REINVENT ENGINEERING

CENTRALE NANTES

Ingénieur grande école | graduate programme

2ND AND 3RD YEAR PROJECT-BASED SPECIALISATION

LOW-TECH ENGINEERING
SUSTAINABLE HOUSING TECHNIQUES
[TYLOTEC]

In order to address today's ecological and social challenges, the "Low-tech engineering - sustainable housing techniques" (TYLOTEC) specialisation aims to train engineers to build a resilient and sober world. They will have to design simple objects, systems or services that incorporate technology according to three main principles:

USEFUL: Low-tech meets essential needs in the fields of energy, food, water, waste management, construction materials, housing, transport, hygiene and health.

SUSTAINABLE: Resilient - robust - repairable - recyclable. Low-techs are eco-designed to maximise their ecological and social impact at every stage of their life cycle, from design, production, distribution and use to the end of the process.

ACCESSIBLE: Unlike high-tech, the cost and technical complexity of low-tech are not excessive for a large section of the population. Low-tech must be accessible to as many people as possible

COURSE CONTENT

Part 1: Human Management Sciences and Low-Tech Engineering (96 hours)

- Low-Tech Engineering: Basics and Applications
- Low-Tech, Ethical and Responsible Management
- Advanced Low-Tech: Communication, Philosophy, Economics, etc

Part 2: Technical and Scientific Knowledge in Eco-Construction (96 hours)

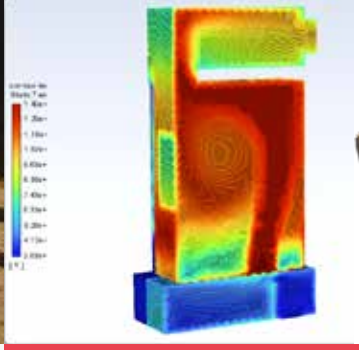
- Ecological and Low-Tech Housing: Designing, building and living sustainably
- Low-tech design and manufacturing
- Sustainable Habitat and Responsible Territory

LOWTEC - Low-tech Project (408 hours)

This option is based on project-based learning.

Carrying out a sustainable housing project should enable students to complete their training in the field. They will also have to teach themselves any points that are not covered in the courses.

The project specialisation will be open to a group of a maximum of 12 students, full-time from the beginning of September 2024 to the end of March 2025, renewable over 3 years until March 2027.



INDUSTRY SECTORS

> Green building
> Energy efficiency
> Waste management
> Water management
> Sustainable landscaping
> Sustainable mobility
> Natural resource management
> Comfort and quality of life

These sectors aim to create living environments that minimise environmental impact while promoting the well-being of residents.

CAREER PROSPECTS

> Engineer & Architect specialising in eco-design
> Renewable energy engineer
> Eco-builder
> Energy efficiency consultant
> Circular economy project manager
> Engineer specialising in green building
> Ecological landscape designer
> Urban planner specialising in sustainable development
> Sustainable development consultant
> Engineer & Trainer in low-tech techniques

These professions reflect the diversity of skills needed to design, build, manage and promote sustainable, environmentally-friendly habitats.

TEACHING STAFF

HEAD OF SPECIALISATION:
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LECTURERS:
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PARTNERS:
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PROJECT-BASED LEARNING

Based on project-based learning, the "Low-tech engineering - sustainable housing techniques" (TYLOTEC) specialisation will focus primarily on producing **a guidebook on eco-construction and eco-renovation of rural housing**.

Intended for architects and construction professionals, the guidebook aims to provide a comprehensive methodology for low-tech construction and renovation. The initiative will culminate in the publication of a white paper, providing a comprehensive resource on sustainable construction and renovation practices. The students will have to identify and develop sustainable techniques for rural housing using a low-tech approach and technologies, to make it as self-sufficient and low-carbon as possible.

The project will draw on scientific rigour to identify, size, prototype and test solutions that are as acceptable as possible to users.

OBJECTIVES FOR 2024/2025

> Identify the specific needs of rural housing and local constraints.
> Develop sustainable techniques for the design, construction and renovation of housing.
> test and validate low-tech systems in demonstration homes.
> Assess solutions in terms of their environmental, economic and ergonomic impact.
> Play a part in communicating and promoting low-tech solutions through awareness-raising and networking activities.

DELIVERABLES TO BE PRODUCED OVER THE 3 YEARS OF THE PROJECT:

> Definition of uses and needs for sustainable housing
> Identification of technical and organisational solutions for sustainable housing
> Specification of the solutions identified
> Design of the selected solutions
> Prototypes of the selected systems to be designed, manufactured, tested and validated
> Environmental and socio-economic assessment of the solutions
> Assessment of the comfort and ergonomics of the systems developed
> Guidebook on eco-construction and eco-renovation of homes in rural areas

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