

Master in Sustainability Technical University of Catalonia

May 2007



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External partnerships

The Master has partnerships agreements and collaborations with various other organisations:

- **International partnerships**
 - Delft University of Technology (Netherlands)
 - Royal Institute of Technology, KTH (Sweden)
 - Chalmers University of Technology (Sweden)
 - Alliance for Global Sustainability
 - United Nations University / RCE Network
 - UNESCO
- **Regional and national partnerships**
 - RCE Barcelona, Regional Centre for Expertise in Education for Sustainable Development (UPC / ESADE / GenCat / DiBa / Ajuntament BCN / ECODES / ESF)
 - Spanish Observatory for Sustainability (OSE)
 - Catalan Sustainability Observatory



United Nations Educational, Scientific and Cultural Organization



Delft University of Technology



Programme Mission

Based on its tradition of excellence in technology, which drives UPC, and the concern and experience of many different groups involved in technology, development and sustainability the **Masters programme aims to train entrepreneurs and agents of change towards sustainability to be:**

- capable of **designing and implementing sustainable solutions** for the long term in an uncertain and complex environment
- able to **work in different cultural and professional contexts** in an interdisciplinary approach
- with **technical and scientific rigour**,
- putting **human sustainable development** at the heart of their aspirations and actions.



Learning outcomes

The student will be able to:

- **Analyze** real life dilemmas from a **holistic and systemic** point of view in a context of uncertainty and increasing multiculturality
- **Design scientific and technological solutions** to sustainability challenges from a socio-economic and environmental point of view
- **Apply** the appropriate management or design **tools and strategies** to face sustainability challenges
- **Contextualize** the principles of sustainability in public and private **organisations** and civil society organisations



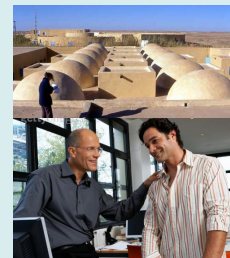
Student target

The Master is targeted at graduates with the following profile:

- **Technological graduates** (engineering, technical engineering, technical architecture, IT ...)
- **Graduates from other disciplines** (environmental sciences, biology, sociology, political science, economics) with relevant training, aptitudes and personal objectives

...who want to develop a professional attitude coherent with sustainability

- Candidates for the PhD programme in Sustainability, Technology and Humanism



Study programme

Length of programme:
 120 ECTS (2 years)
 October 2007 – July 2009

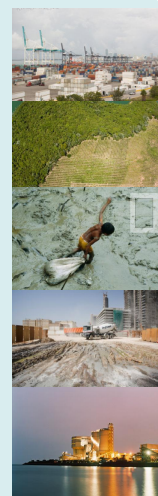
Type of programme:
 Professional/Research

5 specialisms and the possibility of a double degree

<p>Semester 4 (30 ECTS) Professional: Final project Business placements</p> <p>Research: Thesis</p>
<p>Semester 3</p> <p>Specialism (15 ECTS) Optional courses (15 ECTS)</p>
<p>Semester 2</p> <p>Specialism (20 ECTS) Optional courses (10 ECTS)</p>
<p>Semester 1</p> <p>Core programme (30 ECTS) Introduction to the sustainability paradigm</p>

Programme specialisms

1. Sustainable construction (2007/08)
2. Infrastructure and sustainable land-use planning (2007/08)
3. International cooperation for development (2007/08)
4. Sustainability assessment and policy (2007/08)
5. Industrial ecology and technological innovation (2008/09)



Core programme

This part of the programme aims to **give an overarching vision of the problems and possible paths to solutions to achieve a sustainable human development (SHD)**. It gives the student an integrated and systemic grounding to be able to fully develop his/her chosen specialism

Learning outcomes

- Give a general description of the state of the world from a sustainable perspective, or rather expose its limits and imbalances, and the increase in its complexity, providing the possible future alternatives.
- Understand the basic principles of SHD, the related debates, environmental, sociocultural and economic implications
- Express a vision of the world from the perspective of the systemic paradigm and complexity, in relation to the complex problems we encounter today
- Present the basic disciplines which are required to handle the design and implementation of sustainable solutions over the long term with scientific and technological rigour: ecology, environmental and ecological economics, urban ecology and the social impact of technology

Subjects

Environmental and ecological economics
 Ecology and natural resource management
 Systems thinking and complexity
 Human sustainable development
 Urban ecology and land use planning
 Culture, technology and innovation

Sustainable construction

The specialism **Sustainable construction** approaches the field of construction so as to **enable the student to define and assume sustainability objectives in the design or construction of buildings**.

Learning outcomes

- Establish a theoretical framework of the relations between sustainability and construction
- Analyse the current environmental problems of construction as well as the possible roads to current and future improvements
- Identify and present sustainable and viable sustainable strategies for the present
- Learn to develop and implement these sustainable strategies in construction projects

Unique characteristics

The specialism aims to train technicians capable of contributing to the implementation of sustainability in the construction sector, either through their own projects or by advising others.

Subjects

Sustainable construction
 Water cycle and construction
 Life cycle of materials and construction
 Energy efficiency in construction
 Renewable energies in construction
 Case studies of sustainable construction
 Workshop on sustainability in the construction field
 Legal and organizational framework for environmental consulting *
 Bioclimatics *
 Interdisciplinary workshop *

* Electives

International cooperation for development

The specialism International cooperation for development covers the field of the appropriate technologies for the human and sustainable development in countries and frameworks with lack of resources, focusing on the methodologies inherent to international cooperation, from emergency action to design and management of development programs.

Learning outcomes

- Understanding the characteristics and requirements for the different applicable technologies to the provision of basic services, as well as of the capacities needed for their sustainable management.
- Identifying the priorities and instruments of the international cooperation and the humanitarian action relevant for the application of engineering solutions.
- Understanding the particularities of the multicultural environments and having tools for the exercise of direction tasks and participation promotion.
- Learning to identify, to formulate, to manage and to evaluate development and humanitarian actions.

Unique characteristics

- The specialty trains technicians capable of operating in the field of the cooperation with a sustainability approach, as well as manager as consultant in terrain, with governmental, non governmental organizations and companies linked to the promotion of the international development

Subjects

International Cooperation and SR organizations
 Professional competences for a Global Engineering
 International cooperation projects for development
 Human action, risk assessment and emergency engineering
 GIS applied to cooperation
 Basic services and development in depressed urban environments
 Basic services and development in depressed rural environments
 Building of housing and social facilities in cooperation frameworks *
 Economical and transport facilities in cooperation frameworks *
 Interdisciplinary Workshop *
 * Elective

Infrastructure and sustainable land-use planning

The specialism Infrastructure and sustainable land-use planning intends to reach the field of planning and management of infrastructures and urban services in order to be able to describe and to attain sustainability goals when planning and managing cities and rural territories.

Learning outcomes

- establishing a theoretical frame of the infrastructures role in the relationship between sostenibilitat and territory.
- analyzing the current environmental problems of public space organization from a sustainable mobility perspective.
- identifying and showing the actual feasible sustainable strategies nowadays in the territory scale
- learning to develop and to establish these sustainability strategies in the infrastructures projects and in the management of urban services.

Unique characteristics

The speciality wants to train technicians capable of contributing to sustainability application, both in the planning and management of infrastructures, and urban services sectors, as well as municipality technicians as consulting enterprises.

Subjects

Socio-territorial impact of the infrastructures and manufacture of landscape.
 Urban and regional landscape planning
 Form and urban metabolism
 The projects of infrastructures as an instrument of planning
 Environmental economy of infrastructure and of well-being
 Sustainable urbanism
 Hydraulic resources and water cycle in urban areas.
 Urban economy *
 Coastal system management and planning *
 Integral management and decision making*
 Water quality supply and treatment *
 Interdisciplinary workshop *
 •Elective

Sustainability assessment and policy

The specialism of Sustainability assessment and policy intends to bring the tools needed for consulting and elaboration of sustainability policies as well as their evaluation.

Learning outcomes

- presenting the global problems of global sustainability and their consequences at regional and local levels
- introducing the sustainability policies described by international and national institutions, bringing the tools for measuring, modelling, planning and evaluating the global, regional and local sustainability
- Introducing the different models of human development, making special incidence in those most suitable shots for sustainability

Unique characteristics

This profile can be taken, because of its high degree of interdisciplinarity, from any university degree of scientific-technique content, and can find its expression from the entrepreneurial area until that of the administrations, or that of the third sector organizations (Foundations, NGOs..).

Subjects

Sustainability measuring
 Human development modelling
 Natural resources
 Politic ecology
 Sustainability modelling
 Governance, sovereignty and participation
 Territorial diagnosis and analysis
 Interdisciplinary workshop *
 Sustainability culture *
 •Elective

08-09

Industrial ecology and technological innovation

The specialism of Industrial Ecology and Technological Innovation intends to bring the necessary tools to work in industrial environments with a systemic perspective, of closed cycles and a strong orientation to the management of transition processes and technological innovation for sustainability.

Learning outcomes

- Analyzing the real dilemmas of sostenibilitat from a systemic point of view in a context of increasing uncertainty
- Designing scientific-technological solutions to sustainability in the industrial area from a socio-economical and environmental perspective.
- Applying appropriate tools and strategies of management and design to approach the challenges of sustainability
- Setting the principles of the Industrial Ecology tin public, private and social organizations.

Unique characteristics

The specialism is developed with a strong international dimension (minimum 1s abroad), intercultural and scientific excellence. The speciality is carried out in English

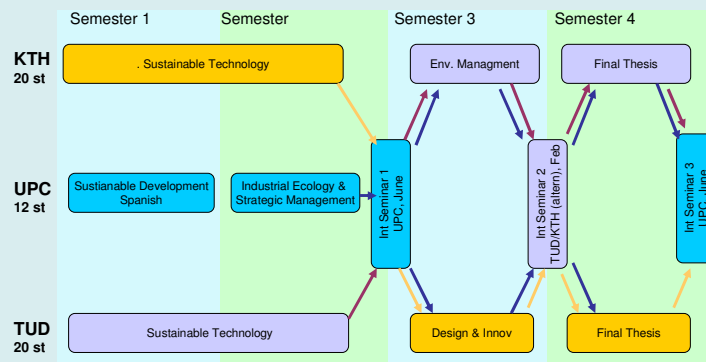
Subjects

Industrial Ecology
 Methods and tools for Industrial Ecology
 Responsibility, innovation and leadership for sustainability in organizations
 International seminar on Sustainable Technological Innovation
 Advances in industrial ecology **
 Complements in industrial ecology **
 International seminar on strategic planning for sustainable organizations
 Interdisciplinary workshop

** To be taken in a foreign university

Internationalisation of the programme. Industrial Ecology

The Industrial Ecology and Technological Innovation specialism aims to offer students a double degree with Delft (Netherlands) and KTH (Sweden) for 2008/2009.



Internacionalització. Cooperació al Desenvolupament

- L'especialitat en Cooperació Internacional per al Desenvolupament preveu la **realització del treball final de Màster o projecte de Tesi** amb institucions i organitzacions amb conveni amb la UPC.
 Destaquem:
 - Organismes de Nacions Unides
 - Membres de la xarxa RCE de la Universitat de Nacions Unides
 - Altres universitats i centres de recerca especialitzats
 - Les principals ONGD catalanes i espanyoles
 - Administracions públiques
- Les estades seran tutoritzades, de **tres a sis mesos** de durada, i amb la possibilitat de **beques de suport a la mobilitat**.
- The speciality in International Cooperation for the Development foresees the realization of the final work of Master or project of Thesis with institutions and organizations with agreement with the UPC. We highlight:
 - Organizations of United Nations
 - Members of the net RCE of the University of United Nations
 - Other universities and centers of research specialized
 - The main Catalan and Spanish ONGD
 - Public administrations

The stays will be tutoritzades, from three to six months of duration, and with the possibility of scholarships of support to the mobility.

Specialisms vs Career profiles

	Consultant	Local authority technician	International cooperation worker	Process design	Expert in assessment and policy	Researcher
1. Sustainable construction	●	●				●
2. Infrastructure and sustainable land use planning	●	●	●			●
3. International cooperation for development	●	●	●			●
4. Industrial Ecology and Sustainable Technology	●			●		●
5. Sustainability assessment and policy	●	●			●	●

Consultant

Mechanisms to introduce sustainability through the inclusion of specific criteria to products and processes, construction and many other areas

Local authority technician

Drafting and coordinating strategic local planning for sustainability (e.g. Agenda 21), urban planning and other areas of sustainability in local authority management

International cooperation worker

Activities in the area of cooperation for development

Process design

Construction processes, at building or infrastructure level and cooperation for development in the industrial field

Expert in sustainability assessment and policy

Businesses, local, regional, and international public bodies, civil society organisations (foundations, NGOs...) in consultancy roles as well as policy design and evaluation

Researcher

Development of a scientific career destined to those people with a research vocation who may continue their academic activity with a PhD.

Learning methodology

Theoretical sessions

- activities in class based on **presenting and debating theoretical concepts**.
- activities based on **problem-solving**. These activities will largely be led by students, either individually or in groups.

Practical sessions

- **Thematic seminars** based on presentations and discussions with prestigious experts (mostly external to the University)
- **Interdisciplinary seminars** based on the development of dynamic activities, presentations or group based conflict resolution. These activities will be largely led by students individually or in groups,
- **activities in the laboratory** or IT spaces focused on experiments or project development. These activities will be developed by students, normally in groups.



Opportunities to collaborate

Knowledge transfer

- Participation in conferences and seminars
- Training professionals in seminars
- Hosting placement students
- Co-direct a final project
- Propose case studies for interdisciplinary workshops

Economic support

- Sponsor international seminar
- Grants for student international mobility
- Grants for teacher exchanges
- Sponsor teaching publications

Strategic partnership

- Redefine and update programme objectives
- Professional recognition of the programme



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