LMECA2195

2015-2016

Gasdynamics and reacting flows

5.0 credits	30.0 h + 30.0 h	2q

Teacher(s) :	Papalexandris Miltiadis ;
Language :	Anglais
Place of the course	Louvain-la-Neuve
Inline resources:	> http://moodleucl.uclouvain.be/enrol/index.php?id=6803 Homework announcements.
Main themes :	Governing equations of compressible flows Steady and unsteady compressible flows in one dimension Steady compressible flows in two and three dimensions Supersonic combustion, detonations Subsonic combustion - deflagrations, explosions Introduction of multiphase compressible flows.
Aims :	With respect to the reference AA of the programme of studies "Masters degree in Mechanical Engineering", this course contributes to the development and acquisition of the following skills AA1.1, AA1.2, AA1.3 AA2.2, AA2.4, AA2.5 AA3.2, AA3.3 AA4.1, AA4.2, AA4.3, AA4.4 AA5.1, AA5.4, AA5.6 AA6.1, AA6.4 Study of compressible gaseous flows, including supersonic flows. Study of reacting flows in which compressibility effects are deemed important. Presentation of industrial and technological applications *The contribution of this Teaching Unit to the development and command of the skills and learning outcomes of the programme(s) can be accessed at the end of this sheet, in the section entitled "Programmes/courses offering this Teaching Unit".*
Evaluation methods :	Written exam, with open books and notes. The score on the exam counts for 70% of the overall score on the course. 3 homework assignments. The score on each assignment counts for 10% of the overall score on the course
Teaching methods :	Course lectures Session of exercices
Content :	-- Steady and unsteady compressible flows in one dimension Euler equations, characteristic decomposition, boundary conditions. -- Simple waves, shock waves. Rankine-Hugoniot relations. -- Steady compressible flows in two and three dimensions. Prandtl-Meyer expansion. Supersonic flow around projectiles. Method of characteristics. Oblique shocks. -- Unsteady flows. Shock formation, Riemmann problem. Piston-induced flow. Wave interactions. Viscosity effects. Introduction to numerical methods. -- Detonations. Introduction. Chapman-Jouguet theory. ZND theory. Stability analysis. Multi-dimensional structure. Applications.
Bibliography :	P.A. Thompson, Compressible Fluid Dynamics, 1988. Compulsory. Additional notes of the course LMECA2195. Compulsory, available on the site i-campus of the course. Homework announcements. Compulsory, available on the site i-campus of the course H.W. Liepmann & mp; A. Roshko, Elements of Gas dynamics, Dover Edition, 1993. Recommended
Faculty or entity in charge:	MECA

Programmes / formations proposant cette unité d'enseignement (UE)				
Intitulé du programme	Sigle	Credits	Prerequis	Acquis d'apprentissage
Master [120] in Mechanical Engineering	MECA2M	5	-	
Master [120] in Electro-mechanical Engineering	ELME2M	5	-	