



## 2<sup>ND</sup> AND 3<sup>RD</sup> YEAR PROJECT-BASED SPECIALISATION

# LOW-TECH ENGINEERING

[LOWTEC]

In light of today's ecological and social challenges, the "Low-tech Engineering" specialisation aims to train engineers capable of building a resilient and sober world. They will have to design simple objects, systems or services that incorporate technology according to three principles:

**USEFUL:** A low-tech corresponds to essential needs in the fields of energy, food, water, waste management, building materials, housing, transport, hygiene or health.

**SUSTAINABLE:** Resilient, robust, repairable, recyclable. It is eco-designed for optimal ecological and social impact at all stages of its life cycle, from design, production, distribution, use and end of life process.

**ACCESSIBLE:** Unlike high technology, its cost and technical complexity are not excessive for the majority of the population. Low-tech must be accessible for as many people as possible.



### COURSE CONTENT

#### Discovery and exploration of low-tech systems (64hrs)

- > Low-tech approach
- > Trips and meetings with various low-tech players
- > Eco-design, environmental assessment and management methods and tools
- > Physics applied to low-tech: thermodynamics, mechanics, electronics, computing, etc.

#### Low-Tech Project (408hrs)

#### Low-tech design and manufacturing (64hrs)

- > Design and prototyping
- > Low-tech materials and processes
- > Low-tech concepts: circular economy, eco-design, economy of functionality, reuse, recyclability, etc.

#### Capitalisation and transfer of low-tech systems (32hrs)

- > Building on experience and feedback
- > Responsible communication
- > Sharing knowledge and common ground

#### Project management (32hrs)

- > Responsible management
- > Collective intelligence and change management
- > Agile method
- > Industrialization and market research



## INDUSTRY SECTORS

- > Energy
- > Building materials
- > Housing
- > Transport
- > Food
- > Water
- > Waste management
- > Hygiene
- > Health

## CAREER PROSPECTS

- > Circular economy or low-tech engineer
- > Ecodesign or life cycle analysis engineer
- > QSE (Quality Safety Environment), Sustainable Development or Ecological Transition Manager
- > Consultant: Carbon strategy, CSR (Corporate Social Responsibility)
- > Entrepreneur in the Social and Solidarity Economy or the circular economy
- > Low-tech energy and housing engineer

## TEACHING STAFF

### HEAD OF SPECIALISATION:

Jean-Marc Benguigui

### PARTNERS:

Explore, Low-tech Lab, APALA, Bathô

**EXPLORE.**

**APALA** aux petites actions (avenir)

**LOW  
TECH  
LAB**

### CONTACT:

jean-marc.benguigui@ec-nantes.fr

## PROJECT-BASED LEARNING

Project-based teaching. Students are involved in and drive their learning, and develop their skills by building prototypes. The project involves equipping the Outremer 5X catamaran and the Explore base with low-tech solutions. Several systems will be studied and manufactured:

- > Production and storage of renewable energy
- > Domestic hot water
- > Hot-air collector
- > Separating toilets
- > Autonomous photovoltaic panels
- > Localized digital system

## OBJECTIVES FOR 2023/2024

- > Develop new systems (not identified in the first phase) or those not yet finalized (particularly in the domestic hot water system).
- > Test and validate prototyped solutions
- > Improve and optimize the various systems
- > Measure the ecological, economic and ergonomic impact of selected solutions
- > Develop marketing concepts for selected solutions
- > Industrialize and certify systems with manufacturers and suppliers
- > Capitalize on, disseminate and promote the low-tech systems studied

## EXAMPLES OF INTERNSHIPS/THESES

- > Low-tech energy engineer - Les vagabond.es de l'Energie
- > Low-tech approach engineer - ADEME
- > Low-tech building renovation engineer (Brussels) - Anthropie SC (Hellow)
- > Consultant in low-tech and environmental strategy - Anthesis
- > Junior CSR and low-tech consultant - Goodwill-management and Baker Tilly
- > Ecodesign engineer on sobriety and low-tech issues - EDF
- > Evaluating the influence of low-tech on local resilience: Application to food - Institut Fayol - Mines St Etienne
- > Proposal of a methodological tool for user-centered low-tech and resilient engineering - Université Grenoble Alpes
- > *Faire, face à l'anthropocène* - the low-tech movement, between discourse and ecological reconfigurations of socio-technical relations - UTC Compiègne