

# SPECIALIZED MASTER'S DEGREE®

## Bioresource Composites: Innovation and Eco-design



FULL TIME COURSE  
100% ENGLISH



STUDY DURATION  
1 YEAR



DIPLOMA  
ACCREDITED BY  
THE FRENCH  
CONFERENCE DES  
GRANDES ÉCOLES  
(CGE)

### OBJECTIVES & PRESENTATION

The Specialized Master's Degree® Bioresource Composites: Innovation and Eco-design trains future high-level executives in the field of innovative composite materials that take into account the challenges of sustainable development.

This level I qualification is accredited as a Specialized Master's degree® by the Conférence des Grandes Écoles (CGE). All lessons are given in English.

The training takes place over 12 months: 6 months of teaching and 6 months of internship in a company as part of a professional dissertation.



In a context of rapid climatic and technological changes, this Specialized Master's degree® trains project leaders capable of managing innovation and eco-design projects for products/processes made from renewable resources.

## BACKGROUND

Many industrial sectors use composite materials that meet a number of technical, economic, ergonomic and aesthetic performance requirements.

Sustainable development issues place bioresource materials as resources of the future for the development of the composites of tomorrow.

These new composites made from renewable plant resources can be developed to fulfil the needs of manufacturers seeking innovative solutions for their own products and to make them sustainable.

## TARGETED SKILLS

This Specialized Master's degree® is based on an interdisciplinary programme supported by an eco-innovation approach. At the end of the training, graduates will be able to:

- Innovate and eco-design materials / products / services from renewable resources.
- Develop and optimize products or process solutions by integrating sustainable development with the opportunities offered by new technologies.
- Lead and manage a project in a collaborative and open manner.
- Manage an interdisciplinary approach and foster the emergence of interdisciplinarity.
- Drive an innovation approach.
- Conduct an eco-design approach using design and creativity tools and methods.
- Take into account regulatory obligations, particularly environmental and societal requirements.
- Understand knowledge (collection, modelling, presenting, expert knowledge) in order to transfer it to his/her activity.
- Provide material solutions to different sectors of activity, understanding their specific needs.

## CAREER OPPORTUNITIES

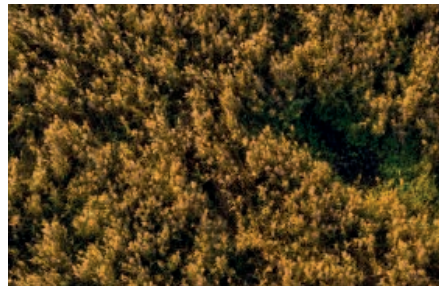
### Activity Sectors

The sectors that should take into account and integrate an eco-design approach are numerous and varied: aeronautics, automotive, shipbuilding, construction, transport, packaging, sports and leisure industry, fittings, furniture, luxury, wood industries.

### Positions held

At the end of the training, graduates will be able to hold management and project management positions:

- Engineer or research and development manager.
- Engineer or innovation manager.
- Engineer or materials manager.
- Process and manufacturing engineer or manager.
- Engineer or eco-design manager.
- Industrial designer.
- Designer or product manager
- Designer or eco-design manager.



## PROGRAMME

The course is divided into thematic periods with transversal and theoretical contributions according to the life cycle analysis (LCA) approach.

Bioresource materials, including wood and its derivatives, together with the workshops and laboratories, make it possible to design and build prototypes within the training itself.

The use of group project work promotes learning by doing, interdisciplinary and the emergence of eco-innovation.

The lessons are given entirely in English.

The 12-month course is programmed as follows:

- **Six months:** courses at ESB and the Nantes Atlantique School of Design (Campus de la Chantrerie in Nantes).
- **Six months:** internship in a company (20 weeks minimum) as part of a professional dissertation.



### **Unit 1 - Sectors & resources (2 ECTS)**

- Introduction to the circular economy and eco-design cycle.
- Global vision of bioresources for composites: production and characteristics.
- Presentation of the sectors of interest: transport, packaging, furniture, fitting, construction.
- Company visits.

### **Unit 2 - Bioresource materials and process (4 ECTS)**

- Understand the techniques and processes of composite manufacturing.
- Define the role and influence of physico-chemical and mechanical parameters of composites in product applications.
- Understanding the constituent materials of bioresource composites

### **Unit 3 - Innovation, design and professional project (4 ECTS)**

- What is an innovation and an innovative approach?
- What is design and related concepts?
- Build an initial vision of your future career path in relation to eco-innovation.

### **Unit 4 - Transport (8 ECTS)**

- Understand the issues related to minimising weight in the transport sector.
- Learn different processes for transforming composites.
- Transferable skills: collaborative innovation and project management

### **Unit 5 - Packaging (8 ECTS)**

- Understand the issues related to the ageing of materials in the packaging sector (and luxury industries).
- Take into account the principles of degradation and recycling.
- Transferable skills: incremental innovation and knowledge engineering.

### **Unit 6 - Preparation for the professional thesis (2 ECTS)**

- Define the subject and context of the mission to be carried out for the professional dissertation.
- Establish a network of contacts linked to your future career.

### **Unit 7 - Furniture and fittings (8 ECTS)**

- Understand the problems of bioresource composites in furniture and fittings (Sports and leisure).
- Imagine finishing solutions for these products.
- Transferable skills: breakthrough innovation (design thinking, optimization) and design to cost.

### **Unit 8 - Construction and external uses (8 ECTS)**

- Discover the composites of the construction industry, in particular composites based on wood or natural fibres.
- Imagine the place, nature, possible developments and applications for bioresource composites.
- Transferable skills: disruptive innovation (C-K theory) and societal transition.

### **Unit 9 - Business innovation (1 ECTS)**

- Finalize the specifications of the mission and objectives that meet the expectations of the course and the partner company.
- Integrate innovation and eco-design objectives into your company's project based on bioresource composites.

### **Unit 10 - Professional thesis (30 ECTS)**

The professional thesis is intended to validate the learner's knowledge in the field of eco-innovative project management, whether industrial or academic.

After understanding the subject and the environment, the learner will have to collect and analyse the information necessary to fulfil the project.

The learner will then develop and validate the proposed solutions in all their aspects: materials, technical, environmental and economic.

The learner will quantify and plan the implementation of his proposals.

## IN-COMPANY PERIOD

A minimum 20-week internship takes place in a company in the sectors covered by the training. It can also take place in an R&D laboratory.

The learner is entrusted with a global mission through an industrial project that includes:

- An innovation and eco-design approach via project management.
- Research on new materials and their applications.
- The financial study: project profitability, return on investment.

The learner will have a large degree of freedom in the management and implementation of their project in order to ensure that it is the learner who is driving the project.

## ADMISSION

### Prerequisites for applying

The training is open to people with a 5 or 4 years of experience in the field of engineering sciences or design professions:

- Postgraduate degree, Master's degree or equivalent.
- Master of Science or equivalent for international students.
- General engineer.
- Engineer from the following specialties: composites industry, chemicals, plastics, wood industry, environmental professions, chemicals, plastics.
- Design engineer.
- Industrial designers or materials aware products (Level I Design Diploma).

Candidates can be in fulltime employment or retraining employees, young graduates, international employees and students or job seekers.

It is possible to initiate a procedure for the «Validation des acquis professionnels» (VAP) in order to access training without having the required diploma.

## Registration process

Admission to the training is based on a study of the academic and/or professional track record, together with an interview in English. The interview can be done via a videoconference

Online application submission on the [My.ESB platform](#) (deadlines on the website).

The training starts in September.

## TRAINING COSTS

Tuition fees amount is indicated on the ESB Website.

The information contained in this document is provided for information purposes only. They are non-contractual and do not engage the responsibility of ESB or its partner.

## SUPPORTING PARTNERS

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