Course guides
230251 - RAD - Radar

Unit in charge: Barcelona School of Telecommunications Engineering
Teaching unit: 739 - TSC - Department of Signal Theory and Communications.

Degree: BACHELOR’S DEGREE IN TELECOMMUNICATIONS SCIENCE AND TECHNOLOGY (Syllabus 2010). (Optional subject).
BACHELOR’S DEGREE IN TELECOMMUNICATIONS SYSTEMS ENGINEERING (Syllabus 2010). (Optional subject).
BACHELOR’S DEGREE IN TELECOMMUNICATIONS TECHNOLOGIES AND SERVICES ENGINEERING (Syllabus 2015). (Optional subject).

Academic year: 2021 ECTS Credits: 6.0 Languages: Catalan, Spanish, English

LECTURER
Coordinating lecturer: ANTONI BROQUETAS
Others: Broquetas Ibars, Antoni

PRIOR SKILLS
Radiation and Propagation, Signals and Systems, Probability and Stochastic Processes

TEACHING METHODOLOGY
- Lectures
- Application classes
- Exercises

LEARNING OBJECTIVES OF THE SUBJECT
We present the fundamentals and techniques of radio detection, location and estimation of parameters of distant bodies. The course has a telecom. system orientation combining a wide range of technical disciplines seen in previous courses applied to aerospace, navigation and industrial needs.

STUDY LOAD

<table>
<thead>
<tr>
<th>Type</th>
<th>Hours</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Self study</td>
<td>98,0</td>
<td>65.33</td>
</tr>
<tr>
<td>Hours large group</td>
<td>52,0</td>
<td>34.67</td>
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</tbody>
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Total learning time: 150 h
## CONTENTS

1. **Introduction: Radar and Telecommunications**

   **Description:**
   Radar: A case of telecommunication system. Historical milestones in the development of radar. Types and examples of radar.

   **Full-or-part-time:** 16h
   Theory classes: 8h
   Self study : 8h

2. **Pulsed Radars**

   **Description:**

   **Full-or-part-time:** 48h
   Theory classes: 24h
   Self study : 24h

3. **Continuous Wave Radars**

   **Description:**

   **Full-or-part-time:** 16h
   Theory classes: 8h
   Self study : 8h

4. **Pulse compression**

   **Description:**
   The Dilemma of Energy and Resolution. Passive techniques and active compression pulses. Equation power radar pulse compression. The radar ambiguity function and properties. Resolution and precision in the estimates of distance and speed. Xirp signal analysis and coded pulses (Barker, Frank, etc.).

   **Full-or-part-time:** 24h
   Theory classes: 12h
   Self study : 12h

5. **Moving Target Detection**

   **Description:**

   **Full-or-part-time:** 23h
   Theory classes: 6h
   Practical classes: 2h
   Self study : 15h
### ACTIVITIES

#### EXERCISES

**Description:**
Collection of problems (with solutions)

**Full-or-part-time:** 26h
Theory classes: 26h

#### CONTROL based on problem solutions

**Description:**
Short mid-term test at the end of Chap.2

**Full-or-part-time:** 1h 30m
Theory classes: 1h 30m

#### EXTENDED ANSWER TEST (FINAL EXAMINATION)

**Description:**
Final Exam. Based on problems solution.

**Full-or-part-time:** 2h 30m
Theory classes: 2h 30m

### GRADING SYSTEM

Final examination: 60%
Partial (Control) examination: 40%

### BIBLIOGRAPHY

**Basic:**

**Complementary:**