

MODULE TEACHING GUIDE

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| | 2th COURSE |
| 40967 | Industrial Ecology I |
| 40968 | Industrial Ecology II |
| 40969 | Practicum |
| | 2th semester |
| 40970 | Thesis |

MODULE TEACHING GUIDE

GENERAL DATA OF THE MODULE

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|---|--|------------------------------------|--------------------------|----------------------|
| Name | Industrial Ecology I | | | |
| Code | 40967 | | | |
| Course and teaching period | Second course, first semester | | | |
| Schedule | See attached schedule | | | |
| Credits ECTS | 10 | | | |
| Type of Module | Common of Master <input checked="" type="checkbox"/> Common of speciality <input type="checkbox"/> Optional | | | |
| Previous requirements to follow the module | | | | |
| Teaching language | English | | | |
| Module responsible | Montserrat Sarrà | | | |
| Department responsible | Dept. of Chemical Engineering | | | |
| TEACHING TEAM | | | | |
| Professor name | Department | Office | e-mail | Tutorials |
| Xavier Gabarrell | Chemical Eng | QC/1087 | Xavier.gabarrell@uab.cat | Previous appointment |
| David Gabriel | Chemical Eng | | David.gabriel@uab.cat | Previous appointment |
| Montse Sarrà | Chemical Eng | QC/1087 | Montserrat.Sarra@uab.cat | Previous appointment |
| Lidia Lombardi | Dipartimento di Energetica "Sergio Stecco" | Universita' degli Studi di Firenze | | |

MODULE ESPECIFIC DATA

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| <p>Educational objectives of the Module</p> | <p>At the end of the module, the student will be capable of:</p> <ul style="list-style-type: none">- Choosing and proposing the most suitable management system for an industrial waste according the actual legislation.- Use adequately the European Decision 2000/532/EC, that establishes a single community list which integrates all the waste.- Proposing a municipal waste management plan for a fixed zone.- Proposing a logic sequence for automatic classification of the fractions of the municipal solid waste.- Evaluating the possibility to apply a biological treatment for a waste according to its characteristics.- Proposing an organic waste valorization system.- Obtaining and synthesizing actual information from the specialized bibliographic sources related to biologic wastewater treatment.- Analyzing the performance of a biologic wastewater treatment plant (WWTP) and proposing improvement and correction actions.- Evaluating the main impact of a landfill- Analysing the main characteristics of the bioreactors design and performance for residual gases and odors.- Analysing sustainable energy systems |
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Module structure and contents

Bloc 1. Industrial waste management

1.1. Industrial waste management

- General context: economic indicators
- Waste legislation: definition, priorities, European, Spanish and Catalan. Definitions.
- Industrial wastes: management, specific cases: Catalonia, Netherlands and Portugal

1.2. General concepts of the industrial waste management

- List of wastes, CRC, involved actors, waste producers.
- Hazardous properties
- Management models.

Bloc 2. Municipal waste management

2.1. General overview: waste production, composition, properties, environmental impacts, legislation

2.2. Collecting systems and related sustainability indexes.

2.3. Management plan

2.4. Processing plants:

- General overview of the available technologies
- Description of the several plants
- Characteristics of the main unit operations involved

2.5. Recyclable materials

2.6. Landfills

Bloc 3. Aerobic depuration of wastewater (*)

3.1. Introduction. WWTP context. Legislation, management and organization.

3.2. Wastewater characterization: (analysis and respirometry)

3.3. WWTP schemes. Pretreatment and sedimentation design. Reactors dimensioning and designing. Organic material removal.

3.4. Dimensioning and designing of aerated systems.

3.5. Economic balance: WWTP exploitation costs.

3.6. Control and instrumentation of a WWTP.

4.7. Activated sludge process modelisation.

Bloc 4. Sustainable Energy Systems

4.1. Introduction

4.2. Gas turbine

4.3. Vapour cycles

4.4. Combined cycles and cogeneration

4.5. Introduction to exergy concept

4.6. Greenhouse effect

Bloc 5. Biological treatment of gases and odors

5.1. Fundamentals: emissions (type, characteristics, legislation), sampling and measurement

5.2. Bioreactors for residual gases and odors treatment.

- Fundamentals of the bioreactors.
- Biofilters and percolating biofilters: operation and design of equipments
- Economic aspects of the gas treatment
- Comparing to physic-chemical treatments
- Case study and evaluation

5.3. Modelization of film bioreactors

- General aspects of the mathematical modelisation
- Unidimensional models for fixed bed bioreactors.
- Simulation practical sessions

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| | (*) Adapted blocs depending of the previous background of students |
| <u>Teaching methodology</u> | The main teaching methodology will be through lectures (approximately 65 hours) but discussions will occur during class times, guided by particular readings and exercises. Some classes will be given in computer labs, and will have follow-up exercises. Several visits to industrial installations will be proposed. |
| <u>Evaluation</u> | Evaluation will be done separately by each professor, but in general, evaluation will be based on: assistance to class, class projects, class exercises and short exams. |
| <u>Bibliographic and web links</u> | <p>-Bilitewski, B., Härdtle, G., Marek, K., Weissbach, A., Boeddicker, H. Waste management. 1997. Springer (Germany).</p> <p>- LaGrega, Michael D., Buckingham, P. L., Evans, J. C. "Hazardous waste management" McGraw-Hill, cop., New York 1994.</p> <p>-Lund, H. F., Manual McGraw-Hill de reciclaje. McGraw-Hill/Interamericana de España. 1996. (Madrid). (English version too)</p> <p>-Tchobanoglous, G., Theisen, H., Vigil, S. Gestión integral de residuos sólidos. McGraw-Hill. Madrid (1994).</p> <p>-Landreth, R. E., Rebers, P. A. Municipal Solid Wastes. Problems and Solutions. CRC Press, Inc., 1997. (USA)</p> <p>-Devinny JS, Deshusses MA, Webster TS. "Biofiltration for air pollution control". 1999. CRC. Lewis Publishers. Boca Raton, Florida, EEUU</p> <p>- Freeman H.M., "Standard handbook of hazardous waste treatment and disposal". 2ona ed., 1997 McGraw-Hill.</p> <p>- Haug, R.T. "The practical handbook of compost engineering." 1993. Lewis Publishers (Boca Raton)</p> <p>-Kennes C, Veiga MC. "Bioreactors for waste gas treatment". 2001. Kluwer Academic Publishers. Dordrecht, Holanda</p> <p>- Stuetz R. and F.B. Frechen. "Odours in Wastewater Treatment: Measuring, Modelling and Control" 2001 International Water Association Publishing, London.</p> <p>- Water Science and Technology. (2001) vol 44 n°8. IWA Publishing. UK</p> <p>- Scientific and Technical Report No 10. Sequencing Batch Reactor Technology (2001). Edited by P. Wilderer, R. Irvine and M. Goronsky. ISBN: 1 900222 21 3. Published by IWA Publishing. Cornwall (UK).</p> <p>-Fifth Specialised Conference on Small Water and Wastewater Treatment Systems (2002). Volume II. Editors: I. Ozturk and A. Tanik. ISBN: 975-561-226-2. Istanbul (Turkey).</p> |

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| | <ul style="list-style-type: none"> - http://www.awwa.org American Water Works Association. Journal AWWA. - http://www.eea.eu.int Agència Europea del Medi Ambient - Agència de Residus de Catalunya, www.arc-cat.net. - Centre per a l'Empresa i el Medi Ambient, www.cema-sa.org. - Global Reporting Initiative (GRI) http://www.globalreporting.org |
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MODULE TEACHING GUIDE

GENERAL DATA OF THE MODULE

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|---|--------------------|--|-----------------------------|----------------------|
| Name | | Industrial Ecology II | | |
| Code | | 40968 | | |
| Course and teaching period | | Industrial Ecology Module II: Second course, first semester | | |
| Schedule | | See attached schedule | | |
| Credits ECTS | | 10 | | |
| Type of Module | | Common of Master <input checked="" type="checkbox"/> Common of speciality <input type="checkbox"/> Optional | | |
| Previous requirements to follow the module | | | | |
| Teaching language | | English | | |
| Module responsible | | Gara Villalba | | |
| Department responsible | | Dept. of Chemical Engineering | | |
| TEACHING TEAM | | | | |
| Professor name | Department | Office | e-mail | Tutorials |
| Gara Villalba | Chemical eng. | ETSE 1133 | Gara.villalba@uab.cat | Previous appointment |
| Maria Rosa Rovira | Business Economics | QC/3105 | Mariarosa.Rovira@uab.cat | Previous appointment |
| Joan Rieradevall | ICTA | ETSE | Joan.rieradevall@uab.cat | Previous appointment |
| Assumpció Anton | IRTA | IRTA | assumpcio.anton@irta.es | Previous appointment |
| Carles Martínez | ICTA | IRTA | Carles.martinez@uab.cat | Previous appointment |
| Juan I. Montero | IRTA | IRTA | juanignacio.montero@irta.es | Previous appointment |
| Pere Muñoz | IRTA | IRTA | Pere.munoz @irta.es | Previous appointment |

MODULE ESPECIFIC DATA

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| <p>Educational objectives of the Module</p> | <p>This course will be an introduction to the origin of Industrial Ecology as a multidisciplinary effort, as well as its methods, tools, and strategies aimed to recreate our industrial system in such a way that it can be sustainable and in harmony with the rest of the natural ecosystem. Besides this theoretical overview, big emphasis will be given to:</p> <ul style="list-style-type: none"> • <i>Material flow analysis</i> • <i>Life cycle analysis</i> • <i>Agricultural life cycle analysis</i> • <i>Sustainable Energy systems</i> |
| <p>Specific skills of the module</p> | <p style="text-align: center;">Skill</p> <p>Introduction to Industrial Ecology: -learn about different tools of Industrial Ecology and be able to apply them to systems at different levels.</p> |
| <p>Corporate social responsibility (CSR) -Understanding corporate social responsibility and the international reporting tool for reporting Global Reporting Initiative (GRI).</p> | |
| <p>Agricultural LCA: -better knowledge of intensive horticulture -identify factors with high environmental impact in the agricultural production systems</p> | |
| <p>Product LCA: -interpret and perform life cycle analysis for products and systems -know how to use other methods such as ecoefficiency and ecodesign, ecoparks, and how to integrate these concepts in LCA -use SimaPro to perform LCA</p> | |

**Module structure
and contents**

For Introduction to Industrial Ecology:

1. Industrial Ecology and Technological change. Introduction to the course, objectives and expectations. A general introduction to the concepts of IE, its framework as a multidisciplinary area of research.

2. Concepts from economy, a vision of resources. In class we will do a game where we learn about marginal costs, carbon emission allocations, and country politics.

3. System Theory. A brief introduction to systems theory. Thermodynamics as a conceptual framework for IE.

4. Material Flow Analysis.

5. Introduction to social metabolism and methods. Eurostat guide for MFAs, resources and methods, including estimation methods. We will start a MFA exercise in the computer lab.

For product and process LCA

1. Regulations and legal framework

2. Definition of objectives, functional unit, and inventory.

3. Impact evaluation and improvement analysis

4. Problems associated with LCA, future objectives

5. case studies: products and processes

6. Introduction to SimaPro 6.0

For agricultural LCA:

1. Introduction to intensive horticulture

2. How to identify factors with high environmental impact in the agricultural production systems.

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| For Corporate social responsibility (CSR) accounting and reporting | |
| <ol style="list-style-type: none"> 1. Introduction to CSR 2. Environmental management accounting 3. Sustainability reporting: Global Reporting Initiative (GRI) | |
| Teaching methodology | Teaching and discussions will occur during class times, guided by particular readings and exercises. Some classes will be given in computer labs, and will have follow-up exercises. |
| Evaluation | Evaluation will be done separately by each professor, but in general, evaluation will be based on: assistance to class, class projects, and class exercises. The final grade for the module will be calculated as follows: Introduction to Industrial Ecology: 40% Corporate social responsibility (CSR): 15% Agricultural LCA:10% LCA theory:35% A minimum of 3.5 is needed in each of the four topics in order to pass. |
| Bibliographic and web links | Available from class syllabus from each professor separately. |

MODULE TEACHING GUIDE

GENERAL DATA OF THE MODULE

| | | | | |
|---|--|---------------|-----------------------|------------------|
| Name | Practicum | | | |
| Code | 40969 | | | |
| Course and teaching period | 2 nd year, November through July | | | |
| Schedule | To be determined by the hosting institution | | | |
| Credits ECTS | 10 | | | |
| Type of Module | Common of Master <input checked="" type="checkbox"/> Common of speciality <input type="checkbox"/> Optional | | | |
| Previous requirements to follow the module | | | | |
| Teaching language | English/Spanish/Catalan | | | |
| Module responsible | David Gabriel | | | |
| Department responsible | Department of Chemical Engineering | | | |
| TEACHING TEAM | | | | |
| Professor name | Department | Office | e-mail | Tutorials |
| David Gabriel ^o | Chemical Engineering | QC-1145 | david.gabriel@uab.cat | |

MODULE ESPECIFIC DATA

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|--|---|---|
| <p>Educational objectives of the Module</p> | <p><i>At the end of the module, the student will be capable of:</i></p> <ul style="list-style-type: none"> - Start working in a public or private research institution or of a public or private company with a basic knowledge of the habits and way of work | |
| <p>Specific skills of the module</p> | <p>Skill</p> | <p>Description</p> |
| | <ul style="list-style-type: none"> - Organization - Teamwork - Overall view - Specific skills | <ul style="list-style-type: none"> - To learn about the work is organized and how to organize himself at work - To learn about teamwork with other professionals - The student will gain an overall view of environmental topics that affect the research or professional work - The student will learn the specific tasks and capabilities of the job developed in the hosting institution |
| <p>Module structure and contents</p> | <ul style="list-style-type: none"> - The value of the credits obtained by the student are those detailed in the module - To calculate the amount of dedication (in hours) that the student has to dedicate to the hosting institution one has to take into account that the minimum number of hours per credit is 25, while the maximum is 30 - The practicum does not imply any obligation to the hosting institution nor the university except for those strictly academic. In any case, no job relationship can be ascribed between the student and the hosting institution - Practicum students are covered by the scholar insurance according to actual regulation - Students that due to legal limitations are not covered by the scholar insurance will be required to present supporting documents demonstrating coverage through any other assistance | |
| <p>Teaching methodology</p> | <p><i>Students will be enrolled in the hosting institution system in terms of working hours and working needs. Prior to the start, a registration file will be fulfilled where the tasks to be performed by the student will be detailed.</i></p> <p><i>During the last week of the Practicum period, the student will present a short report describing its activity along the Practicum period</i></p> | |
| <p><i>Evaluation will be performed according to the following marks:</i></p> | | |

| | |
|------------------------------------|---|
| <u>Evaluation</u> | <ul style="list-style-type: none"> - 50% by the student responsible at the hosting institution - 50% by the university tutor according to the report presented and its considered opinion |
| Bibliographic and web links | |

Practicum Instructions

This activity consists in a short stay of the student in a hosting institution (public or private research institution or in a public or private company) to obtain a basic knowledge of the habits and way of work. Such stays are academically recognized through credits and need of an Agreement signed between the University and the hosting institution.

Agreement for the undertaking of practicums for obtaining academic credits is a MUST that provides recognition of academic credits and can qualify students for the JEMES Master that enrolled the Practicum module. The management of this agreement takes place in the Administration of the Faculty of Sciences prior completion of an **Activity Proposal form**. The Annex section shows a model of such agreement and the Activity Proposal form.

As **important information and recommendations** known to setup such agreements include:

- The Practicum commitment is between 250 and 300h according to the registered module, which must be compatible with other teaching activities (exams, class, delivery of practical work) during the teaching period.
 - There is no obligation of the hosting institution to financially reward students. Such initiative is only part of the company and do not need to be reflected in the agreement.
 - The student is covered by medical insurance.
 - Practicum can be performed in Spain or abroad. However, a case by case analysis will be done by the academic tutor to authorize the Practicum.
 - Erasmus Mundus students cannot perform the Practicum in their country of origin. Any exception will be previously assessed at the EAE commissioned.
 - If the hosting institution in Spain is a private or public company, students must be fluent in Spanish or Catalan.
 - There is not a specific list of companies/institutions. Because of the short Practicum period (250h) and the language limitation, students are encouraged to enrol the practicum in the same hosting institution where they will perform their Master Thesis. In this case, the first 250-300h of their dedication in such hosting institution will be counted as the Practicum activities and evaluated correspondingly. Thus, the hosting institution and tutor of your Thesis is the hosting institution and tutor of your Practicum. Regarding hosting institutions of your Practicum/Thesis, each student looks for their own interests.
- **Periods to enrol/stay. Enrollment in this course will be held simultaneously to the registration of the remaining credits for the Masters and the existence of an agreement is needed prior to the commencement of the stay.**



- **During the first semester.** This option is recommended for most of the students. One has to bear in mind that the schedule of practicum should be compatible with the classes in other modules. Since teaching activities are significantly reduced as of late November, you can program your Practicum along December and January.
- **During the second semester.** This is not the recommended option taking into account the number of hours you need to dedicate to your Master Thesis during this semester.

➤ Stages of completion of your stay.

1. Information talk from the JEMES master coordinator (X. Gabarrell).
2. Students must send an e-mail to the Practicum coordinator (david.gabriel@uab.cat) expressing their interests, preferred period (first semester or second semester), field of interest, a short CV in Word or pdf format providing details about Spanish and Catalan skills. Such e-mail must be sent no later than November 5th.
3. If offers are available, the Practicum coordinator will publish in the Campus Virtual a list of places, including a brief description, to make your practicum. This will be between November 5th and November 20th.
4. During a period of one week after the previous point, students can express their preferences for making their stay. Each student will point to three choices in order of preference.
5. The Practicum coordinator will distribute practicum offers based on the preferences of students and conditions of the places (for example, transportation needs, language skills, selected by the company, etc.). Selection between two students applying for the same option will be based on students academic marks.
6. The Practicum coordinator will contact the tutor at the hosting institution to provide him/her with the name and CV of students assigned by the Practicum coordinator.
7. Through the data provided by the practicum coordinator, the student should contact the hosting institution responsible for maintaining an interview to set the details of your stay (hours, tasks to do, etc.). This interview is needed prior to the final acceptance of the student.
8. If the interview is satisfactory, the student must send via e-mail the Activity Proposal form to the The Practicum coordinator. This will contact the Academic Management of the Faculty of Sciences, who shall prepare the corresponding agreement between the UAB and the hosting institution. The agreement will be prepared with multiple copies.
9. The Academic Management of the Faculty of Sciences will send such copies of the agreement, duly signed by the rector of UAB, to the hosting institution responsible to be signed and returned by the hosting institution responsible to the Academic Management of the Faculty of Sciences.
10. Once the agreement is signed, students can start their practicum activities.
11. Finishing your stay. Evaluation according to the following paragraph.

➤ Practicum Evaluation

Evaluation will be performed according to the following marks:

- 50% by the student responsible at the hosting institution (the person that each one of you will detailed in the Activity proposal form).



- 50% by the university tutor (David Gabriel) according to the report presented and its considered opinion.

The way to proceed is as follows:

1. As soon as you finish your dedication to the Practicum you **MUST** write a 2-3 pages **Memorandum of Practicum activities** (see appendix) and send it by e-mail to the Practicum coordinator at david.gabriel@uab.cat

This report will count 50% of your qualification

2. **Once received the report**, the Practicum coordinator will e-mail an **Evaluation form** (see appendix) to the student responsible at the hosting institution. He/she **MUST** fill and sent it back to the Practicum coordinator (by e-mail or enclosed envelop). This will count another 50% of your qualification.

3. If steps 1 or 2 are not performed, I will assume you did not do the Practicum and you will fail to pass

4. If the rating is negative or steps 1 or 2 are not done, the student will fail to pass the Practicum.

➤ **Common variations to this procedure.**

If students want to find a hosting institution to do the practicum, the student must talk directly with the Practicum coordinator to decide if an agreement can be carried out mainly according the work plan and legal limitations. Prior to this talk, the student can use the documentation provided in the present document if requested by the hosting institution. The student must contact the practicum coordinator with enough time to process the agreement before the start of the practicum. This contact should be equal to or no greater than two-three weeks (which is the time generally needed to process an agreement). All other requirements of registration and evaluation of the subject are completely equivalent to the procedure explained in the already established and previously detailed herein.

ATTACHED DOCUMENTATION

- **Activity Proposal form:** Document that must be completed by the company/research institution and by the student prior to the beginning of the practicum.

- **Agreement:** Official document signed between the UAB and the hosting institution to frame the practicum and to recognize the credits.

- **Evaluation form:** document that the tutor responsible of the student named by the company/research institution will use to value the work of students during their stay. This evaluation will correspond to a 50% of the module qualification.

- **Memorandum of Practicum activities:** Report written by the student that must be sent to the academic tutor right after the stay of the student has finished. This will count another 50% of the final qualification of the module.



Universitat Autònoma de Barcelona

Facultat de Ciències

Gestió Acadèmica

ACTIVITY PROPOSAL FORM

To fill by the company/research institution:

Name and position of the person signing the agreement:

Name of de the company/research institution:

Company code (CIF):

E-mail:

Street, number:

Town:

Zip Code:

Phone:

FAX:

Name of the tutor responsible of the student named by the company/research institution:

Period for Practicum: from day/month/year to day/month/year

Working plan:

| X | Code | Module | Credits |
|---|-------|------------------|---------|
| | 40469 | JEMES PracticumI | 10 |

To fill by the student

Name:

Lastname:

DNI/Passport:

Birth date:

Phone:

E-mail:

Academic Tutor: Dr David Gabriel (email: david.gabriel@uab.cat)

Bellaterra, **day** of **month** of 200

INSTRUCTIONS TO FILL THE FORM

This form must be completed by the student and by the tutor at the hosting institution. Then, the student has to e-mail the form to the academic tutor (david.gabriel@uab.cat) who in turn will forward the form to the Administration staff of the Faculty of Sciences for ulterior formalization of the agreement.

To fill by the company/research institution:

Data necessary to write the agreement by the Administration staff of the Faculty of Sciences.

Name and position of the person signing the agreement: person of the company/research institution whose name will appear in the contract agreement.

Name of the tutor responsible of the student named by the company/research institution: person of the company/research institution responsible for setting the work, work follow-up and evaluation.

Period for Practicum: starting and finishing dates. This dates will appear in the agreement and correspond to the period of time in which the student has a medical insurance as Practicum student.

Working plan: Brief description (1-2 lines) with the tasks foreseen during the Practicum period

To fill by the student

Data necessary to write the agreement by the Administration staff of the Faculty of Sciences.

Academic Tutor: professor at the UAB that will make the monitoring and evaluation of the dedication of the student.



**AGREEMENT FOR THE UNDERTAKING OF IN-COMPANY PRACTICUMS
FOR OBTAINING ACADEMIC CREDITS**

Bellaterra (Cerdanyola del Vallès), 00 [day]/00 [month]/200*

PARTIES

For the first party, Dr XXXXXX, Vice-Chancellor of the *Universitat Autònoma de Barcelona*, with the corresponding legal authority established by article 75 of the UAB Statutes, in accordance with his designation as Vice-Chancellor through Decree 269/2005 of December 13 2005, of the *Generalitat de Catalunya*.

For the second party, Mr* /Ms *XXXX, in the name and representation of the company XXXX, with CIF Fiscal Number XXXX, and with the following company address: [Number/Street/Town/Postal Code] and telephone XXXX.

Each of the parties acknowledges that the other has sufficient legal capacity for this agreement, and to this end they make the following

RECITAL

I. The advisability and relevance that students taking the UAB's Master in (XXX) should combine their academic training with professional practice is made clear by the syllabus for the said Master, approved by the Committee for Academic Affairs, by delegation of the Governing Council, 9/06/2006.

II. Article 9.3 of Spanish Royal Decree 56/2005, of January 21 2005, regulating official university postgraduate studies, and its subsequent modifications, allow universities to establish agreements of collaboration with other public or private institutions or organisations, as well as with companies and industry, for the development of training activities included within studies for a Master's degree.

III. The Framework for drawing-up the Masters' syllabi, approved by the Committee for Academic Affairs on March 21 2006, contemplates the possibility of including modules of a project-based or practical character.

To this end, the parties subscribe to this document on the basis of the following:

CLAUSES

First.- The objective of this agreement is for UAB students of (name of studies) to undertake periods of placement with (company/organisation), for the development of practical study or of a project.



Second.- The company/organisation undertakes to design a programme of practicums suitable to the objectives established by the syllabus that the student is following.

Third.- The (Faculty/School) shall nominate an academic tutor for each student participating in this agreement, the said tutor being responsible for monitoring and evaluating the practicums.

Fourth.- Within a maximum period of * from the signing of this agreement, (company/organisation) shall notify (centre/school) the name of a tutor, designated by the company/organisation, responsible for programming and coordinating the practicums. On termination of the period of practicums, the said tutor shall provide a report accrediting the extent to which the student has taken advantage of the practicums, which report shall serve as the basis for the said student's academic assessment.

Fifth.- 1.- The value of the academic credits obtained by the student for practical study or project-based work pertaining to this current agreement shall be that established by the corresponding syllabus.

2.- For calculating the total number of hours that the student shall be required to undertake, the company/organisation must bear in mind that the minimum number of hours per academic credit is 25, and that the maximum number of hours is 30.

Sixth.- The undertaking of practicums does not imply any assumption, for either of the parties, of obligations beyond those strictly established in this document, and in no event shall the undertaking of practicums imply the existence of a work relationship between the student and the company/organisation.

Seventh.- 1. Students undertaking practicums shall be covered by Student Insurance in the terms indicated by current legislation for this subject.

2. Those students not covered by the application of the terms of the said Student Insurance must, at the time of applying for the practicums, accredit their insurance coverage within another insurance system.

Eighth.- Each academic year, the (Faculty/School) shall draw-up an updated annex that shall contain, at the least, the following data:

- a) A list of students participating in the practicums outlined by this agreement.
- b) The students' dates of birth.
- c) The name of the academic tutor.
- d) The name of the tutor nominated by the company/organisation.

- e) The number of academic credits that are obtained through the practicums and the name of the module to which these said credits shall apply.
- f) A plan for the development of the agreement: type of training, start and conclusion dates, monitoring, form of assessment, etc.

Ninth.- 1. This agreement shall take effect from the moment of its signing, and its duration shall be XX (years).

2. The agreement can be rescinded for any of the following causes:

- a) By mutual accord of the parties, such accord given in writing.
- b) For a complaint made by either one of the parties, made with a minimum of three months' application.
- c) For general causes established by current legislation.

Tenth.- Any modification that alters the content of the present agreement must be expressed by mutual accord and by both parties, in an annexe document, for the said modification to be valid.

Therefore, in proof of their conformity with the content of this agreement, the parties sign this document in quadruplicate in the place and on the date indicated.

The Vice-Chancellor
By authorisation,

The Company/Organisation

The Dean/Director of (Faculty/School)

AGREEMENT APPENDIX

1. Participating student: XXXXXX
2. The academic tutor will be: XXXXX
3. The tutor appointed by **XXXX(company name)**: Mr/Ms. XXXX
4. The student will get XX credits for the following subject XXXX
5. The tasks carried out by the student will be XXXXXXXXXXXXX
6. The duration of the training will be from (starting date) XXX to (ending date) XXX
7. In order to assess the student, we will take into consideration not only the report provided by the appointed tutor but also the report made by the student.

JEMES Joint European Master in Environmental Studies



With the authorization of
The vice-chancellor

(company name) XXXXX

Dr. Jordi Bartrolí
Dean of the Faculty of Sciences

(authorised signature)

Bellaterra (Cerdanyola del Valles) , (date) XXXX

EVALUATION FORM OF THE JEMES STUDENTS PRACTICUM BY THE HOSTING INSTITUTION/COMPANY

| | |
|---------------------------|--|
| Hosting Institution: | |
| Supervisor name & e-mail: | |

| | |
|---------------------|--|
| Student name : | |
| ID type and number: | |

1. Value the previous training of the student in order to the needs of the work that you have proposed to him/her within the framework of the project:

| Very good | Good | Regular | Poor | Very poor |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

2. Value the following skills of the student:

| | Very good | Good | Regular | Poor | Very poor |
|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| a) Capacity to organize the work | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| b) Capacity to solve problems | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| c) Capacity for social relationship | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| d) Communication skills | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| e) Capacity to carry out the assigned work | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| f) Capacity for work in groups | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| g) Initiative skills | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| h) Capacity to adapt to the surroundings | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| i) Interest in the work | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

3. Please, indicate which knowledge or which training would have been useful for the student according to the experience of the work that the student carried out

JEMES Joint European Master in Environmental Studies

AALBORG UNIVERSITET



universidade de aveiro



TUHH

Technische Universität Hamburg-Harburg

UAB

Universitat Autònoma de Barcelona

| |
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| |
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4. Evaluate in a global way the work carried out by the student (*1 minimum – 10 maximum*)

| | |
|--------------|--|
| Global mark: | |
|--------------|--|

5. Please, indicate any suggestions that you may consider interesting.

| |
|--|
| |
|--|

Signature:

Date:

Instructions: Please, sign this form, put it in a close envelop and send it to:

[David Gabriel, PhD](#)
[Associate professor](#)

[Department of Chemical Engineering](#)
[Escola Tècnica Superior d'Enginyeria](#)
[Universitat Autònoma de Barcelona](#)
[08193 Cerdanyola del Vallès, Barcelona](#)

Alternatively, you may give it to the student instead of sending it by regular mail.

Memorandum of Practicum activities

As soon as you finish your dedication to the Practicum you MUST write a 2-3 pages report of your activities. This report will count 50% of your qualification.

The written report to be submitted to david.gabriel@uab.cat at the end of your stay must necessarily consist of the following parts, which are detailed below:

(a) Introduction: This part describes the hosting institution in which the student has made the stay, including all the following information: Objective (goals) of your practicum and brief description of the project were you enrolled

(b) work done by the student: This part must be, necessarily, the central body of the report and it should describe the main tasks that the student has done during its stay. This description should include essentially, a brief summary of tasks developed as Practicum activities, responsibilities given to you and any other comments you want to highlight. Confidentiality issues should be respected at all times. It is the responsibility of the student to find a way to reconcile the description of work with interest in the field of the JEMES Master and scrupulously respecting any confidentiality requirements at the same time.

(c) Autoevaluation: the student must explain what he has learned during the practicum, what weaknesses or strengths can be drawn from their experience.