

Job-Competencies Framework

Engineering Degree in Systems and Innovation Engineering

The **Job-Competencies Framework (REC – Référentiel Emploi-Compétences)**, created in 1996 and updated in 2016 and 2022, is a founding component of the course's orientation and management and of related educational choices. It takes full account of and connects the School's vision and values and the professional world's concerns and needs in one and the same document.

The Framework's development and updating are the result of collaboration between the professional world (representatives of large groups, SMEs/SMIs and alumni), and ENSGSI's' Research Team on Innovative Processes and teachers.

This REC is composed of two sections making the connection between educational content and the requirements of a given work situation, between the student undergoing training and their future professional activity:

- Identification of key competencies targeted by the training programme and which express the meaning and processes of engineers' actions with regard to typical activities.
- A job framework describing the typical activities performed by ENSGSI engineers – activities which, in various proportions, will be required in the positions they will eventually hold in companies;

This document is intended for:

The **professional world**: showcasing the competencies acquired by graduates and helping its readers understand the ENSGSI training programme's specific goals.

Students: helping with development of their career plans by clarifying the programme's educational goals, through the connections between learning outcomes targeted by the programme's various components and their purposes (why I'm learning).

The **teaching team**: making the connection between content, teaching methods and the training system's assessment methods, with regard to the overall competencies targeted (why I'm teaching).

Here's hoping you use it well and often!

Job-Competencies Framework:

C1. COLLECTING, PROCESSING AND DISSEMINATING DATA AND INFORMATION

- C1.1** Collecting, processing, analysing and interpreting quantitative and qualitative data and information, knowing in particular how to design databases constituting an information system
- C1.2** Choosing and implementing languages, tools and methods (formal and analytical/analogical and systemic) enabling modelling or representation of a problem, situation or system of variable complexity, and expressing them in simple, accessible and meaningful texts or diagrams that foster communication, participation and collective co-construction
- C1.3** Identifying and applying multi-criteria methods of optimisation and analysis in support of decision-making.
- C1.4** Defining indicators and drawing up a dashboard in line with stakeholders' goals and needs.
- C1.5** Stimulating internal and external networking through efficient networking and flow of information, especially by managing the functional and structural evolution of information systems.

C2. MASTERING THE ENGINEERING SCIENCES REQUIRED IN INNOVATION PROFESSIONS

- C2.1** Analysing needs, defining design requirements in terms of mechanics and energy upstream of a product's industrialisation phase, integrating them into the specifications and making an initial outline of the product's/process' sizing and optimisation
- C2.2** Taking account of materials' chemical, physical and microstructural properties in order to relate them to their usage properties in innovation projects, and making choices in line with needs.
- C2.3** Materialising concepts (creation of prototypes and models, digital plans, and digital avatars); developing test protocols.
- C2.4** Applying assessment principles (materials, energy, etc.) in development of new products and processes (optimisation, analogy, etc.)
- C2.5** Structuring a complex industrial process in its entirety, identifying types of unitary operations required and estimating related material and heat transfers.

C3: DEVELOPING AND IMPLEMENTING INNOVATION PROCESSES (PRODUCTS, SERVICES, etc.)

- C3.1** Defining product positioning on the basis of an approach integrating monitoring and analysis of the company's environment, its technological, economic and sustainable development concerns, and its development strategy.
- C3.2** Creating conditions for the emergence and enrichment of concepts for new products (services/processes/etc.), with the help of collaborative co-innovation tools (Intermediate Design Objects, Proof of Concept, etc.).
- C3.3** Eco-designing new products based on LCAs and in compliance with the principles of the circular economy.
- C3.4** Assisting and contributing to the development (agile or otherwise) of a product (service/etc.) with added value and consistent with needs,
 - by overseeing all development phases (creativity, functional/technical specifications, design, prototyping, validation of feasibility and acceptability, etc.),
 - in particular by supervising technical evolutions in interface with experts.
- C3.5** Implementing an innovative project while taking account of commercial, financial, production and supply-chain imperatives, and interfacing with the project's internal and external stakeholders.
- C3.6** Developing and disseminating the innovation's specific methodologies and rationales (including analogical and systemic thinking) to colleagues and workgroups.

C4: STRUCTURING AND MANAGING A PROJECT

- C4.1** Analysing the initial request, the project's environment and stakeholders' expectations, in order to define and document project specifications (challenges, goals, deliverables, scope, etc.) in line with the instigator's wishes.
- C4.2** Drafting a project management plan incorporating requirements as regards deliverables, a timetable for the necessary activities, costs and budget (knowing how to calculate these using such international methods as OPEX-CAPEX), expected quality level, human resources management, communication plan, and risk, supplier and stakeholder management.
- C4.3** Managing a project, adapting management methods and tools and monitoring indicators (costs, deadlines, safety, quality, etc.) to the project's context and nature
- C4.4** Managing, coordinating and monitoring a cross-functional, cross-departmental, cross-skilled and cross-cultural collaborative engineering project at the service of innovation and/or continuous improvement.

C5: SIZING AND OPTIMISING THE OPERATION OF COMPLEX PRODUCTION SYSTEMS AND RELATED SUPPLY-CHAINS

- C5.1** Contributing to organisation of production means and processes (planning, product and information flows, etc.), in accordance with productivity needs and requirements, and compliance.
- C5.2** Leading projects on improvement of performance and optimisation of production processes and logistics flow management, and of related information systems (lean management).
- C5.3** Contributing to development of production procedures and processes in order to adapt them to new contextual factors (new products, reorganisations, regulations, etc.).
- C5.4** Defining and facilitating rollout of an industrial strategy based on observations and measurements on the ground, with the help of formal decision-support tools (processing of qualitative and quantitative data)

C6: MAKING A MULTILEVEL, MULTIDIMENSIONAL DIAGNOSIS OF ECOSYSTEMS AND THEIR EVOLUTIONARY DYNAMICS

- C6.1** Identifying environmental factors of their organisation (micro-environment and macro-environment), taking particular note of societal needs and concerns,
 - by establishing their interrelationships and impacts on the system,
 - by taking account of their evolutions via constant monitoring (scientific, economic, regulatory, etc.) combined with a forward-looking approach.
- C6.2** Identifying the organisation's operation and practices, and its internal and external networks; determining roles and missions, and mapping processes (information flows, decisions).
- C6.3** Making technological, strategic and organisational diagnoses of the system with regard to its development challenges (competitiveness, productivity, innovation, CSR, etc.), leading to the drafting of forward-looking scenarios, including risks and opportunities analysis; using these latter as the basis for an action plan, incorporating acquisition of new technologies if necessary.

C7: PROMOTING AND IMPLEMENTING THE PRINCIPLES OF SUSTAINABLE DEVELOPMENT AND CORPORATE SOCIAL RESPONSIBILITY

- C7.1** Assessing and evolving the organisation in line with standards and regulations with regard to EHSQ (Single Risk Assessment Document (DUER), the Law governing Installations Classified for Environmental Protection (ICPE), SEVESO III Directive, ISO 14001, 9001, 45001, 26000, Global Compact, QWL, etc.)
- C7.2** Characterizing the company's environmental, social and societal commitments in relation to its strategic orientations (CSR).
- C7.3** Designing and implementing crosscutting projects in the fields of EHSQ and SD&CSR, integrating (naturally enough) wellbeing at work

- C7.4** Facilitating collaborative thinking on the issues and philosophy of sustainable development for the company (CSR)
- C7.5** Looking for ways of improving the organisation's/products'/processes' EHSQ and SD&CSR performances, integrating any new technologies available
- C7.6** Rolling out and orientating new activities, drawing on the principles of the Social and Solidarity Economy, inclusiveness and eco-design
- C7.7** Developing an overall vision of the social, environmental and ethical aspects of your responsibility as an engineer

C8: IMPLEMENTING AND OVERSEEING AN INNOVATION MANAGEMENT SYSTEM

- C8.1** Enabling the Management to develop an appropriate ambition and vision with regard to innovation, relating analysis of innovation potential to strategic orientations, and possibly including new partnerships based on the principles of open innovation
- C8.2** Developing and ensuring ongoing momentum for generation of new projects and their monitoring, in particular through capitalisation of corresponding knowhow.
- C8.3** Contributing to the industrial property policy in order to consolidate the competitive advantages generated by innovation, at the service of the company's strategy.
- C8.4** Accompanying organisational learning by lending (technological, methodological and psychological) support to the various actors concerned throughout the duration of innovation projects.
- C8.5** Fostering collaborative encounters that serve creativity and imagination, by connecting individual potentialities and the opportunities provided by the milieu, contexts and the environment
- C8.6** Making best use of the talent for coming up with simple, economical, ingenious and effective solutions and responses
- C8.7** Creating a work environment and management procedures that foster mobilisation of individual capacities for learning, by encouraging experimentation, exploration of new possibilities, openness to the outside world, and risk taking, and by regarding failure as an opportunity to learn

C9: EXERCISING COLLABORATIVE LEADERSHIP

- C9.1** Uniting all teams around the company's strategy and creating conditions for commitment to change:
 - by co-development of a shared vision of the goal to be achieved
 - by making collective work a meaningful activity encompassing the collective and individual interest of self-fulfilment.
- C9.2** Contributing to development of a climate of trust and harmonious human relations, by ensuring that teams are cohesive and that actors know they are valued through recognition of their initiatives and involvement.
- C9.3** Promoting mutual enrichment and assisting individual fulfilment by fostering complementarity of diversities (cultural diversities in particular) and developing real communication and a personal attitude that is both open and welcoming.
- C9.4** Supporting development of collective intelligence by integrating emotional intelligence, in order to facilitate adjustments and cope with pressure and stress
- C9.5** Re-examining yourself by working on awareness of your own cognitive biases and modes of operation
- C9.6** Adopting a reflective and proactive attitude towards your professional choices and career management through a broader knowledge of yourself, your skills, preferences and values.

The Degree's overall competencies

DNA – AN ENSGSI ENGINEER'S GENERAL PROFILE

The **ENSGSI engineer** performs functions relating to management of organisation development and transformation projects (applied to products/services/procedures/processes/ technological and organisational systems), and contributes to them as an operational support:

- on the basis of their general skills in scientific, technological and managerial fields.
- as a specialist in innovation engineering, drawing on methodologies fostering concepts' feasibility and acceptability, and considering all aspects (technical, economic, human and organisational) of problems to be solved.
- due to their ability to manage projects in complex environments, by developing a contextualised approach enabling creation of a reliable process leading from generation of a concept to its implementation in the technological system and its dissemination.

Since its origin, **ENSGSI's training programme** has sought to develop individual approaches that have now come fully into their own in accompaniment of such societal evolutions as the digital, energy and ecological transitions, as our engineers must be able to :

- know how to provide meaning and to question, beyond simple resolution of a problem, with a view to creating conditions for appropriation by and empowerment of all stakeholders.
- develop an interdisciplinary, intercultural vision: know how to create dialogues between areas of knowledge, technologies and professions, connect abstraction and virtual world to concretisation and materialisation, in order to underpin the emergence and management of innovative systems.
- connect short-term local optimisation approaches, subject to immediate cost-effectiveness and performance, with an overall responsible and sustainable long-term vision respectful of environmental and societal concerns.

TYPICAL ACTIVITIES PERFORMED BY ENSGSI ENGINEERS

- Contributions to the design of new products/services and/or integration of new technologies and development of already existing ones, in operational support of one or more stages of the development of an offer, from its creation to its industrialisation and marketing.
- Management, coordination and monitoring of cross-functional, cross-departmental collaborative engineering projects, in the context of design and continuous improvement of processes and methods of organisation: production processes, support processes (supply-chain, QSE, Sustainable Development, etc.), and information systems.
- Operational rollout of engineering projects and their integration into the depending on their function (hierarchical responsibility for the department, functional project leader, advisory, etc.).
- Support and development of innovation strategies and their implementation in the form of action plans, at the levels of the organisation's structure (architecture/organisational changes) and operation (deployment of the project portfolio and methodological support to their management), in the context of a department, a company; a network or a territory.
- Development and/or management of a structure (department, new activity, business creation) in its various technological, organisational and managerial aspects, also integrating social and environmental responsibility aspects.