

Postgraduate Course on Laboratory Course on RF Measurements (MSc)

Instructor Information

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Course Information

Course Description

This course allows the students to practice about the fundamentals acquired in “Advanced Topics on Antenna Technologies and Radiofrequency Technologies. The course is divided in some laboratory sessions about the following topics: Antenna Measurements, Measurement of electrical properties of Materials, Calibration techniques of vector network analyzer, time domain techniques in vector network analyzers, active component measurements, RADAR system measurements and Electromagnetic Compatibility measurements.

Prerequisites

Antenna Analysis and Design

Radiofrequency Systems

Course Goal

To understand the different measurement techniques for active and passive Radiofrequency components, materials, antennas, RADAR systems and Electromagnetic Compatibility.

Summary of intended course outcomes

The student will understand the measurement techniques in Radiofrequency, including:

- Capability of understanding and elaborating test plans and test procedures.
- Capability of understanding test equipments as vector network analyzers, antenna measurement systems and RADAR measurement equipment.
- Capability of understanding the measurement technologies for active and passive RF components, material characterization, RADAR systems, antennas and EMC.

Syllabus

- Session 1: Vector Network Analyzer: Calibration techniques.
- Session 2: Vector Network Analyzer. Time domain Techniques.
- Session 3: Active Components Characterization with complex wave forms.
- Session 4: Antenna Measurements I. Antenna test set-up. Anechoic Chambers. Far and Near Field Techniques. Measurement of an antenna in far field (radiation pattern, gain and cross-polar). Near Field Techniques: measurement of a BTS antenna in Fresnel Zone.
- Session 5: Antenna Measurements 2. Error diagnosis in antenna measurements.
- Session 6: Characterization of electrical properties of material through free space and waveguide techniques.
- Session 7: RADAR System characterization.
- Session 8: EMC measurements.

Material and Instrumentation:

- UPM Radiofrequency Laboratory.
- UPM Antenna Measurement Laboratory.

Suggested readings

- Before each session, the lecturer of the laboratory session will provide the recommended tests and papers.

Student Assessment Criteria

- 60% Laboratory report. For each session, the student will complete a report.
- 40% Final exam.

It is compulsory to participate in the laboratory sessions to pass the subject.