Course guide
220066 - MME - Mathematical Models in Engineering

Last modified: 02/04/2024

Unit in charge:	Terrassa School of Industrial, Aerospace and Audiovisual Engineering
Teaching unit:	749 - MAT - Department of Mathematics.

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

Academic year: 2024   **ECTS Credits:** 3.0   **Languages:** English

LECTURER

Coordinating lecturer:	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

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

Type	Hours	Percentage
Hours large group	30,0	40.00
Self study	45,0	60.00

Total learning time: 75 h

CONTENTS

Module 1: Partial differential Equations

Full-or-part-time: 75h
Theory classes: 30h
Self study : 45h

ACTIVITIES

PARTIAL EVALUATION

Full-or-part-time: 5h
Self study: 3h
Theory classes: 2h

FINAL EVALUATION

Full-or-part-time: 5h
Self study: 3h
Theory classes: 2h

THEORY AND PROBLEM CLASSES

Full-or-part-time: 65h
Self study: 39h
Theory classes: 26h

GRADING 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 con métodos de variable compleja y yde transformaciones integrales [on line]. Barcelona: Reverté, 1970 [Consultation: 09/05/2022]. Available on: https://www-ingebook-com.recursos.biblioteca.upc.edu/ib/NPcd/IB_BooksVis?cod_primaria=1000187&codigo_libro=7862. ISBN 9788429191400.
- Haberman, Richard. Ecuaciones en derivadas parciales: con series de Fourier y problemas de contorno. Madrid: Prentice-Hall, 2003. ISBN 8420535346.