

## 220012 - Further Mathematics

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 AEROSPACE TECHNOLOGY ENGINEERING (Syllabus 2010). (Teaching unit Compulsory) BACHELOR'S DEGREE IN AEROSPACE VEHICLE ENGINEERING (Syllabus 2010). (Teaching unit Compulsory)		
ECTS credits:	6	Teaching languages:	Catalan

### Teaching staff

Coordinator:	- RAMON QUINTANILLA DE LATORRE
Others:	ANTONIO MAGAÑA NIETO - M. DEL CARMEN LESEDUARTE MILAN

### 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

Theory sessions  
Problems sessions  
Independent work

The theory sessions will introduce the basic concepts and results of each topic, as well as examples and case studies. In the problems sessions, the students have to solve exercises and problems to help them understanding the concepts studied and to acquire the ability to express themselves properly, using concepts and tools of the course. Each teacher has a fixed office hours where students can answer any questions regarding theory and problems lessons.

### Learning objectives of the subject

- A. Learning to solve ODE and PDE.
- B. To solve engineering problems using models of the concerned phenomena.

### Study load

Total learning time: 150h	Hours large group:	32h	21.33%
	Hours medium group:	28h	18.67%
	Self study:	90h	60.00%

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### Content

<p>Generalities about ODE</p>	<p>Learning time: 12h 30m Theory classes: 3h Practical classes: 2h Self study : 7h 30m</p>
<p>-</p>	<p>Learning time: 30h Theory classes: 7h Practical classes: 5h Self study : 18h</p>
<p>Specific objectives:</p>	
<p>Applications</p>	<p>Learning time: 10h Theory classes: 2h Practical classes: 2h Self study : 6h</p>
<p>Description: (ENG) Mostrar als estudiants diversos problemes de la mecànica i l'enginyeria que poden ser estudiats i modelats amb l'ajuda de les equacions diferencials. Specific objectives: (ENG) Els estudiants hauran de saber resoldre problemes de creixement de poblacions, desintegració de substàncies, buidat de dipòsits, escalfament i refredament, mescles, vibracions, circuits elèctrics...</p>	
<p>Linear differential equations of orden n</p>	<p>Learning time: 35h Theory classes: 7h Practical classes: 7h Self study : 21h</p>
<p>Specific objectives:</p>	



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Laplace transform	Learning time: 30h Theory classes: 6h Practical classes: 6h Self study : 18h
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Specific objectives:
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Generalities about EDP	Learning time: 32h 30m Theory classes: 7h Practical classes: 6h Self study : 19h 30m
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Description:
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### Planning of activities

(ENG) EXAMEN PARCIAL	Hours: 12h Theory classes: 2h Self study: 10h
Description:	
(ENG) EXAMEN FINAL	Hours: 12h Theory classes: 2h Self study: 10h
Description:	
(ENG) SESSIONS GRUPS GRANS/TEÒRICS	Hours: 56h Theory classes: 26h Self study: 30h
(ENG) SESSIONS GRUPS MITJANS/PROBLEMES	Hours: 62h Self study: 34h Practical classes: 28h
(ENG) CONTROL 1	Hours: 4h Theory classes: 1h Self study: 3h
(ENG) CONTROL 2	Hours: 4h Theory classes: 1h Self study: 3h

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### Qualification system

Midterm Exam Weigh: 30%

Final Exam Weigh: 50%

Test 1 Weigh 10%

Test 2 Weigh 10%

The midterm exam and final exams will be scheduled by the School. Test 1 and 2 will be during two different lessons. Unsatisfactory results of the partial examination may be re-conducted by a written test to be carried out on the day of the final examination. Students with a score of less than 5 in the partial exam can be admitted to this test. If the grade of this test is greater than or equal to five the grade of the partial exam is replaced by a grade of five.

### Bibliography

#### Basic:

Leseduarte Milán, M.C. [et al.]. Equacions diferencials: problemes resolts [on line]. Barcelona: Iniciativa Digital Politècnica, 2012 [Consultation: 04/07/2017]. Available on: <<http://hdl.handle.net/2099.3/36607>>. ISBN 9788476539330.

Simmons, G. F. Ecuaciones diferenciales: teoría, técnica y práctica. México: McGraw-Hill, 2007. ISBN 9780072863154.

Boyce, William E. Introducción a las ecuaciones diferenciales. México: Limusa, 1972. ISBN 9681806360.

Zill, Dennis G. Ecuaciones diferenciales con aplicaciones de modelado. 9a ed. México: International Thomson, 2009. ISBN 9789708300551.