860011 - 11005HAB - Engineering Skills

Coordinating unit: 860 - EEI - Igualada School of Engineering
Teaching unit: 860 - EEI - Igualada School of Engineering
Academic year: 2013
Degree: DEGREE IN CHEMICAL ENGINEERING (Syllabus 2009). (Teaching unit Compulsory)
DEGREE IN INDUSTRIAL SCHEDULING (Syllabus 2011). (Teaching unit Compulsory)
ECTS credits: 6
Teaching languages: Catalan, English

Teaching staff
Coordinator: ROSA CANTERO GÓMEZ
Others: EULÀLIA BORRÀS RIBA

Degree competences to which the subject contributes

Specific:
4. Communicating with clarity at least in Catalan, Spanish and English in contexts such as meetings, presentations and multilingual and interdisciplinary teamwork.
5. Capacity for planning, structuring and supervising teamwork; decision making, leadership skills, human resources management to favour labour relations, career development to full potential.

Generical:
1. EFFICIENT ORAL AND WRITTEN COMMUNICATION - Level 1. Planning oral communication, answering questions properly and writing straightforward texts that are spelt correctly and are grammatically coherent.
2. THIRD LANGUAGE. Learning a third language, preferably English, to a degree of oral and written fluency that fits in with the future needs of the graduates of each course.
3. TEAMWORK - Level 1. Working in a team and making positive contributions once the aims and group and individual responsibilities have been defined. Reaching joint decisions on the strategy to be followed.
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**Teaching methodology**

This being an introductory college course (1st year, 1st semester) dealing with the university environment (what an engineer does in a globalized world) the course will have two major axes: First, it will provide students with tools to help them manage their university studies, such as information on study patterns, learning styles, time management and organization. Second, the course will focus on acquiring crucial skills in their studies and professional life including public speaking, effective writing, third language, group work, and critical reasoning. To put this into practice we have structured this course in a coordinated manner with the contents of course "General Chemistry", which students will be taking simultaneously.

The course will be structured with a double purpose and with two different teachers: part (a), which will emphasize communication and English as well as scientific writing and presentations, and (b) which will explore skills through the perspective of chemistry.

**Part a)**
Teacher-fronted classes will be combined with participatory class activities (individually / group) and homework. The role of homework will be to provide constant feedback to students. Classes will be entirely in English. Concepts tackled will include learning strategies, project work, multidisciplinary teams, time management, general vs. scientific writing, effective presentations, and basic engineering/chemistry discussions. Class structure will be as follows: The teacher will make an initial assessment of prior knowledge by brainstorming the class. Several lines of work will then be explored interactively in groups. Teams will generally be posed challenges or questions and students will get organized to achieve the aims of the task at hand. Therefore, the students' job will be to reflect, plan work, identifying needs, seek information, write and orally present their findings to the entire class, designating one or more rotating speakers. Teams will get feedback, in general, both from the teacher and the rest of the class. The virtual campus is intended to be a tool for internal communication within the small group and also for the whole group-class with the teacher, who will post links with relevant information (videos, documents)

**Part b)**
To address the skills from an academic point of view more closely linked to the studies of chemical engineering, some chemistry work, coordinated with the General Chemistry course, will be carried out. This will be done in a very practical way and with constant feedback from the teacher. Students will seek information, do group work and oral presentations, as well as written reports. The whole class will examine communication processes and provide feedback for improvement. Classes will be mostly in Catalan for this section of the course.

Our methodology will include groups of experts, report writing (individually and in groups) and teamwork for designing study materials or reports.

**Learning objectives of the subject**

After having taken this course the student will be able to:

- Make effective oral presentations.
- Write clearly and efficiently.
- Become acquainted with the chemical engineering career.
- Become acquainted with the different learning styles.
- Plan and manage tasks individually and in groups.
- Analyze, synthesize, reason and write scientific communications.
- Establish relationships between engineering contents and their social context.
# Study load

<table>
<thead>
<tr>
<th>Description</th>
<th>Time</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total learning time:</strong></td>
<td>150h</td>
<td></td>
</tr>
<tr>
<td>Theory classes:</td>
<td>18h</td>
<td>12.00%</td>
</tr>
<tr>
<td>Practical classes:</td>
<td>21h</td>
<td>14.00%</td>
</tr>
<tr>
<td>Laboratory classes:</td>
<td>15h</td>
<td>10.00%</td>
</tr>
<tr>
<td>Guided study:</td>
<td>12h</td>
<td>8.00%</td>
</tr>
<tr>
<td>Self study:</td>
<td>84h</td>
<td>56.00%</td>
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</tbody>
</table>
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## Content

<table>
<thead>
<tr>
<th>Introduction to University Life</th>
<th>Learning time: 20h</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Theory classes: 6h</td>
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<tr>
<td></td>
<td>Laboratory classes: 4h</td>
</tr>
<tr>
<td></td>
<td>Self study: 10h</td>
</tr>
</tbody>
</table>

**Description:**
1. Introduction to the university
2. Virtual campus: Atenea
3. Basic Skills
4. Study habits
5. How to learn more: Study habits, multiple intelligences
6. The Engineering Career

<table>
<thead>
<tr>
<th>Writing Fundamentals</th>
<th>Learning time: 60h</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Theory classes: 10h</td>
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<tr>
<td></td>
<td>Laboratory classes: 10h</td>
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<tr>
<td></td>
<td>Self study: 40h</td>
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</tbody>
</table>

**Description:**
1. Characteristics of good Writing: the Writing Process
2. Characteristics of Scientific writing: Types of documents
3. How to handle information in the INTERNET age
4. Brainstorming
5. Planning
6. Writing
7. Revision
8. Feedback
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**Public Speaking**

<table>
<thead>
<tr>
<th>Percentage</th>
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<tbody>
<tr>
<td>Exercises / Written assignments</td>
</tr>
<tr>
<td>Teamwork</td>
</tr>
<tr>
<td>Exam</td>
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<tr>
<td>Active class participation</td>
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<tr>
<td>Project</td>
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</tbody>
</table>

**Learning time:** 70h
- Theory classes: 20h
- Laboratory classes: 10h
- Self study: 40h

**Description:**
1. Working in (international) teams: Brainstorming in small groups, internal debates, task coordination, group leadership.
2. Intercultural communication.
6. Listening to presentations by peers.
7. Asking questions after a presentation.

**Qualification system**

<table>
<thead>
<tr>
<th>Grading</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exercises / Written assignments</td>
<td>15%</td>
</tr>
<tr>
<td>Teamwork</td>
<td>20%</td>
</tr>
<tr>
<td>Exam</td>
<td>30%</td>
</tr>
<tr>
<td>Active class participation</td>
<td>15%</td>
</tr>
<tr>
<td>Project</td>
<td>20%</td>
</tr>
</tbody>
</table>

**Regulations for carrying out activities**

- Class attendance is absolutely required and will be monitored by the lecturer. Students are expected to actively participate in the classroom by asking questions, working in groups and generally taking part in the activities planned for that particular day. For this reason, students are not allowed to incur in more than 10% unjustified absences.

- If the student fails to hand in a particular assignment within the deadline, he will get a zero in that particular assignment.

- Note that plagiarism will not be tolerated under any circumstance and will be severely penalized. By plagiarism we understand any form of copying, either from peers or directly from the Internet without citations. Work has to be original and not copied literally unless you are quoting someone.

- Assignments will usually be handed in through the Atenea campus, unless otherwise stated.
Bibliography

Others resources:

Hyperlink

Bibliotècnica: la biblioteca digital de la UPC
http://bibliotecnica.upc.edu/

Academic Skills Center. Dartmouth University. MIT
http://www.dartmouth.edu/~acskeepers/

Program in Writing and Humanistic Studies. MIT
http://humanistic.mit.edu/about/mission
### Planning of activities

| ACTIVITY 1: EXERCISES OR INDIVIDUAL HOMEWORK | Hours: 40h  
Self study: 40h |
|--------------------------------------------|----------------|

**Description:**
The course will involve completing assignments such as exercises or papers as homework, individually or in group. The teacher will generally grade the work, except for occasional co-evaluation.

**Support materials:**
Class notes and documents (writings, videos, webpages) made available on the virtual campus. Independent information search. Recommended bibliography.

**Descriptions of the assignments due and their relation to the assessment:**
Work will usually be delivered through the Atenea campus, unless otherwise stated. This type of assignments will make up 15% of the total grade. Note that plagiarism will not be tolerated under any circumstance and will be severely penalized. By plagiarism we understand any form of copying, either from peers or directly from the Internet without citations. Work has to be original and not copied literally unless you are quoting someone.

**Specific objectives:**
After completing this activity the student should be able to:
- Produce well-structured and coherent documents.
Planning of activities

ACTIVITY 2: TEAMWORK

**Description:**
Students will work together in teams on texts or videos. Many times they will have to present their conclusions to the whole class and/or write a final product.

**Support materials:**
Class notes and documents (writings, videos, webpages) made available on the virtual campus. Independent information search. Recommended bibliography.

**Descriptions of the assignments due and their relation to the assessment:**
Homework will usually be handed in through the Atenea campus, unless otherwise stated. This type of assignments will make up 20% of the total grade.

Note that plagiarism will not be tolerated under any circumstance and will be severely penalized. By plagiarism we understand any form of copy, either from peers or directly downloaded from the Internet without citations. Work has to be original and not copied literally unless you are quoting someone.

**Specific objectives:**
At the end of the activity the student should be able to:
- Act in a team in a coordinated manner to produce coherent and well-structured products (either written or oral).

ACTIVITY 3: DEBATES, TEAM AND INDIVIDUAL PRESENTATIONS, SIMULATION OF INTERNATIONAL MEETINGS

**Hours:** 50h
- Practical classes: 30h
- Self study: 20h

**Description:**
Simulations of international meetings and presentations will take place. Students will be expected to participate by exchanging information, persuading, negotiating, presenting and formulating questions to peers.

**Support materials:**
Class notes and documents (writings, videos, webpages) posted on the virtual campus. Independent information search. Video camera.

**Descriptions of the assignments due and their relation to the assessment:**
Lecturers will assess the students' active participation. This activity will make up 30% of final grade.

**Specific objectives:**
At the end of the activity the student should be able to:
- Actively participate in international and multilingual settings.
- Formulate questions after a presentation.
- Understand the impact of globalization on the handling of information.
### Planning of activities

<table>
<thead>
<tr>
<th><strong>ACTIVITY 4: EXAMS</strong></th>
<th><strong>Hours:</strong> 12h</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Theory classes: 2h</td>
</tr>
<tr>
<td></td>
<td>Self study: 10h</td>
</tr>
</tbody>
</table>

**Description:**
Written assessment at the end of course. The lecturer will grade exams.

**Support materials:**
Notes and class activities. Documents on the virtual campus. Recommended bibliography.

**Descriptions of the assignments due and their relation to the assessment:**
Exams will make up 30% of the final grade.

**Specific objectives:**
After taking the exam, the student should be able to:
- Achieve the learning objectives of the course.