Water and Environmental Engineering

Course offer in English

Autumn semester
2021/2022

Last Update: April 2020

ENGEES - Department of International Relations
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FOREWORD

Dear students of our partner universities and engineering schools abroad,

From the autumn semester 2019/2020 onwards, the ENGEES in Strasbourg has developed a greater choice of modules offered in English:

The “Hydrosystems” and “Water Treatment" specialisation courses of the ENGEES Water and Environmental Engineering programme will be offered in English and I am pleased to inform you that you can, from now on, study an entire semester in English with us.

The new course offer is one result of the internationalisation process of our French taught Engineering degree course and all modules that are presented in this document are guaranteed in English for your incoming mobility.
However, it may happen that some projects are presented in French by external lecturers. In this case, our professors will ensure an individual support and group work will always be done in English in mixed teams with French students.

Since the choice of the destination is certainly also very important for your semester abroad, please notice that Strasbourg is a very beautiful and international city in the heart of Europe with about 20% of students from abroad. There are many good reasons to choose Strasbourg and you can find out 10 of them on the “Strasbourg aime ses étudiants” (Strasbourg loves its students) website.

ENGEES is located directly in the picturesque city centre of Strasbourg. For the first visual impression of our school and its surroundings, I suggest you a three-minute visit by video.

For the successful integration into everyday life, we highly recommend at least a basic knowledge of French to all students who are interested in our English taught course offer. French as a Foreign Language courses are available and will permit you to improve your language skills during your stay.

If you have further questions, please do not hesitate to contact us.

A bientôt à l’ENGEES,
we are looking forward to welcoming you very soon!

Best regards,

Marianne Bernard
Study Director

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Module descriptions - Course offer in English in semester 9

Common core teaching units for all students:

Specialisation in Hydrosystems:

Specialisation in Water Treatment:

Specialisations in Hydrosystems and Water Treatment (common teaching units):

Appendix

Module Overview (Full range of modules, French and English taught course offer):

- Semesters 5 to 9
- Specialisations semester 8 and 9

Course offer - Tables semester 5 to 9 (Full range of modules, French and English taught course offer)

Additional Information

- **Lecture period** of semester 9: From the early beginning of September to Christmas (for all other semesters see the document “academic calendar”)
- **Language skills**: Minimum level required English B2, basic knowledge of French is highly recommended to enjoy everyday life at school and in Strasbourg.
- **Nomination deadline** for incoming students for semester 9: 30th of April
- To avoid temporal overlap, you should **choose one of the two specialisations offered in English, Hydrostystems or Water Treatment.**

For a three-minute visit of the ENGEES by **video, click here**

International Engineering
Ingénierie à l'international

INGENINT

Type of teaching unit: **Common core**

Language	EN	Module coordinator	Martine BOHY
ECTS	3		
Academic year	2020/2021	Contact	martine.bohy@engees.unistra.fr
Semester	9 (autumn term)	Last update	11/03/2018

Subjects	- Sanitation in Southern Contexts - Working in an International Context
Number of hours	The number of hours and the type of teaching for each subject are detailed in the tables at the end of the document.
Assessment methods	Will be communicated at the beginning of the teaching unit.
Prerequisites for following this TU	
General objective	Present concepts, methods and mathematical models to optimise the ecosystem services of aquatic environments for the restoration of rivers, the treatment of diffuse pollution in artificial wetlands and the treatment of extensive domestic and industrial effluents. Main objectives: - Discuss the concept of ecosystem services - Raise awareness of the concept of ecological engineering - Discuss the technical aspects of ecological engineering (natural environment, diffuse pollution, tertiary treatment) - Ability to identify ecosystem services associated with aquatic environments - Identify the techniques to implement in a case study - Assess the scope of the techniques to apply
Targeted skills	- Be able to identify ecosystems services rendered by aquatic ecosystems - Adapt the systems / treatment possibilities to the pollution to be treated - Calculate the evolution of the environmental impact engendered by the ecological engineering systems envisioned

Advanced Project Management

Management de projet avancé

MANAGPRO

Type of teaching unit: **Common core**

Language	EN	Module coordinator	Amir Hassene Ali NAFI
ECTS	3		
Academic year	2020/2021	Contact	amir.nafi@engees.unistra.fr
Semester	9 (autumn term)	Last update	11/03/2018

Subjects	- Life Cycle Analysis - Project management / MS Project
Number of hours	The number of hours and the type of teaching for each subject are detailed in the tables at the end of the document.
Assessment methods	Will be communicated at the beginning of the teaching unit.
Prerequisites for following this TU	Environmental assessment and project management
General objective	Consolidate first year's lessons (semesters 5 and 6) in sustainable development engineering and project management. This is to broaden the scope of environmental assessment through a more comprehensive and multi-criteria methodology namely Life Cycle Analysis that goes beyond the GHG inventory discussed before. Deepening project management by learning to use software and a case study that addresses the human dimension in project management as a separate competence.
Targeted skills	It involves adapting an environmental assessment methodology to systems or methods of water management. This translates into real skills in engineering, optimization and even eco-design by adapting the approaches that exist and taking a step back from the use and interpretation of results obtained. This is to show that this assessment skill can be an added value in calls for tender or diagnostic studies. Preliminary training in the use of LCA software: GaABI.

Territorial Management of the Environment and Risks

Gestion territoriale de l'environnement et des risques

GESTER

Type of teaching unit: **Specialisation in Hydrosystems**

Language	EN	Module coordinator	Sara FERNANDEZ Anne ROZAN
ECTS	6		
Academic year	2020/2021	Contact	sara.fernandez@engees.unistra.fr
Semester	9 (autumn term)	Last update	11/03/2018

Subjects	Territorial Management of the Environment and Risks
Number of hours	The number of hours and the type of teaching for each subject are detailed in the tables at the end of the document.
Assessment methods	Synthesis/critical analysis of one article in English (humanities and social sciences), oral restitution (forecasting exercise)
Prerequisites for following this TU	- Hydrological concepts related to extreme events (low-flows and floods) - Agronomic concepts (water-soil-plant interdependence, water yield and stress, etc.) - Economic and legal concepts (scarce resources, common goods, valuation of environmental goods etc.) - Actors and financial circuits of water management - National and international water policies/politics/polities
General objective	- Know the institutional and economic instruments of public action for water management in France - Understand extreme situations: floods, water scarcity and conflicts over the use of water resources - Understand what the technical choices regarding water says about society's choices, and conversely, understand the link between scientific rigor and political pragmatism (prospective)
Targeted skills	- Ability to understand the implicit assumptions of choices to develop action strategies (prospective) - Ability to mobilize analytical tools specific to the humanities and social sciences - Team work and project management skills by ensuring a distribution of tasks and responsibilities within the group - Ability to synthetize and critically read a social science text

Erosion and Solid Matter Transport

Gestion de l'érosion et du transport solide

GESER

Type of teaching unit: **Specialisation in Hydrosystems**

Language	EN	Module coordinator	Emilie BEAULIEU
ECTS	3		
Academic year	2020/2021	Contact	emilie.beaulieu@engees.unistra.fr
Semester	9 (autumn term)	Last update	11/03/2018

Subjects	- Solid Matter Transport in Streams - Solid Matter Transport in Mountains
Number of hours	The number of hours and the type of teaching for each subject are detailed in the tables at the end of the document.
Assessment methods	2 reports
Prerequisites for following this TU	Hydrology, hydraulics, chemistry, hydromorphology, agronomy, scientific calculation, GIS
General objective	The aim of this teaching unit is to provide the knowledge necessary for understanding and management of solid transport phenomena in mountainous areas (debris flow) and in the presence of works (e.g. dams). - Analyse available data (hydrology, geology, soil occupation, geomorphology ...) on a site and propose an inventory of areas and issues - identify the different modes of solid transport and quantify solid transport(mudslides / landslides) - identify the various protection systems - make a diagnosis of soil erosion phenomena during a project - quantify the solid transport before and after the implementation of structure such as a dam
Targeted skills	- fully understand solid transport processes and their management - manage a project as a whole (from the exposure of the problem to the resolution and proposal of solutions) - groupwork - ability to take into account the impacts and / or costs of a project - establish a diagnosis from paper and computer resources

Contaminant Transport in Hydrosystems

Gestion du transfert de contaminants

GESQUAL1

Type of teaching unit: **Specialisation in Hydrosystems**

Language	EN	Module coordinator	Jérémy MASBOU
ECTS	3		
Academic year	2020/2021	Contact	jeremy.masbou@engees.unistra.fr
Semester	9 (autumn term)	Last update	11/03/2018

Subjects	Contamination Transfer Management
Number of hours	The number of hours and the type of teaching for each subject are detailed in the tables at the end of the document.
Assessment methods	A group report on the quantification and prediction of contaminant transport at the studied study site and an individual report.
Prerequisites for following this TU	Hydrology, Hydrogeology, Chemistry, GIS, Modelling Tools for Water Resources Management
General objective	- Understand: interaction between microbiological, chemicals and hydrology during contaminant transfer - Acquire basics: observe and characterize contaminant transfer - Understand and use modern analytical approaches: Assess and predict the transfer and degradation of contaminants
Targeted skills	- Know how to diagnose contaminant transport routes on the surface water / groundwater continuum - To be able to design and conduct a water and soil sampling protocol for quantifying a contaminant - Interpret contaminant quantification results in various environmental compartments and associated uncertainties - Implement prediction tools to interpret and translate results of contaminant transport within hydrosystems

Management of Aquatic Natural Environments

Gestion des milieux naturels aquatiques

GESQUAL2

Type of teaching unit: **Specialisation in Hydrosystems**

Language	EN	Module coordinator	Corinne GRAC
ECTS	3		
Academic year	2020/2021	Contact	corinne.grac@engees.unistra.fr
Semester	9 (autumn term)	Last update	11/03/2018

Subjects	- Management of Aquatic Natural Environments - Renaturation
Number of hours	The number of hours and the type of teaching for each subject are detailed in the tables at the end of the document.
Assessment methods	1 report and 1 oral defence
Prerequisites for following this TU	This TU is based on the full understanding of acquired knowledge in ecological engineering (TU above INGECOL), in fluvial hydraulics and in hydro-ecology, including ecological diagnostic tools.
General objective	Propose, implement and assess actions of protection, restoration and management of natural aquatic ecosystems to achieve European objectives of good ecological status. Teaching and practical work in the context of a visit and a local project (documents and project supervision partially in french, work organised by group mixing french speakers and english speakers).
Targeted skills	Acquisition of skills to make a diagnosis, to propose restoration actions, monitor their progress, assess them as project manager/engineering consultancy or to manage natural environments as project owner-councils, managers of protected areas

Management of Flooding Risks and 2D Urban Stream Flood Modelling

Gestion du risque inondation, modélisation 2D inondation rivière ville

HYDROMOD3

Type of teaching unit : **Specialisations in Hydrosystems and Urban Hydraulics**

Language	EN	Module coordinator	Pascal FINAUD-GUYOT
ECTS	3		
Academic year	2020/2021	Contact	pascal.finaudguyot @engees.unistra.fr
Semester	9 (autumn term)	Last update	11/03/2018

Subjects

- Flooding Vulnerability
- 2D Modelling
- Flood Prevention Planning
- Dams

Number of hours

The number of hours and the type of teaching for each subject are detailed in the tables at the end of the document.

Assessment methods

Flooding Vulnerability: Oral exam in flood research and risk management
Flood Prevention Planning: A card and a settlement handed in at the end of the project

Prerequisites for following this TU

GIS, open channel hydraulics, river hydraulics

General objective

This teaching unit deals with:
- regulatory approaches to risk management and
- advanced flood modelling tools (2D approach)

Both these points are assessed.

Targeted skills

- Identify the type of modelling adapted for the study of floods
- use modelling results to produce a document (Flood Prevention Plan or equivalent)
- taking into account any uncertainties of the model
- Be able to identify ecosystems services rendered by aquatic ecosystems
- Adapt the systems / treatment possibilities to the pollution to be treated
- Calculate the evolution of the environmental impact engendered by the ecological engineering systems envisioned

Public Performance Monitoring and Expertise

Expertise et pilotage des services

PILOT

Type of teaching unit: **Specialisations in Water Treatment, Urban Hydraulics and Utility Management and Construction Sites**

Language	EN	Module coordinator	Christophe WITTNER
ECTS	3		
Academic year	2020/2021	Contact	marie.tsanga@engees.unistra.fr
Semester	9 (autumn term)	Last update	11/03/2018

Subjects	Public performance assessment: economic regulation of outsourced water services, public water governance
Number of hours	The number of hours and the type of teaching for each subject are detailed in the tables at the end of the document. Subject to alterations, depending on the lecturers (French or English speaking externals).
Assessment methods	Will be communicated at the beginning of the teaching unit.
Prerequisites for following this TU	Public environmental management, public accounting. Knowledge of French is an advantage
General objective	Provide knowledge and tools to learn and integrate through case studies, the multidisciplinary approach necessary for the analysis of the management performance and the requirements of the economic regulation of public water services.
Targeted skills	- Be able to situate the nature of the activity's reporting documents and to identify useful and reliable information for performance analysis and regulation of a public water or sanitation service. - Know the relevant criteria for analysing and assessing overall performance of a public service. - Identify and integrate the key articles of a public service delegation contract and to understand the issues. - Integrate and know how to implement the tools of economic, financial and pricing analysis. - Be able to interpret accounting, economic and financial reporting technical documents - Be able to make a diagnosis and make a judgment on the overall performance of the service - Know how to use the key elements of assessment and analysis of the performance of the service to provide information for a strategic management dialogue among the main stakeholders of water management - Understand the dynamics and the realities of stakeholders and the regulatory issues at stake of a public service

Standardisation and Risk Evaluation

Normalisation, évaluation des risques

NORMAL

Type of teaching unit: **Specialisations in Water treatment and Utility Management and Construction Sites**

Language	EN	Module coordinator	Amir Hassene Ali NAFI
ECTS	3		
Academic year	2020/2021	Contact	amir.nafi@engees.unistra.fr
Semester	9 (autumn term)	Last update	11/03/2018

Subjects

- Risk Analysis and Management
- Engineering Standards

Number of hours

The number of hours and the type of teaching for each subject are detailed in the tables at the end of the document.

Assessment methods

Will be communicated at the beginning of the teaching unit.

Prerequisites for following this TU

Quality management system ISO 9000 and ISO 14000

General objective

The aim is to widen engineering students' skills beyond technical skills. The lessons proposed refer to management in the broad sense, more specifically, organization (water/sanitation/deconcentrated services) and more particularly around the definition of management systems addressed by the various standards. Two aspects seem relevant: 1) knowledge of the norms and sectorial standards landscape more specifically and 2) the execution and implementation of these standards by explaining the place of the engineer in this type of project, support and guidance, participation.
The other aspect related to management concerns the area of risk and the implementation of existing risk management approaches that embody a managerial dimension but also a strong technical dimension in the image of the approaches and existing methods for the identification and assessment of risk in general but also in the field of water and sanitary risk.

Targeted skills

- Know the standards: technical standards vs. systems standards
- Understand a standard and be able to implement it.
- Associate project management with the implementation of a standard by identifying the role that the engineer can play in such a project.
- Know the concept of risk, types of risk and risk management in the water and sanitation field
- Know the methods and approaches for risk management
- Construct ad-hoc performance indicators for risk assessment.
- Be able to identify ecosystems services rendered by aquatic ecosystems
- Adapt the systems / treatment possibilities to the pollution to be treated
- Calculate the evolution of the environmental impact engendered by the ecological engineering systems envisioned

Drinking Water Treatment 2

Traitement des eaux de consommation 2

TREAUC2

Type of teaching unit: **Specialisation in Water treatment**

Language	EN	Module coordinator	Christian BECK
ECTS	3		
Academic year	2020/2021	Contact	christian.beck@engees.unistra.fr
Semester	9 (autumn term)	Last update	11/03/2018

Subjects

- Interdisciplinary Treatment Station Rehabilitation Project
- Emerging Problems and Specific Treatments
- Industrial Water Problems

Number of hours

The number of hours and the type of teaching for each subject are detailed in the tables at the end of the document.

Assessment methods

1 report per group of 3-4 students

Prerequisites for following this TU

Basics of chemistry solutions and organic chemistry, Knowledge of water's physicochemical parameters, Process Engineering, Microbiological engineering, Fluid mechanics, Applied hydraulics, Drinking water treatment

General objective

Conceived as a deepening and a follow-up to the drinking water treatment course in semester 7, this module aims to complete it by giving insights into current and future treatment problems, as well as on special contexts drinking water production, such as in the context of developing countries or emergency response, as well as a first look at industrial water treatment.
In addition, it also aims at taking a step back
and laying the groundwork for reflection on the upstream / downstream issues of a drinking water production plant project, the problems of rehabilitation, diagnosis of an existing installation, management of an installation in the event of non-compliance, control of operating costs.

Targeted skills

- ability to diagnose the functioning of an existing industry and its weak points with regard to health objectives, reliability, operating costs, environmental impact, and then define short-term priorities for the manager or in the longer term for restoration work; obtaining a wider perspective
- ability to integrate upstream / downstream aspects of a treatment plant project (regulatory authorizations, including levy / distribution, security context, problematic costs operation, energy contract, land and phasing problems...)
- awareness of the evolution of the parameters to be processed and the technologies according to the emerging issues
- Balancing treatment objectives and adapted techniques with various contexts (emerging countries, crisis management, industrial water treatment ...)

Wastewater Treatment 2

Traitement des eaux usées 2

TREAUS2

Type of teaching unit: **Specialisation in Water treatment**

Language	EN	Module coordinator	Julien LAURENT
ECTS	3		
Academic year	2020/2021	Contact	julien.laurent@engees.unistra.fr
Semester	9 (autumn term)	Last update	11/03/2018

Subjects	- Initiation - Resource Recovery - Wastewater Treatment 2 - Treatment of Micropolluants
Number of hours	The number of hours and the type of teaching for each subject are detailed in the tables at the end of the document.
Assessment methods	Will be communicated at the beginning of the teaching unit.
Prerequisites for following this TU	Knowledge of water's physicochemical parameters, Knowledge of the overall structure of a treatment chain, Process engineering, Microbiological engineering, Wastewater treatment, Drinking water treatment, Knowledge of servo modes, control over a TSUE
General objective	In-depth knowledge on a number of specific / recent issues in the field of wastewater treatment Identify current and future issues in wastewater treatment processes
Targeted skills	Getting started - Understand the methodology of startup operations of a "typical" water treatment facility - Have the necessary bases to plan the controls and the stages of the ramping up process - Anticipate problems by the management of technical, operational, organizational and contractual aspects - Avoid the most common mistakes and analyse the associated risks - Understand the pathway towards final acceptance of the buildings work and factory. Micropollutants - Approach to techniques (treatments, reduction at the source) that can be envisaged for the mitigation of micropollutant flows contained in urban waters - Know the issues and the various treatment channels related to treating micropolluants - Sizing Know the resource recovery potential (reuse of treated water, energy, nutrients) of wastewater and changes in the sector (paradigm shift) to achieve this

Wastewater Treatment Modelling

Modélisation du traitement des eaux usées

TREAUS3

Type of teaching unit: **Specialisation in Water treatment**

Language	EN	Module coordinator	Julien LAURENT
ECTS	3		
Academic year	2020/2021	Contact	julien.laurent@engees.unistra.fr
Semester	9 (autumn term)	Last update	11/03/2018

Subjects	Wastewater Treatment Modelling
Number of hours	The number of hours and the type of teaching for each subject are detailed in the tables at the end of the document.
Assessment methods	Will be communicated at the beginning of the teaching unit.
Prerequisites for following this TU	Knowledge of water's physicochemical parameters Knowledge of the overall structure of a treatment chain Process engineering Microbiological engineering Wastewater treatment Performance data analysis of wastewater treatment plant, data validation and reconciliation
General objective	Student acquisition of tools to understand the physical processes and associated mathematical models for biologically activated sludge treatment. Know how to model the dynamic operation of a wastewater treatment plant Consolidation of knowledge acquired in the TREAUS1 teaching unit.
Targeted skills	- Identify the physical and biological mechanisms involved in the treatment of activated sludge wastewater - Knowledge of the processes described by the main bio-kinetic models (biological kinetics) - Knowledge of 1D decantation and oxygen transfer models - Ability to describe the functionality of an activated sludge process for - wastewater treatment - Ability to associate a mathematical model with a physical / chemical / biological process, - Ability to understand, use and implement mathematical models that simulate the described processes. - Know how to use a simulation platform (ASIM) - Notions about calibration and model validation

Modelling Hydrodynamic and Reactive Transfers in Constructed Wetland: Application to Wastewater and Stormwater Treatment

Modélisation du couplage Hydrodynamique et Transferts Réactifs : Application aux filières extensives de traitement des eaux usées et pluviales (MHyTRéA) - MHYTREA

Type of teaching unit: **Specialisation in Water treatment**

Language	EN	Module coordinator	Adrien WANKO NGNIEN
ECTS	3		
Academic year	2020/2021	Contact	adrien.wankongnien @engees.unistra.fr
Semester	9 (autumn term)	Last update	11/03/2018

Subjects	Modelling hydrodynamic and reactive transfers in Constructed Wetland: Application to wastewater and stormwater treatment
Number of hours	The number of hours and the type of teaching for each subject are detailed in the tables at the end of the document.
Assessment methods	Directed studies/ Project defence/Project report.
Prerequisites for following this TU	Higher Mathematics
General objective	Constructed Wetland: history, application and functionalities Learning Hydrus software Modelling water flow through variably saturated porous media Modelling solute transport through porous media Modelling water flow and reactive transport in constructed wetland Introduction to model calibration and validation First case study: Modelling stormwater treatment using green roofs Second case study: Tertiary treatment by surface flow constructed wetland This teaching unit has for general objective the acquisition by the students of the tools to understand the physical processes and the associated mathematical models in the framework of the wastewater and stormwater treatment by constructed wetland. Three main goals: - Identify the physical mechanisms involved in constructed wetland for urban water treatment through extensive processes, - Describe biological kinetics and the influencing factors, - Model the interactions between hydrodynamics and reactive transfers
Targeted skills	- Ability to describe the functionalities of constructed wetland for urban water treatment, - Ability to associate a mathematical model with a physical process, - Ability to understand, use, implement and criticize mathematical models that simulate the described processes for a better constructed wetland sizing and diagnostic.

Ecological Engineering

Ingénierie écologique

INGECOL

Type of teaching unit: **Specialisations in Hydrosystems and Water Treatment**

Language	EN	Module coordinator	Paul BOIS
ECTS	3		
Academic year	2020/2021	Contact	paul.bois@engees.unistra.fr
Semester	9 (autumn term)	Last update	11/03/2018

Subjects	- Extensive Wastewater Treatment - Treatment of Diffused Pollution - Ecosystem Services and Ecological Engineering
Number of hours	The number of hours and the type of teaching for each subject are detailed in the tables at the end of the document.
Assessment methods	Written examination, Project on natural ecosystems, Tutorial about diffuse pollution, Tutorial about tertiary treatment, Case study
Prerequisites for following this TU	Water treatment, Ecology, hydroecology, hydraulics, ecology, territories, hydrogeology, hydrology
General objective	Present the concepts, methods and mathematical models to optimise the ecosystem services provided by aquatic environments for the restoration of rivers, the treatment of diffuse pollution in artificial wetlands and the treatment of extensive domestic and stormwater effluents. Main objectives: - Discuss the concept of ecosystem services - Raise awareness on the concept of ecological engineering - Discuss the technical aspects of ecological engineering (natural environment, diffuse - pollution, tertiary treatment) - Ability to identify ecosystem services associated with aquatic environments - Identify the techniques to implement in a case study - Assess the scope of the techniques to apply
Targeted skills	- Be able to identify ecosystems services provided by aquatic ecosystems - Adapt the systems / treatment possibilities to the pollution to be treated - Calculate the evolution of the environmental impact generated by the ecological engineering systems envisioned

Technological Project/Company Project

Projets d'entreprises

PROTEC

Type of teaching unit: **Specialisations in Hydrosystems, Water Treatment and Urban Hydraulics**

Language	EN	Module coordinator	Catherine FRAUNHOFER
ECTS	3		
Academic year	2020/2021	Contact	catherine.fraunhofer @engees.unistra.fr
Semester	9 (autumn term)	Last update	11/03/2018

Subjects	Technological Project/Company Project
Number of hours	The number of hours and the type of teaching for each subject are detailed in the tables at the end of the document.
Assessment methods	Group project, oral presentation
Prerequisites for following this TU	Depending to the project: Ecology, hydroecology, hydraulics, environment, territories, hydrogeology, hydrology
General objective	At the end of this project, the student will be able to: - Analyse a given problem in its institutional, cultural, social, human and environmental context - Implement its knowledge, scientific and technical tools to respond to this problem - Assess his or her own skills and organize them within a work group
Targeted skills	- Fully understand (scientific and technical) conceptual tools - Conjugate technical knowledge with an understanding of the institutional and human environment - Take into account social, ethical, safety and health issues at work - Take environmental issues into account - Fully understand technical and human know-how in the organizational, personal, and cultural dimension - Know, assess and manage his or her skills