The course provides basic knowledge of the railway as a means of transportation and focuses its scope in the field of industrial engineering. The various topics that have been chosen up as a starting point for everyone who wants to be or has been in railways specialize in this sector. However, the object of the course is more general, to use the railway as a clear example of the application of different specialties so that concur in draft and in its operation. And this also is aimed at anyone who wants to learn how to check and apply in a different case knowledge acquired during the race.

In line with this, the first goal is learning descriptive of knowledge of the facilities track, signals and electrification; vehicles; materials and components; railway operation. The second is a learning analytical formula to deduce and apply through the technical study of some selected cases, the third objective is economic learning to analyze economic aspects of railway activity and assess their viability.

The course includes lectures, demonstration sessions and visits to offices and railway facilities.
## Study load

<table>
<thead>
<tr>
<th>Total learning time: 75h</th>
<th>Hours large group:</th>
<th>27h</th>
<th>36.00%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Self study:</td>
<td>48h</td>
<td>64.00%</td>
</tr>
</tbody>
</table>
### Content

<table>
<thead>
<tr>
<th>Module 1: Rail layout</th>
<th>Learning time: 9h</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Theory classes: 2h</td>
</tr>
<tr>
<td></td>
<td>Self study: 7h</td>
</tr>
</tbody>
</table>

**Description:**

**Related activities:**
1, 3

<table>
<thead>
<tr>
<th>Module 2: Geometry, kinematics and effort on the road</th>
<th>Learning time: 20h</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Theory classes: 10h</td>
</tr>
<tr>
<td></td>
<td>Self study: 10h</td>
</tr>
</tbody>
</table>

**Description:**

**Related activities:**
1, 3

<table>
<thead>
<tr>
<th>Module 3: Railway, switches and crossings</th>
<th>Learning time: 4h</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Theory classes: 2h</td>
</tr>
<tr>
<td></td>
<td>Self study: 2h</td>
</tr>
</tbody>
</table>

**Description:**

**Related activities:**
1, 2, 3
## Module 4: Electrification.

**Learning time:** 6h  
Theory classes: 2h  
Self study : 4h

**Description:**  

**Related activities:**  
1,2,3

## Module 5: Railway safety. Signs

**Learning time:** 6h  
Theory classes: 2h  
Self study : 4h

**Description:**  

**Related activities:**  
1,2,3

## Module 6: Traction and braking

**Learning time:** 6h  
Theory classes: 2h  
Self study : 4h

**Description:**  

**Related activities:**  
1,3,4
## Module 7: Wheel-rail contact.

**Description:**

**Related activities:**
1,3,4

**Learning time:** 4h  
Theory classes: 2h  
Self study: 2h

## Module 8: Wreck action.

**Description:**
Wreck theory. Formula of Nadal. Discussion.

**Related activities:**
1,3,4

**Learning time:** 12h  
Theory classes: 4h  
Self study: 8h

## Module 9: Cross section. Gauge. Accessibility

**Description:**

**Related activities:**
1,3,4

## Module 10: financial Management

**Description:**

**Related activities:**
1,3,4
## Planning of activities

| Activity 1: Assistance to Project sessions | Hours: 15h  
Self study: 5h  
Theory classes: 10h |
|------------------------------------------|----------------|
| **Description:**  
Assistance to Project sessions. | |
| **Support materials:**  
Atenea notes platform. | |
| **Descriptions of the assignments due and their relation to the assessment:**  
Project Reports of the practice. Represents 15% of the final evaluation. | |
| **Specific objectives:**  
Builds a Railroad Project. | |

| Activity 2: Examination 1st part | Hours: 21h  
Theory classes: 6h  
Self study: 15h |
|----------------------------------|----------------|
| **Description:**  
Individual examination and written about the contents of the modules 3,4,5. | |
| **Support materials:**  
Atenea notes platform. | |
| **Descriptions of the assignments due and their relation to the assessment:**  
Individual exam. This exam can be recovered during the execution of the final exam. Represents 30% of the final grade for the course. | |
| **Specific objectives:**  
Check the knowledge acquired in the theory sessions of these modules. | |

| Activity 3: Work home | Hours: 14h  
Theory classes: 4h  
Self study: 10h |
|----------------------|----------------|
| **Description:**  
Performing the railway problems. | |
| **Support materials:**  
Atenea notes platform. | |
| **Descriptions of the assignments due and their relation to the assessment:**  
Portfolio. It represents 25% of the final grade for the course. | |
| **Specific objectives:**  
Check the knowledge acquired in the subject. | |
### Activity 4: Final examination

<table>
<thead>
<tr>
<th>Hours</th>
<th>25h</th>
</tr>
</thead>
<tbody>
<tr>
<td>Activity classes</td>
<td>10h</td>
</tr>
<tr>
<td>Self study</td>
<td>15h</td>
</tr>
</tbody>
</table>

**Description:**
- Individual exam and written about the contents of the modules 6, 7, 8, 9, 10.

**Support materials:**
- Atenea notes platform.

**Descriptions of the assignments due and their relation to the assessment:**
- The deliverable will be the resolution of the exam.
- Represents 30% of the final grade for the course.

**Specific objectives:**
- The exam must demonstrate that the student has acquired and assimilated the concepts, principles and fundamentals related to all these modules.

### Qualification system

The final grade depends on the following evaluative acts:

- Activity 1 (project), weight: 15%
- Activity 2 (Exam 1st parc) weight: 30%
- Activity 3 (portfolio) weight: 25%
- Activity 4 (final exam), weight: 30%

Activity 1 will be performed in groups and shall be in writing on the project.
Activity 2 will be performed individually in person and in writing.
Activity 3 will be held individually and delivered by Atenea.
Activity 4 will take place individually in person and in writing.

In the activity 2 it will be possible to redirect the result if the result is unsatisfactory (less than 5) presenting a recovery on the day of the final evaluation (final exam), in the same time.

### Bibliography