoted to senior positions such as:

- Environmental safety and quality manager
- Quality Manager for products, suppliers, etc.
- Engineering and quality tools expert working directly with project teams
- Consultant
- Internal or external auditor in charge of measuring discrepancies between practices and guidelines, and accrediting the quality management system.

## The Program

International focus, enterprise and academic innovation are the three watchwords of the engineering curriculum at the Ecole des Mines de Nantes. During the program, students will engage in situation scenarios, either individually in a company, or in groups during industrial field study exercises. The teaching faculty are supported by professionals from the corporate world who provide insight into actual requirements in industry.

### A Project with Virginia Tech

Specific to the QSF program is an option project during which the French students work with students from Virginia Tech to solve an industrial problem submitted either by a French or US industrial firm. Their assignment is to provide an operational solution to an innovation problem for the firm in question.

Essentially taking place during the last year of the engineering cycle, the QSF option builds on the instruction of the previous cycles with theoretical and technical aspects centered on Industrial Engineering as well as courses in Social and Management Sciences.

| ORGANIZING QUALITY |
|---|
| Quality Management |
| Risk Management |
| Environmental Management |
| Quality of Services |
| Logistics |
| Production Management |
| Economic Strategy |
| **DESIGNING SAFE SYSTEMS** |
| Industrial system modeling |
| Operational Safety |
| Problem solving methods |
| Integrated Logistics Support |
| System Engineering |
| Robust Engineering |
| Project Management |
| **INSPECTION AND MAINTENANCE** |
| System Analysis Methods |
| Audit |
| Statistical Process Control |
| Maintenance optimization |

Bruno Castanier,
Program Head.

E-mail: bruno.castanier@emn.fr

"The option offers an integrated and multidisciplinary vision of enterprise management systems that takes into account socio-organizational and decisional factors. The program integrates human factors and has recently incorporated notions of environmental management and occupational hazard management. Hence the quality-safety-environment trio is complete."

# Beyond Borders

There are numerous opportunities for the students to develop their skills internationally. They can complete an entire year of study in a foreign university with credit transfer, perform a 3-month internship in a foreign research lab or company, and carry out an option project in collaboration with American students.
In terms of double degrees, QSF is a special partner of the Virginia Polytechnic Institute and also offers the opportunity to study at other prestigious universities, including Shanghai Jiaotong University (China), Universidad de Los Andes (Columbia), Ecole Polytechnique de Montréal (Canada), and Tec de Monterrey (Mexico). Finally, the international dimension is emphasized by the presence of students from other cultures (China, USA, Columbia) completing the entire program in France.


➤ Double degrees

# Research

The QSF academic program is based on research topics developed by the "Production and Logistics Systems" research groups ( http://www.irccyn.ec-nantes.fr/slp) at the Research Institute in Communications and Cybernetics of Nantes, (UMR CNRS 6597), whose automation and industrial engineering department is actively involved.
QSF engineers can get an introduction to research by writing Masters theses supervised jointly with our foreign partner institutions.

## "A genuine junior consultant assignment"

### Michel Baujard, aviation division of Thales

"Sébastien Roche? We're still talking about him! In 2003, he came to do his graduate project in the aviation division of Thales, one of the six divisions of the corporation, which has 13,000 employees. The aviation division is managed based on a customer driven continuous improvement system, and Sébastien's project consisted of a major effort to reduce the documentation being provided, in particular to Airbus.
The mass of documents was huge, and they had to be analyzed one by one to assess their added value and figure out where the duplications and overlaps were coming from. Sébastien carried out a genuine junior consultant assignment, helping the various actors reach an agreement, and then making proposals. His idea was to change the way of thinking. Instead of depending on the corporate in-house organization, he suggested setting up an adjustable standard documentation based on a technical tree hierarchy. This resulted in eliminating a great many useless or duplicate documents.
In 2006, another student from Nantes, Nicolas Chéreau, interned with us, and he also performed work that was highly beneficial for the division. Again, in the context of our improvement system, he helped organize in-house forums for exchanging best practices in R&D. He was still an intern here when the forums were held. Nearly 5,000 people from all the sites capitalized their experiences in a database. He was able to see the real-life results!
In both cases, the students demonstrated great analytical and organization abilities, all of course in a totally international context. The benefits to the company were undeniable."

ECOLE DES MINES DE NANTES

Ecole des Mines de Nantes
La Chantrerie
4 rue Alfred Kastler
BP 20722
44307 Nantes cedex 3
France
Tél. : + 33(0)2 51 85 81 00
Fax : + 33(0)2 51 85 81 99
Site web : www.emn.fr

GEM FRANCE
Groupe des Ecoles des Mines
Albi • Alès • Douai • Nancy • Nantes • Paris • Saint-Etienne

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