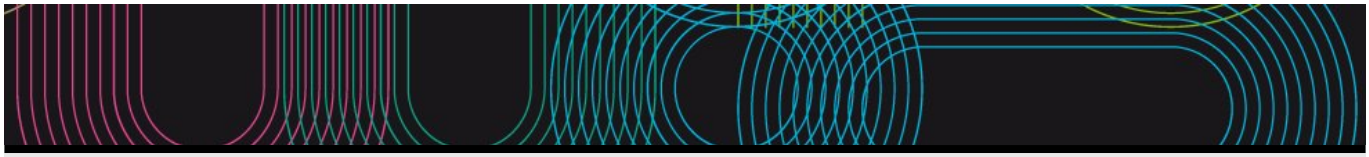

IDENTIFYING DATA				
Fluid Mechanics				
Subject	Fluid Mechanics			
Code	V05M135V01201			
Study programme	(*)Máster Universitario en Matemática Industrial			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Optional	1st	2nd
Teaching language				
Department				
Coordinator	Martín Ortega, Elena Beatriz			
Lecturers	Martín Ortega, Elena Beatriz Meis Fernández, Marcos			
E-mail	emortega@uvigo.es			
Web	http://www.m2i.es/docs/modulos/MESimNumerica/MBasica/1.%20Mecanica%20de%20fluidos.pdf			
General description	Course of *modelado mathematical of the problems of fluid mechanics that appear in the industrial problems.			

Competencies	
Code	
C1	(*)Alcanzar un conocimiento básico en un área de Ingeniería/Ciencias Aplicadas, como punto de partida para un adecuado modelado matemático, tanto en contextos bien establecidos como en entornos nuevos o poco conocidos dentro de contextos más amplios y multidisciplinares.
C2	(*)Modelar ingredientes específicos y realizar las simplificaciones adecuadas en el modelo que faciliten su tratamiento numérico, manteniendo el grado de precisión, de acuerdo con requisitos previamente establecidos.
C6	(*)Ser capaz de extraer, empleando diferentes técnicas analíticas, información tanto cualitativa como cuantitativa de los modelos
C7	(*)Saber modelar elementos y sistemas complejos o en campos poco establecidos, que conduzcan a problemas bien planteados/formulados.

Learning outcomes	
Expected results from this subject	Training and Learning Results
Capacity of selection of a model *aceduado for a real problem	C2 C6 C7
Understanding of the basic properties of the main models	C1 C2
Knowledge of the technicians of qualitative analysis of the solutions of the models	C1 C6

Contents	
Topic	
Main models of the dynamics of fluids	Systems of laws of conservation for Newtonian fluids. *Adimensionamiento Of the equations and physical meaning of the main adimensional numbers in the dynamics of fluids: *Mach, *Reynolds, *Froude, *Prandtl, *Peclet, *Grashof and *Nusselt Deduction of the main models of the dynamics of fluids like models limit in the adimensional numbers

Perfect flows *incompresibles	Equations of evolution of the *vorticidad in a perfect flow. Study of flows *irrotaciones and potential flows. Limitations of the potential model. Examples of potential flows and applications. Some ideas of theory of *sustentación.
Viscous flows *incompresibles	Some particular solutions of the equations of *Navier-*Stokes *incompresibles in diet *estacionario. Elementary analysis of the layers limit: basic ideas of the technicians of analysis and study of the problem of *Blasius. Observations on the stability of viscous solutions *laminares *estacionarias. Some examples of hydrodynamic unsteadinesses.
Turbulent flows	Introduction *Inviabilidad of the direct numerical simulation (*DNS) Problem of the closing of equations in turbulence Models of turbulence
Flows with transfer of heat	Equations of flows no reagents to low numbers of *Mach Convection forced. Natural convection. Exchangers of heat

Planning			
	Class hours	Hours outside the classroom	Total hours
Introductory activities	1	0	1
Master Session	30	60	90
Troubleshooting and / or exercises	4	8	12
Projects	1	12	13
Case studies / analysis of situations	10	20	30
Long answer tests and development	4	0	4
*The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.			

Methodologies	
	Description
Introductory activities	They will expose the aims and organisation of the matter.
Master Session	They will expose the contents of character more theoretical of the *asignatura
Troubleshooting and / or exercises	They will realise exercises of application of technical *análiticas to the models presented of the matter.
Projects	It will tackle the complete modelling of a problem of industrial character
Case studies / analysis of situations	They will devote to the preparation of models *aceduados for problems of industrial character and to the analysis of these models

Personalized attention	
Methodologies	**Description**
Introductory activities	*asesorará To the students, with *curricula and previous knowledges very diverse, on the necessary preparation to follow properly the *asignatura

Assessment			
	Description	Qualification	Training and Learning Results
Projects	Evaluation of the works/problems proposed presented by the student	40	C1 C2 C6 C7

Long answer tests and development	Relative written proof to the study of a case and his analysis	60	C1 C2 C7

Other comments on the Evaluation

Sources of information

Basic Bibliography

Complementary Bibliography

Barrero, A. y Pérez-Saborid, M,, **Fundamentos y aplicaciones de la Mecánica de fluidos,**, 2005

Panton, R.L,, **Incompressible Flow,**, 3rd, 2005

White, F.M.,, **Heat and mass transfer,**, 1988

Wilcox, D.C.,, **Turbulence Modelling for CFD,**, 3rd ed., 2006

Recommendations

Subjects that continue the syllabus

MEMS Heat Transfer Fluid and Power-MEMS/V05M135V01209
Professional Software in Fluid Mechanics/V05M135V01212

Subjects that are recommended to be taken simultaneously

Numerical Methods for Partial Differential Equations/V05M135V01104

Subjects that it is recommended to have taken before

Differential Equations and Dynamic Systems/V05M135V01102
Partial Differential Equations/V05M135V01103
Mechanics of Continuous Media/V05M135V01105