

Program	09TT - Engineering in Telecommunication Technologies and Services
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Course number and name	
Number	95000019
Name	Mathematics Methods Métodos Matemáticos
Semester	Y1-S2

Credits and contact hours	
ECTS Credits	4.5
Contact hours	45

Coordinator's name	Francisco Ballesteros Olmo
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Specific course information		
Description of course content		
A course in Fourier Series, Complex Analysis and Ordinary Differential Equations		
List of topics to be covered		
<ol style="list-style-type: none"> 1. Fourier Series: orthogonal expansion and convergence. 2. Complex Analysis: complex functions, continuity and limits, derivability and holomorphy, contour integral of a complex function, complex series, Residue theory, Laplace and Fourier Transforms. 3. Ordinary Differential Equations (ODE): first-order ODE's, higher-order ODE's, first-order ODE systems. 		
Prerequisites or co-requisites		
None.		
Course category in the program		
<input checked="" type="checkbox"/> R (required)	<input type="checkbox"/> E (elective)	<input type="checkbox"/> SE (selective elective)

Specific goals for the course
Specific outcomes of instruction
RA149: Capability to formalize and analyse problems in Engineering mathematically.
RA150: Function representation by means of Fourier Series.
RA151: Capability to properly manage complex functions and ability to solve problems where these functions are involved.
RA152: Capability to properly handle complex series.
RA153: Knowledge and understanding of the Cauchy Theory for contour integrals of

complex functions.

RA154: Ability to solve contour integrals of complex functions by means of Residue Theory.

RA155: Knowledge of the Laplace and Fourier Transforms and ability to apply them to problems in Engineering.

RA156: Physic phenomena modelling in terms of Ordinary Differential Equations.

Student outcomes addressed by the course

CEB1, CEB4

CG1, CG2, CG4, CG5

Bibliography and supplemental materials

- C. Sánchez, Variable compleja y Transformada de Laplace, Servicio de Publicaciones de Fundetel, Madrid, 2010.
- W.E. Boyce; R.C. DiPrima, Ecuaciones diferenciales y problemas con valores de la frontera, Limusa Noriega Editores, México, 2010.
- J.W. Brown; R.V. Churchill, Variable compleja y aplicaciones, McGraw-Hill, Madrid, 2004.
- J.C. Angulo; Variable Compleja: resolución de problemas y aplicaciones, Paraninfo, Madrid 2012.
- D.G.Zill; R.Cullen, Matemáticas avanzadas para ingeniería, vol. 1: Ecuaciones diferenciales, McGraw-Hill, México, 2008.
- G. Vera, Variable compleja, problemas y complementos, Textos universitarios, coedición con RSME, 2013.
- M. Molero; A. Salvador; M.T. Menárguez; L. Garmendia, Análisis matemático para ingeniería, Prentice Hall, Madrid, 2007.
- R.Cabanes, Análisis de Fourier (series y transformadas): 25 problemas útiles, García-Maroto, Madrid, 2008.
- M. Cordero; M.Gómez, Ampliación de matemáticas: variable compleja y ecuaciones diferenciales, García-Maroto, Madrid, 2008.
- A.D.Wunsch; Variable compleja con aplicaciones, Pearson Educación/Addison-Wesley, México, 1999.
- A.D.Osborne, Complex Variables and Their Applications, Addison Wesley, New York, 1999.
- WEB: <http://moodle.upm.es/titulaciones/oficiales>

Teaching methodology

<u>X</u> lectures	<u>X</u> problem solving sessions	<u>X</u> collaborative actions	__ laboratory sessions
Other:			