Last update: 23-04-2019

220066 - Mathematical Models in Engineering

Coordinating unit: 205 - ESEIAAT - Terrassa School of Industrial, Aerospace and Audiovisual Engineering

Teaching unit: 749 - MAT - Department of Mathematics

Academic year: 2019

Degree: BACHELOR'S DEGREE IN INDUSTRIAL DESIGN AND PRODUCT DEVELOPMENT ENGINEERING (Syllabus 2010). (Teaching unit Optional)
BACHELOR'S DEGREE IN INDUSTRIAL ELECTRONICS AND AUTOMATIC CONTROL ENGINEERING (Syllabus 2009). (Teaching unit Optional)
BACHELOR'S DEGREE IN ELECTRICAL ENGINEERING (Syllabus 2009). (Teaching unit Optional)
BACHELOR'S DEGREE IN MECHANICAL ENGINEERING (Syllabus 2009). (Teaching unit Optional)
BACHELOR'S DEGREE IN CHEMICAL ENGINEERING (Syllabus 2009). (Teaching unit Optional)
BACHELOR'S DEGREE IN AUDIOVISUAL SYSTEMS ENGINEERING (Syllabus 2009). (Teaching unit Optional)
BACHELOR'S DEGREE IN TEXTILE TECHNOLOGY AND DESIGN ENGINEERING (Syllabus 2009). (Teaching unit Optional)
BACHELOR'S DEGREE IN AEROSPACE VEHICLE ENGINEERING (Syllabus 2010). (Teaching unit Optional)
BACHELOR'S DEGREE IN AEROSPACE TECHNOLOGY ENGINEERING (Syllabus 2010). (Teaching unit Optional)
BACHELOR'S DEGREE IN INDUSTRIAL TECHNOLOGY ENGINEERING (Syllabus 2010). (Teaching unit Optional)

ECTS credits: 3 Teaching languages: English

Teaching staff

Coordinator: Ramon Quintanilla

Others: Mari Carme Leseduarte

Degree competences to which the subject contributes

Specific:

1. The ability to solve mathematical problems that may arise in an engineering context. The ability to apply knowledge of linear algebra; geometry; differential geometry; differential and integral calculus; differential and partial differential equations; numerical methods; numerical algorithms; statistics and optimisation

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Teaching methodology

The course is divided into parts:

Theory classes
Practical classes
Self-study for doing exercises and activities.

In the theory classes, teachers will introduce the theoretical basis of the concepts, methods and results and illustrate them with examples appropriate to facilitate their understanding.

In the practical classes (in the classroom), teachers guide students in applying theoretical concepts to solve problems, always using critical reasoning. We propose that students solve exercises in and outside the classroom, to promote contact and use the basic tools needed to solve problems.

Students, independently, need to work on the materials provided by teachers and the outcomes of the sessions of exercises/problems, in order to fix and assimilate the concepts.

The teachers provide the syllabus and monitoring of activities (by ATENEA).

Learning objectives of the subject

1. To solve Partial Differential Equations
2. To solve engineering problems by means of the mathematical models describing the phenomena

Study load

Total learning time: 75h	Hours large group:	30h	40.00%
	Self study:	45h	60.00%

Content

Module 1: Partial differential Equations	Learning time: 75h Theory classes: 30h Self study : 45h

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Planning of activities

PARTIAL EVALUATION	Hours: 5h Theory classes: 2h Self study: 3h

FINAL EVALUATION	Hours: 5h Theory classes: 2h Self study: 3h

THEORY AND PROBLEM CLASSES	Hours: 65h Theory classes: 26h Self study: 39h

Qualification system

The final grade depends on the following assessment criteria:

- First evaluation, weight: 50 %
- Second evaluation. weight: 50 %

The unsatisfactory results of the evaluations can be redirected by means of a written test to be realized the day fixed by the final examination. This test can be accessed by all enrolled students. The note obtained by the application of the conversion replaces the initial qualification and when it is higher.

Bibliography

Basic:

Weinberger, Hans F. Curso de ecuaciones diferenciales en derivadas parciales. Barcelona: Reverté, 1992. ISBN 8429151605.

Haberman, Richard. Ecuaciones en derivadas parciales: con series de Fourier y problemas de contorno. Madrid: Prentice-Hall, 2003. ISBN 8420535346.