UNIVERSITÀ DEGLI STUDI DI PALERMO

SCHOOL	POLYTECHNIC SCHOOL
ACADEMIC YEAR	2016/2017
SECOND CYCLE (7TH LEVEL) COURSE	AEROSPACE ENGINEERING
SUBJECT	FLIGHT DYNAMICS
TYPE OF EDUCATIONAL ACTIVITY	B
AMBIT	50350-Ingegneria aerospaziale ed astronautica
CODE	02374
SCIENTIFIC SECTOR(S)	ING-IND/03
HEAD PROFESSOR(S)	GRILLO CATERINA Professore Associato Univ. di PALERMO
OTHER PROFESSOR(S)	
CREDITS	12
INDIVIDUAL STUDY (Hrs)	192
COURSE ACTIVITY (Hrs)	108
PROPAEDEUTICAL SUBJECTS	
YEAR	2
TERM (SEMESTER)	1° semester
ATTENDANCE	Not mandatory
EVALUATION	Out of 30
TEACHER OFFICE HOURS	**GRILLO CATERINA** Tuesday 11:00 13:00 Studio Prof. Grillo Thursday 12:00 14:00 Studio Prof. Grillo Friday 11:00 12:00

DOCENTE: Prof.ssa CATERINA GRILLO

TEACHING METHODS	Lectures, Numerical applications, Case and research studies analysis.Seminars. Technical visit
ASSESSMENT METHODS	Oral Examination with mandatory presentation of Technical reports on the numerical applications.
LEARNING OUTCOMES	Knowledge and ability to understand: Knowledge and methodology to solve challenging problems related to aircraft dynamics taking into account either the pilot in the loop or the atmospheric disturbances. Ability to: analyze the dynamic behavior of aircraft; model complicated systems evaluate effects of design solution on the dynamic behavior of aircraft . Ability to apply knowledge and understanding: Ability to apply advanced methodologies of analysis, calculation and design in the context of flight dynamics and control of advanced systems. Making judgments: Ability to recognize problems in the framework of System Theory. Ability to select the best approach in order to solve complex problems. Communicative skills: Ability to write technical reports, to talk about technical questions with noticeable precision. Learning ability: Ability to carry out advanced studies in the field of Flight dynamics and Automatic Controls .
EDUCATIONAL OBJECTIVES	To supply advanced methodologies suited for solutions of problems related to the dynamics of the "system aircraft"
PREREQUISITES	Familiarity with : Aerodynamics, Contro Theory(SISO Systems), Static longitudinal, lateral and directional stability of aircraft
SUGGESTED BIBLIOGRAPHY	• B. Etkin – Dynamics of Atmospheric Flight – John Wiley & Sons, Inc. • C. Casarosa - Meccanica del Volo - Plus • J. Roskam – Airplane Flight Dynamics and Automatic Flight Controls - DARcorporation

SYLLABUS

Hrs	Frontal teaching
1	Introduction
2	Dynamic Systems: Physical and Mathematical models
1	Linearized Models
1	The small-disturbance Theory
2	Linear/Invariant Systems
1	Equilibrium,control and stability
2	Response of Linear/Invariant Systems
1	Reference Frames
7	General Equations of unsteady motion
2	The Linear Equations
6	Stability Derivatives
2	Control Derivatives
5	Longitudinal Dynamics
4	Lateral Dynamics
2	Response to actuation of the controls (open loop)
1	Response to gust disturbances
1	Closed loop control
4	Random Process Theory
2	Flight in a turbulent air
3	Mathematical model of Human Pilots
3	Handling and flying Qualities
1	System Observers
3	Aircraft Dynamis In Ground Effect

SYLLABUS

Hrs	Frontal teaching
2	SAS

Hrs	Practice
3	Frequency Response
9	Response of Linear/Invariant systems
6	Longitudinal Dynamics
4	Lateral Dynamics
3	Response to actuation of the controls
6	Flight in a turbulent air
6	IGE Dynamics
4	Response to a Power spectral density input
3	SAS