

New combustion mode for propulsion

Course code: ACP3

ECTS Credits: 2

Department	: ET	Lectures	: 7h30
Lecturers	: R. Zitoun	Tutorials	: 6h15
Year of study	: 2 nd year	Laboratory sessions	: 3h00
Semester	: 3 rd semester	Project	:
Assessment method(s)	: written tests	Home works	:
Language of instruction	: English	Total hours	: 16h45
Type of courses	: Compulsory		

Objective: To give basic concepts on shock and detonation physics to allow the understanding of the the detonation propulsion systems. We first focus on physical models and structure of detonation wave and then presents the main concepts of propulsion by detonation currently studied.

Prerequisites: Thermodynamics, fluid mechanics

Content:

1. Detonation phenomenology
2. Detonation models
3. Flow of detonation products
4. Detonation dynamics and structure
5. Detonation and propulsion:

Continuous Detonation Wave Engine (CDWE)

- Principle
- History
- Modelisation
- Examples and Perspectives

Pulse Detonation Engine (PDE)

- Principle
- History
- Examples and Perspectives

Others non-conventional aeronautical engines: CVC, Combine Cycle Engine etc...

Programs: US VAATE, ADVENT, FALCON etc...

Recommended reading:

“Detonation: Theory and Experiment”, Wildon FICKETT and William C. DAVIS, Dover Publications, 2000, ISBN-13: 978-0-486-41456-0,

“The detonation phenomenon” John H.S. Lee, CAMBRIDGE University Press, 2008, ISBN 978-0-521-89723-5

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