

## [GC101] TREATMENT TECHNOLOGY: WATER AND AIR

### GENERAL INFORMATION

<b>Studies</b>	DEGREE IN ENGINEERING IN ECO-TECHNOLOGY IN INDUSTRIAL PROCESS		<b>Subject</b>	WASTE MANAGEMENT AND TREATMENT
<b>Semester</b>	1	<b>Course</b>	3	<b>Mention / Field of specialisation</b>
<b>Character</b>	COMPULSORY		<b>Language</b>	ENGLISH
<b>Plan</b>	2017	<b>Modality</b>	Adapted Face-to-face	<b>Total hours</b>
<b>Credits</b>	6	<b>Hours/week</b>	2.33	42 class hours + 108 non-class hours = <b>150 total hours</b>

### PROFESSORS

AROSTEGUI OCHOA, ASIER

### REQUIRED PREVIOUS KNOWLEDGE

Subjects	Knowledge
(No specific previous subjects required)	(No previous knowledge required)

### SKILLS

#### VERIFICA SKILLS

##### SPECIFIC

**GCES06** - To be able to analyse, design, simulate and optimise processes and products.

##### GENERAL

**G\_CB6** - To be able to respond adequately in complex situations or situations that call for innovative solutions in both the academic field and work environments within their field of study;

**GCCG03** - To take the initiative in problem solving, decision making and creativity, and to communicate and share knowledge and skills, understanding the ethical and professional responsibilities of the business activity in the field of Ecotechnology Engineering in Industrial Processes.

**GCCG4** - To know how to perform measurements, calculations, valuations, studies, reports, task planning, and other activities pertaining to the field of Ecotechnology Engineering in Industrial Processes

**GCCG5** - To be able to analyse and assess the social and environmental impact of technical solutions.

**GCCG8** - To draft and develop projects in the field of Ecotechnology Engineering in Industrial Processes, focusing on the the design and development and on the application of systems, technologies and strategies in the industrial processes which minimise their impact on the environment.

##### CROSS

**GCCTR2** - To be able to do their job in cooperative, participatory environments, with awareness of social responsibility.

##### BASIC

**G\_CB2** - To be able to apply knowledge to occupational or professional tasks; have the necessary skills to pose and defend arguments, and to solve problems within their field of study

**G\_CB3** - To be capable of gathering and interpreting relevant data (normally within their field of study) in order to make judgements, reflecting on relevant matters of a social, scientific or ethical nature

**G\_CB4** - To be able to communicate information, ideas, problems and solutions to both expert and lay audiences

### LEARNING RESULTS

**RG301** Assumes responsibilities in the work team, organizing and planning the tasks to be developed, facing the contingencies and encouraging the participation of its members.

#### LEARNING ACTIVITIES

Development and writing of records, reports, presentations, audiovisual material, etc. on projects/work experience/challenges/case studies/experimental investigations carried out individually and/or in teams

CH

NCH

TH

6 h.

6 h.

#### EVALUATION SYSTEM

Self-assessment

W

50%

Co-assessment

50%

#### MAKE-UP MECHANISMS

(No mechanisms)

**Comments:** Assessment of the acquired transversal skills:  
Followed methodology to solve the project: team work, decision making methods, conflict management... Project management: definition of objectives, planning,... Written and oral communication

**Comments:** Continuous assessment. The project is managed through the tutoring meetings and the meetings held with the experts, errors are corrected and the precise guidelines are given to overcome the project.

**CH - Class hours:** 0 h.

**NCH - Non-class hours:** 6 h.

**TH - Total hours:** 6 h.

**RG302 Analyze the intervening variables in the problem and propose actions for a stable situation.**

**LEARNING ACTIVITIES**

*CH*

*NCH*

*TH*

Development and writing of records, reports, presentations, audiovisual material, etc. on projects/work experience/challenges/case studies/experimental investigations carried out individually and/or in teams

5 h.

5 h.

**EVALUATION SYSTEM**

*W*

Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems

100%

**MAKE-UP MECHANISMS**

*(No mechanisms)*

**Comments:** Continuous assessment. The project is managed through the tutoring meetings and the meetings held with the experts, errors are corrected and the precise guidelines are given to overcome the project.

**Comments:** Assessment of the acquired transversal skills:

Followed methodology to solve the project: team work, decision making methods, conflict management... Project management:

definition of objectives, planning,... Written and oral communication

**CH - Class hours:** 0 h.

**NCH - Non-class hours:** 5 h.

**TH - Total hours:** 5 h.

**RG304 Define the problem, develop the solution and present the conclusions in a efficient manner, arguing and justifying each one of them in writing.**

**LEARNING ACTIVITIES**

*CH*

*NCH*

*TH*

Development and writing of records, reports, presentations, audiovisual material, etc. on projects/work experience/challenges/case studies/experimental investigations carried out individually and/or in teams

6 h.

6 h.

**EVALUATION SYSTEM**

*W*

Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems

100%

**MAKE-UP MECHANISMS**

*(No mechanisms)*

**Comments:** Continuous assessment. The project is managed through the tutoring meetings and the meetings held with the experts, errors are corrected and the precise guidelines are given to overcome the project.

**Comments:** Assessment of the acquired transversal skills:

Followed methodology to solve the project: team work, decision making methods, conflict management... Project management:

definition of objectives, planning,... Written and oral communication

**CH - Class hours:** 0 h.

**NCH - Non-class hours:** 6 h.

**TH - Total hours:** 6 h.

**RG305 Define the problem, develop the solution and present the conclusions in a efficient manner, arguing and justifying each one of them in spoken form.**

**LEARNING ACTIVITIES**

*CH*

*NCH*

*TH*

Development and writing of records, reports, presentations, audiovisual material, etc. on projects/work experience/challenges/case studies/experimental investigations carried out individually and/or in teams

6 h.

6 h.

**EVALUATION SYSTEM**

*W*

Presentation and defence of exercises, case studies, computer practical work, simulation practical work, laboratory practical work, term projects, end of degree project, master's thesis, challenges and problems

100%

**MAKE-UP MECHANISMS**

*(No mechanisms)*

**Comments:** Continuous assessment. The project is managed through the tutoring meetings and the meetings held with the experts, errors are corrected and the precise guidelines are given to overcome the project.

**Comments:** Assessment of the acquired transversal skills:

Followed methodology to solve the project: team work, decision

making methods, conflict management... Project management:  
definition of objectives, planning,... Written and oral communication

**CH - Class hours:** 0 h.  
**NCH - Non-class hours:** 6 h.  
**TH - Total hours:** 6 h.

**RGC322 Understanding of the nature of impurities in waters and wastewaters, the basic principles of conventional treatment processes, and select and applicate the appropriate processes depending on the nature of the impurities to be removed**

**LEARNING ACTIVITIES**

	<i>CH</i>	<i>NCH</i>	<i>TH</i>
Development, writing and presentation of memorandums, reports, audiovisual material, etc.	5 h.	10 h.	15 h.
Relating to projects/POPBLs carried out individually or in teams			
Individual study and work, tests and evaluations and check points	20 h.		20 h.
Presentation of the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects	2 h.	23 h.	25 h.

**EVALUATION SYSTEM**

*W*

Individual written and oral tests to assess technical skills of the subject 75%

Presentation and defence of exercises, case studies, computer practical work, simulation practical work, laboratory practical work, term projects, end of degree project, master's thesis, challenges and problems 25%

**Comments:** - In order to calculate the average, a minimum mark of 3.0 is necessary in the written exam - In each topic they have to fill in the gaps in a scheme using Mudle, the student who filled in correctly and presented to the class can lead to +1 in the learning outcome - When the number of questionnaires is greater than 3, the lowest mark could be discarded in the calculation of the average

**MAKE-UP MECHANISMS**

Individual written and oral tests to assess technical skills of the subject

**Comments:** The final mark is obtained as follows: 25 % written exam + 75 % retake

**CH - Class hours:** 27 h.  
**NCH - Non-class hours:** 33 h.  
**TH - Total hours:** 60 h.

**RGC323 Understanding of the scientific principles that characterize the physical and chemical behaviour of atmospheric pollutants and the chemical engineering air**

**LEARNING ACTIVITIES**

	<i>CH</i>	<i>NCH</i>	<i>TH</i>
Individual study and work, tests and evaluations and check points	2 h.	12 h.	14 h.
Presentation of the teacher in the classroom, in participatory classes, of concepts and procedures associated with the subjects	13 h.		13 h.
Carrying out/resolving projects/challenges/cases, etc. to provide solutions to problems in interdisciplinary contexts, real and/or simulated, individually and/or in teams		40 h.	40 h.

**EVALUATION SYSTEM**

*W*

Individual written and oral tests to assess technical skills of the subject 45%

Reports on the completion of exercises, case studies, computer exercises, simulation exercises, laboratory exercises, term projects, challenges and problems 55%

**Comments:** - In order to calculate the average, a minimum mark of 3.0 is necessary in the written exam - When the number of questionnaires is greater than 3, the lowest mark could be discarded in the calculation of the average

**MAKE-UP MECHANISMS**

Individual written and oral tests to assess technical skills of the subject

**Comments:** The final mark is obtained as follows: 25 % written exam + 75 % retake

**CH - Class hours:** 15 h.  
**NCH - Non-class hours:** 52 h.  
**TH - Total hours:** 67 h.

## CONTENTS

1. Constituents in wastewater
2. Primary wastewater treatment
3. Secondary wastewater treatment
4. Tertiary wastewater treatment
5. Industrial wastewaters management
6. Air pollution
7. Treatment and control systems for particles and dust
8. Gas cleaning systems

## LEARNING RESOURCES AND BIBLIOGRAPHY

### Learning resources

Moodle Platform  
Slides of the subject  
Topic related web quires  
Video projections

### Bibliography

[http://katalogoa.mondragon.edu/janium-bin/janium\\_login\\_opac\\_re\\_Ink.pl?grupo=EKOTEKNOLOGIA31&ejecuta=5](http://katalogoa.mondragon.edu/janium-bin/janium_login_opac_re_Ink.pl?grupo=EKOTEKNOLOGIA31&ejecuta=5)