240EQ023 - Control, Verification and Audit

Coordinating unit: 295 - EEVE - Barcelona East School of Engineering
Teaching unit: 713 - EQ - Department of Chemical Engineering
Academic year: 2018
Degree: MASTER'S DEGREE IN CHEMICAL ENGINEERING (Syllabus 2012). (Teaching unit Compulsory)
MASTER'S DEGREE IN CHEMICAL ENGINEERING (Syllabus 2012). (Teaching unit Compulsory)
ECTS credits: 3
Teaching languages: English

Coordinator: Rosa Maria Darbra Roman

Opening hours: To be agreed with the professor

Degree competences to which the subject contributes

Specific:
3. Lead and manage work organization and human resources applying criteria of industrial safety, quality management, risk prevention, sustainability, and environmental management.
4. Manage and perform verification, control of facilities, processes and products, as well as certifications, audits, inspections, tests and reports.

Generical:
5. Possess independent learning skills to maintain and enhance the competencies of chemical engineering to enable the continued development of their profession.
6. Ability to analyze and synthesize to the continued progress of products, processes, systems and services using criteria of safety, affordability, quality and environmental management.

Teaching methodology

Lectures
Practical classes
Independent learning
Learning through projects, problems and case-studies (team project)

Learning objectives of the subject

This subject aims to introduce to the students to the different internal control structures that allow companies to manage three of the most important aspects of an organization: the quality of the product or service, the environmental impact and the safety management.

At the end of this subject, the students will be able to:

1. Identify the most common quality, environmental and safety management systems as well as the methodology to implement them in any organization.
2. Determine the most suitable methodology for the quantification of the environmental impact of a given activity.
3. Appreciate the benefits obtained from the application of a quality management system in an organization or industry.
4. Identify the legal requirements that a company needs to know concerning the safety of their workers, installations and environment.
5. Get a global vision of the integration of three management systems in one organization.

<table>
<thead>
<tr>
<th>Study load</th>
<th>Hours large group:</th>
<th>27h</th>
<th>36.00%</th>
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<tbody>
<tr>
<td></td>
<td>Hours medium group:</td>
<td>0h</td>
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<tr>
<td></td>
<td>Hours small group:</td>
<td>0h</td>
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<tr>
<td></td>
<td>Guided activities:</td>
<td>0h</td>
<td>0.00%</td>
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<tr>
<td></td>
<td>Self study:</td>
<td>48h</td>
<td>64.00%</td>
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<table>
<thead>
<tr>
<th>Content</th>
<th>Learning time: 6h</th>
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| **Introduction to the Management Systems** | Theory classes: 3h  
Self study : 3h |

**Description:**
In this first chapter, a global vision of the subject will be given together with a set of basic definitions that allow the understanding of the concepts that will be used in the forthcoming chapters.

**Related activities:**
There will be a 3 hours lecture and the students will have to read some papers and other documentation at home related to the introductory concepts.

**Specific objectives:**
Objectives from 1 to 5

<table>
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<tr>
<th>Content</th>
<th>Learning time: 19h</th>
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| **Environmental Management Systems** | Theory classes: 5h  
Practical classes: 2h  
Self study : 12h |

**Description:**
In this chapter different aspects related to the environment that affect companies, organizations and the society will be introduced. Different methodologies will be presented according to the scope of the activity (project, production process, and product).

**Related activities:**
There will be 5 hours of lectures and one practical activity of two hours. In addition, the students will have to carry out some previous work to prepare the practical activity, then write the report of results obtained and finally, start to prepare the team project of the subject.

**Specific objectives:**
Objectives 1 and 2
## Quality Management Systems

**Learning time:** 16h  
**Theory classes:** 6h  
**Practical classes:** 0h  
**Self study:** 10h

**Description:**  
In this chapter, diverse methodologies that allow the companies to manage the quality of the product or service are presented. Moreover, the benefits of certifying the quality management system will be also highlighted.

**Related activities:**  
There will be lectures for 4 hours of lectures. There will be also a visit (2hrs) to a chemical plant. As independent learning, the students will have to continue working on the final work (with tutorials with the lecturer) and personal study.

**Specific objectives:**  
Objectives 1 and 3

## Safety Management Systems

**Learning time:** 16h  
**Theory classes:** 4h  
**Practical classes:** 2h  
**Self study:** 10h

**Description:**  
There will be a presentation of the safety management systems, highlighting their importance and the potential certifications such as OSHAS 18001 of Occupational Health and Safety.

**Related activities:**  
There will be a 4 hours lecture and then a practical class of 2hrs. The students will prepare the practical class report and proceed to finish the team project and also devote some time to personal study.

**Specific objectives:**  
Objectives 1 and 4
In this chapter, the synergies among the three management systems (environmental, quality and safety) will be presented. Moreover, it will be shown how the integration of all of them means an optimization of resources for the companies and organizations.

**Related activities:**
There will be two hours of lectures and one seminar with an expert on this topic. After this, the students will present their team project final report (4 hours) in front of the rest of students. The students will have to prepare beforehand this presentation and also deliver the final team project.

**Specific objectives:**
Objectives 1 and 5
## Planning of activities

### PRACTICAL CLASSES

**Description:**
The practical classes will deliver complementary information and also reinforce the lectures in order to improve the knowledge of the students on the topic.

**Support materials:**
Practical class documentation with guidelines, computers, report, etc.

**Descriptions of the assignments due and their relation to the assessment:**
Delivery of preliminary report and final report.

**Specific objectives:**
To apply the concepts and methods explained at class through practical exercises that allow the student to solve an applied activity.

<table>
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<tr>
<th>Hours</th>
<th>Self study: 4h</th>
<th>Practical classes: 4h</th>
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### VISIT

**Description:**
Visit a company or an organization where the three management systems explained at class have been implemented.

**Support materials:**
The one provided by the company.

**Descriptions of the assignments due and their relation to the assessment:**
Delivery of a visit report a week after the visit.

**Specific objectives:**
To observe at first hand the implementation of the environmental, safety and quality management systems in a company. In addition, this visit will help the students to understand the importance of these systems and the benefit of their integration.

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<tr>
<th>Hours</th>
<th>Theory classes: 2h</th>
<th>Self study: 2h</th>
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### FINAL TEAM PROJECT

**Description:**
The students will select one simple production process and they will have to implement one of the management systems studied at class (environmental, safety or quality).

**Support materials:**
Bibliographic research, computers, companies' visits, lecturers' tutorials, etc.

**Descriptions of the assignments due and their relation to the assessment:**
2 preliminar deliveries to follow the progress and a final delivery of the written final team project and an oral presentation.

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<tr>
<th>Hours</th>
<th>Theory classes: 4h</th>
<th>Self study: 20h</th>
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**Specific objectives:**
To deal with a challenging situation as the one of implementing a management system in a company. The students will have to learn how to manage/implement/develop/assess a specific management system working in a team. After, they will have to communicate efficiently to the rest of the students the most significant results and the lessons learned during the team project.

<table>
<thead>
<tr>
<th>LECTURES</th>
<th>Hours: 39h</th>
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<tbody>
<tr>
<td>Description:</td>
<td>Theory classes: 20h</td>
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<tr>
<td></td>
<td>Self study: 19h</td>
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**Support materials:**
Slides, exercises and papers. All is available at the atena platform.

**Specific objectives:**
Comply with those fixed in the subject.

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**Qualification system**

Mid-term exam: 37,5% of the final qualification  
Final exam: 37,5% of the final qualification  
Team project: 15% of the final qualification  
Practical classes: 10% of the final qualification

The reevaluation will include only the two exams (mid-term and final). There will not be reevaluation of the team project and the practical classes.

- The student will have to do at least one evaluation event to have a final qualification.

**Regulations for carrying out activities**

- Each exam is independent. The first one assesses the topics explained up to mid-term and the second one the rest until the end of the course. There is no a global exam of the subject.

- No material can be used in the exams.

- During the term, there will be different partial deliverables of the team project. In this way the professor can follow the progress.

- The practical classes are going to be done in class hours.
Bibliography

**Basic:**


**Complementary:**