

300242 - AM2 - Further Mathematics 2

Coordinating unit:	300 - EETAC - Castelldefels School of Telecommunications and Aerospace Engineering		
Teaching unit:	749 - MAT - Department of Mathematics		
Academic year:	2018		
Degree:	BACHELOR'S DEGREE IN AEROSPACE SYSTEMS ENGINEERING (Syllabus 2015). (Teaching unit Compulsory) BACHELOR'S DEGREE IN AEROSPACE SYSTEMS ENGINEERINGS/BACHELOR'S DEGREE IN TELECOMMUNICATIONS SYSTEMS ENGINEERING - NETWORK ENGINEERING (AGRUPACIÓ DE SIMULTANEÏTAT) (Syllabus 2015). (Teaching unit Compulsory) BACHELOR'S DEGREE IN AEROSPACE SYSTEMS ENGINEERING/BACHELOR'S DEGREE IN TELECOMMUNICATIONS SYSTEMS ENGINEERING (Syllabus 2015). (Teaching unit Compulsory) BACHELOR'S DEGREE IN AEROSPACE SYSTEMS ENGINEERING/BACHELOR'S DEGREE IN NETWORK ENGINEERING (Syllabus 2015). (Teaching unit Compulsory)		
ECTS credits:	7,5	Teaching languages:	Catalan, Spanish

Teaching staff

Coordinator:	Definit a la infoweb de l'assignatura.
Others:	Definit a la infoweb de l'assignatura.

Prior skills

Have passed or be enrolled in 1A: Algebra and Geometry and Calculus and 1B Further Mathematics and be able to derive and integrate functions in one and two variables and solve first order ordinary differential equations.

Requirements

ALGEBRA AND GEOMETRY - Corequisite
CALCULUS (AERONAUTICAL ENGINEERING) - Corequisite

Degree competences to which the subject contributes

Specific:

1. CE 1 AERO. Capacidad para la resolución de los problemas matemáticos que puedan plantearse en la ingeniería. Aptitud para aplicar los conocimientos sobre: álgebra lineal; geometría; geometría diferencial; cálculo diferencial e integral; ecuaciones diferenciales y en derivadas parciales; métodos numéricos; algorítmica numérica; estadística y optimización. (CIN/308/2009, BOE 18.2.2009)

Transversal:

2. SELF-DIRECTED LEARNING - Level 2: Completing set tasks based on the guidelines set by lecturers. Devoting the time needed to complete each task, including personal contributions and expanding on the recommended information sources.
3. EFFICIENT ORAL AND WRITTEN COMMUNICATION - Level 2. Using strategies for preparing and giving oral presentations. Writing texts and documents whose content is coherent, well structured and free of spelling and grammatical errors.

Teaching methodology

X



300242 - AM2 - Further Mathematics 2

Learning objectives of the subject

X

Study load

Total learning time: 187h 30m	Hours large group:	52h	27.73%
	Guided activities:	30h 30m	16.27%
	Self study:	105h	56.00%

300242 - AM2 - Further Mathematics 2

Content

<p>(ENG) Taylor formula. Power series.</p>	<p>Learning time: 16h Theory classes: 4h Laboratory classes: 1h Guided activities: 1h Self study : 10h</p>
<p>Description: X</p>	
<p>(ENG) Numerical methods for differential equations.</p>	<p>Learning time: 54h 30m Theory classes: 14h Laboratory classes: 3h Guided activities: 3h 30m Self study : 34h</p>
<p>Description: (ENG) Numerical differentiation. Initial-value problems for ordinary differential equations. Runge-Kutta methods. Numerical solutions to partial differential equations.</p> <p>Related activities: X</p>	
<p>X</p>	<p>Learning time: 20h Theory classes: 6h Laboratory classes: 2h Guided activities: 2h Self study : 10h</p>
<p>Description: X</p> <p>Related activities: X</p>	

300242 - AM2 - Further Mathematics 2

X	<p>Learning time: 20h</p> <p>Theory classes: 6h Laboratory classes: 2h Guided activities: 2h Self study : 10h</p>
<p>Description: X</p> <p>Related activities: X</p>	
X	<p>Learning time: 20h</p> <p>Theory classes: 6h Laboratory classes: 2h Guided activities: 2h Self study : 10h</p>
<p>Description: X</p> <p>Related activities: X</p>	
X	<p>Learning time: 10h</p> <p>Theory classes: 3h Laboratory classes: 1h Guided activities: 1h Self study : 5h</p>
<p>Description: (ENG) Mostres aleatòries. Estimadors. Intervals de confiança per a la mitjana i la desviació típica de la població.</p> <p>Related activities: X</p>	

300242 - AM2 - Further Mathematics 2

<p>X</p>	<p>Learning time: 9h 30m Theory classes: 2h 30m Laboratory classes: 1h Guided activities: 1h Self study : 5h</p>
<p>Description: (ENG) Model lineal simple. Estimació per mínims quadrats. Correlació.</p> <p>Related activities: X</p>	
<p>Graph theory and algorithms</p>	<p>Learning time: 21h 30m Theory classes: 6h 30m Laboratory classes: 1h 30m Guided activities: 1h 30m Self study : 12h</p>
<p>Description:</p> <p>1 Graphs. Basic definitions: vertices, edges, arcs, degrees of the vertices, digraphs, multigraphs, paths, cycles, circuits, trees, weithed graphs and digraphs.</p> <p>2 Algorithmic complexity. Minimum spanning tree of a weighted graph (Prim's, Prim-Jarnik and Kruskal Algorithms). Shortest paths (Dijkstra and Floyd's algorithm). Shortest eulerian path (Euler's Theorem). Shortest hamiltonian paths (Christofides' Approximative Algorithm and algorithm of exponential complexity using dynamic programming. Ford-Fulkerson's Algorithm.</p>	
<p>Queueing theory</p>	<p>Learning time: 16h Theory classes: 4h Laboratory classes: 1h 30m Guided activities: 1h 30m Self study : 9h</p>
<p>Description:</p> <p>Introduction to Poisson stochastic processes. Exponential queues M/M/ with finite and infinite population. Mean time in the system, in the queue and service time. Mean number of users in the system, in the queue and being serviced. Equations of the queue in stationary regime. Probabilities of the states in stationary regime.</p>	

300242 - AM2 - Further Mathematics 2

Planning of activities

X	Hours: 1h Theory classes: 1h
Description: X Descriptions of the assignments due and their relation to the assessment: X Specific objectives: X	
X	Hours: 1h Theory classes: 1h
Specific objectives: X	
X	Hours: 3h Self study: 1h 30m Laboratory classes: 1h 30m
X	Hours: 3h Laboratory classes: 1h 30m Self study: 1h 30m
Specific objectives: X	
(ENG) TÍTOL ACTIVITAT 7: PRÀCTIQUES	Hours: 3h Laboratory classes: 1h 30m Self study: 1h 30m
Description: X Specific objectives: X	
(ENG) TÍTOL ACTIVITAT 9: CONTROL DE PRÀCTIQUES i ADs	Hours: 2h Laboratory classes: 1h Self study: 1h

300242 - AM2 - Further Mathematics 2

Description: X
Support materials: X
Specific objectives: X

X	Hours: 10h Laboratory classes: 5h Self study: 5h
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Qualification system

X

Regulations for carrying out activities

X

Bibliography

Basic:

Burillo, Josep; Miralles, Alícia; Serra, Oriol. Probabilitat i estadística. Barcelona: Edicions UPC, 2003. ISBN 8483016869.

Complementary:

Lipschutz, Seymour; Schiller, John J.; Cortiñas Vázquez, Pedro; Santos Peña, Julián; Muñoz Alamillos, Ángel; Guzmán Justicia, Luis. Introducción a la probabilidad y estadística. Madrid [etc.]: McGraw-Hill/Interamericana de España, 2001. ISBN 8448125045.

Burden, Richard L.; Faires, J. Douglas. Numerical analysis. 9th. [Pacific Grove (California), etc.]: Brooks/Cole Cengage Learning, 2011. ISBN 9780538735643.