TROYES CAMPUS

MAJOR

Sustainable Industrial Design

#INDUSTRIALDESIGN #SMARTDESIGN #DESIGNTHINKING #CREATIVITY
#USERCENTEREDDESIGN #CIRCULARECONOMY #LIFECYCLEASSESSMENT
#INNOVATIVEPROCESSES #SUSTAINABILITY #ECODESIGN #ECOINNOVATION

A curriculum in collaboration with the Graduate School of Design, Troyes

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Creating the future together

Industrial design is a creative activity that consists of determining the formal properties of industrially produced objects, both from the producer's and the consumer's point of view. The industrial designer imagines all kinds of objects and implements their design, from creation to realization, while planning their reuse.

TRAINING OBJECTIVE

In a rapidly changing global market, environmental constraints and the growing demand for the development of new, more sustainable products and processes are forcing engineers to acquire new advanced skills to refocus their design around the user and their use of the product. These engineers are equipped with a multidisciplinary approach to link **innovation and environmental sustainability in design.**

The Sustainable Industrial Design curriculum was created to meet these needs. It provides engineers with the range of **skills** required in **creativity, eco-design and manufacturing techniques** to meet the environmental challenges we face today. It enables them to develop designs adapted to changing production methods and **new usage and consumption practices,** in response to the needs of a **sustainable industrial economy.**

ORGANIZATION OF THE COURSE

The program covers the design and manufacturing of sustainable products using a user-centered approach, to meet societal and industrial demands.

In the Sustainable Industrial Design curriculum, you will learn how to design new products used in everyday life. You will develop **creative,** strategic and critical design thinking to ensure the commercial success of products through **competitive and sustainable business models.** You learn to **eco-design products** that are aesthetic, ergonomic and functional with a user-centered approach, and to **analyze their environmental impact.** Emphasis is placed on **innovation and creativity** to meet the challenges of a **more sustainable future.**

During this major, you will develop an **advanced understanding of innovative manufacturing processes** using eco-responsible, cleaner and safer production systems, **enabling resource saving, waste recovery and the use of alternative materials.** You will also develop skills in **traditional modeling,** and learn about new, **emerging approaches such as virtual environment simulation,** enabling you to **realistically represent the product and its use** (human/machine interaction).

A curriculum that aims to:

- impart advanced industrial **design and conception methods** to design **aesthetic and functional products** that meet socio-environmental issues;
- train in the use of **modern technologies** to produce **a prototype, a set of components, or a product;**
- master the interaction between materials, processes, and products. Promote **prediction, prototyping, maintenance, reuse and recycling;**
- develop environmental expertise in **product life-cycle assessment to save resources and reuse waste;**
- train multi-disciplinary engineers to manage **product innovation** and **industrialization** that can lead an **innovation strategy,** taking environmental, social, and economic sustainability needs into consideration.

The curriculum extends over 2 academic years and is structured around two academic semesters, between two internships.

4TH YEAR – MANDATORY COURSES

Product design and industrial design	**90 hours I 6 ECTS**
· Culture design · Product design and industrial design · User-centered design and ergonomics · Eco-design · Prototyping and modeling	Learn design methodologies for responding to socio-environmental issues with usage scenarios.
Sustainable product management	**90 hours I 6 ECTS**
· Product life cycle management and carbon footprint evaluation · Recycling, reconditioning and waste managing · Lean manufacturing · Regulations and certifications	Controlling the product life cycle to save resources and recycle waste.
Materials and manufacturing technologies	**75 hours I 6 ECTS**
· Advanced mechanical fabrication processes · Materials and products · Structural analysis · Prototyping and modeling	Adapt the design of a part and implement a manufacturing technology.
Entrepreneurship and managerial engineering	**75 hours I 6 ECTS**
· Corporate Social Responsibility for engineering · Strategic and financial steering · Technological innovation · Conferences and industry tours · English	Understand the fundamental tools for an engineer's responsibilities.
Project	**160 hours I 6 ECTS**

5TH YEAR – MANDATORY COURSES

Smart Design — 64 hours I 5 ECTS

- Design for X
- Generative design
- Eco-design and topographic optimization
- Introduction to 4D printing
- Multi-challenge project

Design a product using advanced methods.

Sustainable innovation strategy — 64 hours I 5 ECTS

- Design and sustainable innovation
- Strategic planning and innovation
- Design, a vector for innovation
- Innovation economics

Focus on sustainable innovation strategies that ensure environmental, social, cultural, and economic sustainability.

Products, materials, and advanced processes — 64 hours I 5 ECTS

- Advanced mechanical fabrication processes
- Design and innovative materials
- Durability, choice of materials and manufacturing processes
- Material integrity and performances
- Prototyping and manufacturing

Mastering the interaction between materials, processes, and products, as well as the durability of structures.

Virtual design — 70 hours I 5 ECTS

- Virtual reality and augmented reality
- Virtual shaping of environments
- Design and simulation of production systems

Represent and manipulate a product virtually using innovative technologies.

Smart manufacturing — 70 hours I 5 ECTS

- Digitalization and industry of tomorrow
- Industrialization and customization processes
- Responsible manufacturing and sourcing
- Energy efficiency in industry

Manufacturing customized products using more responsible, cleaner and safer production systems.

Project — 150 hours I 5 ECTS

AFTER THE SUSTAINABLE INDUSTRIAL DESIGN CURRICULUM

GROWTH SECTORS

All sectors of activity are concerned by industrial design. Design and other skills such as **eco-design, ergonomics, user experience and industrialization can be found in all everyday products.** You will be free to explore different industries and create **your own professional adventure** based on the engineering fields that are important to you.

FUTURE CAREERS

The role of a multi-disciplinary engineer in industrial design is becoming increasingly important in corporate strategies. The associated skills are integrated into the organization chart of many companies, such as:

- Product designer
- Design engineer
- Eco-design consultant engineer
- Industrial project manager
- Creative director
- Product and materials engineer
- Methods and industrialization engineer
- Research and Development engineer
- Methods and industrialization engineer

PRACTICAL PROJECTS TO DEVELOP PROFESSIONAL SKILLS

Each academic semester, a «guideline» project is carried out in collaboration with a company. This enables the students to apply the advanced knowledge required to achieve the learning objectives. The projects proposed by manufacturers are designed to extend the product life cycle through a production and consumption model that involves sharing, renting, reusing, repairing, refurbishing and recycling as much as possible.

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PRATICAL DETAILS

- **Duration:** 2 years
- **Location:** Troyes campus

ANY QUESTIONS?

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