# 240AU022 - Transmission Systems and Performance

**Coordinating unit:** 240 - ETSEIB - Barcelona School of Industrial Engineering  
**Teaching unit:** 712 - EM - Department of Mechanical Engineering  
**Academic year:** 2017  
**Degree:** MASTER’S DEGREE IN AUTOMOTIVE ENGINEERING (Syllabus 2012). (Teaching unit Compulsory)  
MASTER’S DEGREE IN INDUSTRIAL ENGINEERING (Syllabus 2014). (Teaching unit Optional)  
**ECTS credits:** 4,5  
**Teaching languages:** Catalan

## Teaching staff

**Coordinator:** MIQUEL SARAROLS FIGUERAS  
**Others:** MIQUEL SARAROLS FIGUERAS

## Prior skills

Basic knowledge of the machine and mechanic elements calculation.

## Requirements

Have coursed the subject Longitudinal and Lateral Dynamics of Q1.

## Degree competences to which the subject contributes

**Specific:**
3. Apply knowledge of mathematics, physics and technology obtained through study, experience and practice, using critical reasoning to establish economically viable solutions to technical problems in the automotive sector

**General:**
1. Develop independent learning skills to maintain and enhance the powers of Automotive Engineering, to allow the continued development of the profession.  
2. Ability to apply appropriate knowledge of mathematical aspects, analytical, scientific, instrumental, technological and management, the resolution of the problems of the automotive  
4. Be able to conduct research, development and innovation in relation to automotive technology.

## Teaching methodology

Theory-practical classes where the Professor exposes theory concepts and knowledge, together with illustrative examples, and later, the students carry out exercises, with the support of the Professor if needed, so as to put into practice the taught knowledge.

Practical sessions, in small groups, with the aim of physically get to see the described elements in the theory classes; and to carry out the works to evaluate the concepts exposed in real models of vehicles.

## Learning objectives of the subject

Apply the knowledge of the engine-receiver model in an automobile vehicle to obtain its performance.  
Know the elements making up the driving line, its function within it and measure them so that they respond to the desired specifications.
## Study load

<table>
<thead>
<tr>
<th></th>
<th>Hours large group:</th>
<th>Hours medium group:</th>
<th>Hours small group:</th>
<th>Guided activities:</th>
<th>Self study:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total learning time:</strong></td>
<td>112h 30m</td>
<td>0h</td>
<td>27h</td>
<td>13h 30m</td>
<td>72h</td>
</tr>
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<td></td>
<td>0.00%</td>
<td>24.00%</td>
<td>12.00%</td>
<td>0.00%</td>
<td>64.00%</td>
</tr>
</tbody>
</table>
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## Content

<table>
<thead>
<tr>
<th>Performance: driving and receiving force</th>
<th>Learning time: 14h</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Theory classes: 2h</td>
</tr>
<tr>
<td></td>
<td>Practical classes: 2h</td>
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<tr>
<td></td>
<td>Self study: 10h</td>
</tr>
</tbody>
</table>

**Description:**
Definition and valoration of the driving and receiving forces taking part in the determination of a vehicle's performance.

**Related activities:**
Resolution of exercises so as to measure the values these characteristic curves achieve.

**Specific objectives:**
Know the characteristics of an engine and of an automobile vehicle as the receiver of the energy of the engine.

<table>
<thead>
<tr>
<th>Performance: F-v diagram and working points</th>
<th>Learning time: 22h</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Theory classes: 3h</td>
</tr>
<tr>
<td></td>
<td>Practical classes: 3h</td>
</tr>
<tr>
<td></td>
<td>Self study: 16h</td>
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</tbody>
</table>

**Description:**
Force-speed diagram as a tool to value the performance and the functioning points of the vehicle.

**Related activities:**
Practice to obtain the working points starting from the real characteristics of a vehicle.

**Specific objectives:**
Reduce the driving characteristic curve of the engine of the vehicle, so that it can be compared to the receiving curve and obtain the working points.

<table>
<thead>
<tr>
<th>Transmissions: driving line, elements which make it up and distribution in the vehicle</th>
<th>Learning time: 14h</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Theory classes: 4h</td>
</tr>
<tr>
<td></td>
<td>Self study: 10h</td>
</tr>
</tbody>
</table>

**Description:**
Definition of the elements allowing to transmit the energy of the engine to the driving wheels.

**Related activities:**
See in a real vehicle the elements of the transmission line and the position they take in a vehicle.

**Specific objectives:**
Know the elements making up, or the elements which can make up, the driving line of a vehicle depending on the type and position of the engine unit and the driving wheels.
The calculation algorithm of the final mark of the course will be:

Final Mark: max(Nfe, 0.7*Nfe + 0.3*Npe)

Where:
Nfe: Mark of the final exam
Npe: Mark of the partial exam

Qualification system

The calculation algorithm of the final mark of the course will be:
Final Mark: max(Nfe, 0.7*Nfe + 0.3*Npe)
Where:
Nfe: Mark of the final exam
Npe: Mark of the partial exam

Regulations for carrying out activities

To carry out the exams, the students can only have available the basic writing tools (pencil, rubber...) calculator and, in the practical exercises, an A4 sheet with the content every student considers important.
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Bibliography

Complementary:


Others resources:

Audiovisual material

Apunts