Course guide
330157 - OS - Separation Operations

Unit in charge: Manresa School of Engineering
Teaching unit: 750 - EMIT - Department of Mining, Industrial and ICT Engineering.

Degree: BACHELOR’S DEGREE IN CHEMICAL ENGINEERING (Syllabus 2009). (Compulsory subject).

Academic year: 2022        ECTS Credits: 6.0        Languages: Catalan

LECTURER
Coordinating lecturer: ANNA BONSFILLS PEDROS
Others: ANTONIO DAVID DORADO CASTAÑO

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
1. Use balances of matter and energy in basic operations. Calculate and design basic separation operations, based on the transfer of matter and heat transmission. Solve problems and apply theoretical knowledge to practice. Develop the capacity for analysis and synthesis.

Transversal:
2. EFFICIENT ORAL AND WRITTEN COMMUNICATION - Level 3. Communicating clearly and efficiently in oral and written presentations. Adapting to audiences and communication aims by using suitable strategies and means.
3. TEAMWORK - Level 3. Managing and making work groups effective. Resolving possible conflicts, valuing working with others, assessing the effectiveness of a team and presenting the final results.
4. SELF-DIRECTED LEARNING - Level 3. Applying the knowledge gained in completing a task according to its relevance and importance. Deciding how to carry out a task, the amount of time to be devoted to it and the most suitable information sources.

TEACHING METHODOLOGY

The subject consists of four hours of class per week, which are dedicated to explaining the theoretical foundations and solving problems.

LEARNING OBJECTIVES OF THE SUBJECT

Upon completion of the course, the student must be able to:

- Use mass and energy balances in basic operations.
- Calculate and design basic separation operations, based on the transfer of matter and the transmission of heat.
- Solve problems and apply theoretical knowledge to practice.
- Develop the capacity for analysis and synthesis.
- Efficient oral and written communication.
- Work efficiently as a team.
- Learn autonomously.
STUDY LOAD

<table>
<thead>
<tr>
<th>Type</th>
<th>Hours</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours large group</td>
<td>30,0</td>
<td>20.00</td>
</tr>
<tr>
<td>Hours medium group</td>
<td>30,0</td>
<td>20.00</td>
</tr>
<tr>
<td>Self study</td>
<td>90,0</td>
<td>60.00</td>
</tr>
</tbody>
</table>

Total learning time: 150 h

CONTENTS

1. Evaporation

Description:
- Simple evaporator.
- Methods to minimize energy consumption.
- Multiple effect evaporator.

Related activities:
- Theoretical classes.
- Posing and solving problems in class.
- Study and autonomous work of the student.
- Individualized monitoring of the student and evaluation.
- Activities: 1,2,3.

Full-or-part-time: 42h
Theory classes: 9h
Practical classes: 8h
Self study : 25h

2. Distillation

Description:
- Differential distillation.
- Flash distillation.
- Rectification.

Related activities:
- Theoretical classes.
- Posing and solving problems in class.
- Study and autonomous work of the student.
- Individualized monitoring of the student and evaluation.
- Activities: 1,2,3.

Full-or-part-time: 62h
Theory classes: 13h
Practical classes: 11h
Self study : 38h
### 3. Humidification and dehumidification

**Description:**
- Methods to humidify and dehumidify.
- Adiabatic columns.

**Related activities:**
- Theoretical classes.
- Posing and solving problems in class.
- Study and autonomous work of the student.
- Individualized monitoring of the student and evaluation.
- Activities: 1, 2, 3.

**Full-or-part-time:** 23h
- Theory classes: 4h
- Practical classes: 5h
- Self study: 14h

### 4. Drying of solids

**Description:**
- Discontinuous drying.
- Continuous drying.

**Related activities:**
- Theoretical classes.
- Posing and solving problems in class.
- Study and autonomous work of the student.
- Individualized monitoring of the student and evaluation.
- Activities: 1, 2, 3.

**Full-or-part-time:** 22h
- Theory classes: 4h
- Practical classes: 5h
- Self study: 13h

### ACTIVITIES

**ACTIVITY 1: AUTONOMOUS PROBLEM RESOLUTION**

**Description:**
The student will be proposed a series of problems that must be solved individually and delivered.

**Specific objectives:**
Monitor learning in the different separation operations to be studied, with special emphasis on the correct application of mass and energy balances, as well as calculations.

**Material:**
Atenea Campus

**Delivery:**
25% of the final grade

**Full-or-part-time:** 40h
- Self study: 40h
**ACTIVITY 2: WRITTEN TESTS**

**Description:**
There will be two individual written tests.

**Specific objectives:**
Know the student's learning individually.

**Material:**
Atenea Campus.

**Delivery:**
60% of the final grade.

**Full-or-part-time:** 46h
- Practical classes: 6h
- Self study: 40h

**ACTIVITY 3: ORAL PRESENTATION**

**Description:**
Oral presentation of an industrial calculation problem and its resolution, where the assimilation of the contents taught in the subject is demonstrated, with subsequent questioning by the rest of the student body.

**Specific objectives:**
- Solve problems and apply theoretical knowledge to practice.
- Develop the capacity for analysis and synthesis.

**Material:**
Atenea Campus

**Delivery:**
15% of the final grade.

**Full-or-part-time:** 12h
- Practical classes: 2h
- Self study: 10h

**GRADING SYSTEM**

Final mark = 60% individual written tests + 25% autonomous problem solving activities + 15% oral presentation and participation.

**EXAMINATION RULES.**

The activities are part of the continuous evaluation. If the student does not carry out any of the activities, it will be considered not scored.
**BIBLIOGRAPHY**

**Basic:**

**Complementary:**

**RESOURCES**

**Other resources:**