

## 320164 - MCS - Modelisation, Complexity and Sustainability

Coordinating unit:	205 - ESEIAAT - Terrassa School of Industrial, Aerospace and Audiovisual Engineering		
Teaching unit:	724 - MMT - Department of Heat Engines		
Academic year:	2019		
Degree:	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) BACHELOR'S DEGREE IN INDUSTRIAL DESIGN AND PRODUCT DEVELOPMENT ENGINEERING (Syllabus 2010). (Teaching unit Optional) BACHELOR'S DEGREE IN TEXTILE TECHNOLOGY AND DESIGN ENGINEERING (Syllabus 2009). (Teaching unit Optional) BACHELOR'S DEGREE IN AUDIOVISUAL SYSTEMS ENGINEERING (Syllabus 2009). (Teaching unit Optional) BACHELOR'S DEGREE IN CHEMICAL ENGINEERING (Syllabus 2009). (Teaching unit Optional) BACHELOR'S DEGREE IN MECHANICAL ENGINEERING (Syllabus 2009). (Teaching unit Optional) BACHELOR'S DEGREE IN ELECTRICAL ENGINEERING (Syllabus 2009). (Teaching unit Optional) BACHELOR'S DEGREE IN INDUSTRIAL ELECTRONICS AND AUTOMATIC CONTROL ENGINEERING (Syllabus 2009). (Teaching unit Optional)		
ECTS credits:	6	Teaching languages:	Catalan, Spanish

### Teaching staff

Coordinator:	Rosas Casals, Marti
Others:	Martinez Magaña, Juan

### Learning objectives of the subject

### Study load

Total learning time: 150h	Hours large group:	30h	20.00%
	Hours medium group:	30h	20.00%
	Self study:	90h	60.00%

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### Content

(ENG) Tema 3: INTRODUCCIÓ A LA COMPLEXITAT	Learning time: 25h Theory classes: 10h Self study : 15h
(ENG) Tema 2: DINÀMICA DE SISTEMES	Learning time: 35h Theory classes: 14h Self study : 21h
(ENG) Tema 4: MODELITZACIÓ DE SISTEMES SOCIO-ECOLÒGICS	Learning time: 50h Theory classes: 20h Self study : 30h

### Planning of activities

(ENG) PROVA PARCIAL	Hours: 3h Theory classes: 3h
(ENG) EXAMEN FINAL	Hours: 3h Theory classes: 3h

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### Bibliography

#### Basic:

Norberg, Jon; Cumming, Graeme S. Complexity theory for a sustainable future. New York: Columbia University Press, cop. 2008. ISBN 9780231134613.

Berkes, Fikret; Colding, Johan; Folke, Carl. Navigating social-ecological systems: building resilience for complexity and change. Cambridge, U.K. ; New York: Cambridge University Press, cop. 2003. ISBN 0521815924.

Berkes, Fikret; Folke, Carl; Colding, Johan. Linking social and ecological systems: management practices and social mechanisms for building resilience. Cambridge: Cambridge University Press, cop. 1998. ISBN 0521785626.

Strogatz, Steven H. Nonlinear dynamics and chaos: with applications to physics, biology, chemistry, and engineering [on line]. 2nd ed. Philadelphia: Westview Press, cop. 2015 [Consultation: 06/05/2019]. Available on: <<https://ebookcentral.proquest.com/lib/upcatalunya-ebooks/detail.action?docID=1181622>>. ISBN 9780813349107.

Solé Vicente, Ricard. Redes complejas: del genoma a internet. Barcelona: Tusquets, 2009. ISBN 9788483831175.

#### Others resources:

Those suggested as the course goes on