UNIVERSITÀ DEGLI STUDI DI PALERMO

SCHOOL	POLYTECHNIC SCHOOL
ACADEMIC YEAR	2016/2017
SECOND CYCLE (7TH LEVEL) COURSE	AEROSPACE ENGINEERING
SUBJECT	GAS DYNAMICS
TYPE OF EDUCATIONAL ACTIVITY	B
AMBIT	50350-Ingegneria aerospaziale ed astronautica
CODE	03549
SCIENTIFIC SECTOR(S)	ING-IND/06
HEAD PROFESSOR(S)	MARRETTA ROSARIO Professore Associato Univ. di PALERMO
OTHER PROFESSOR(S)	
CREDITS	12
INDIVIDUAL STUDY (Hrs)	192
COURSE ACTIVITY (Hrs)	108
PROPAEDEUTICAL SUBJECTS	
YEAR	1
TERM (SEMESTER)	2° semester
ATTENDANCE	Not mandatory
EVALUATION	Out of 30
TEACHER OFFICE HOURS	**MARRETTA ROSARIO** Monday 15:00 17:00 Proprio Ufficio Wednesday 15:00 17:00 Proprio Ufficio

DOCENTE: Prof. ROSARIO MARRETTA

TEACHING METHODS	Lessons, Excercises
ASSESSMENT METHODS	Speech meeting (set of 3 questions with multiple answers) 30 minutes and discussion about a short report on CFD topics
LEARNING OUTCOMES	General theory about mechanics and study of gasdynamic flows and fields. Compressible and thermal boundary layers theory. CFD analysis. Learning Be able to recognize, apply, share and organize the contents for the whole gasdynamic pre-processing. Synthesis Be able to evaluate design variables of gasdynamic post-processing Communications Be able to share and compare learning and managing in aerospace context Learning Be able to acquire basic state of the art and literature. Be able to apply methods of gasdynamic to research and development.
EDUCATIONAL OBJECTIVES	Modulus III aims and scopes Math-physical aspects of gasdynamics with focus on in 2D and 3D flows and bodies: basic approaches Modulus IV aims and scopes Gasdynamic approaches and methods on the following items: steady supersonic flows in ducts and free; shock waves (normal and not); nozzle in supersonic and subsonic regimes; thermal exchanges in flows.
PREREQUISITES	Fundamentals of: Math Analysis; Physics and Industrial Physics; Aerodynamics
SUGGESTED BIBLIOGRAPHY	Dispense fornite dal docente (Marretta); Culbert Laney "Computational Gasdynamics" Cambridge University Press.

SYLLABUS

Hrs	Frontal teaching
1	Aims and scope of discipline
6	Criteria and basics of math-physical aspects of gasdynamics
1	Molecular transport
6	Isoentropic flows
6	Turbulence and models
8	Math approaches about boundary layers
24	Exercises set about all the topics of the past modulus
2	Subsonic and supersonic piped flows
2	Governing equations: integral method
2	Subsonic and supersonic free flows
2	Normal shock waves
3	Different shock waves
3	Prandtl-Meyer flow
5	Subsonic and supersonic nozzles
5	Diffusers
2	Rayleigh flow
2	Fanno flow

Hrs	Practice
24	Exercises set about all the topics of the past modulus