UNIVERSITÀ DEGLI STUDI DI PALERMO

SCHOOL	POLYTECHNIC SCHOOL
ACADEMIC YEAR	2016/2017
SECOND CYCLE (7TH LEVEL) COURSE	AEROSPACE ENGINEERING
SUBJECT	STRUCTURAL DYNAMICS
TYPE OF EDUCATIONAL ACTIVITY	C
AMBIT	20907-Attività formative affini o integrative
CODE	02375
SCIENTIFIC SECTOR(S)	ICAR/08
HEAD PROFESSOR(S)	PIRROTTA ANTONINA Professore Ordinario Univ. di PALERMO
OTHER PROFESSOR(S)	
CREDITS	6
INDIVIDUAL STUDY (Hrs)	96
COURSE ACTIVITY (Hrs)	54
PROPAEDEUTICAL SUBJECTS	
YEAR	1
TERM (SEMESTER)	2° semester
ATTENDANCE	Not mandatory
EVALUATION	Out of 30
TEACHER OFFICE HOURS	**PIRROTTA ANTONINA** Monday 14:00 15:30

DOCENTE: Prof.ssa ANTONINA PIRROTTA

TEACHING METHODS	Front lessons; exercises in class; visits to the Laboratory of Experimental Dynamics of DICAM
ASSESSMENT METHODS	Oral examination with presentation of the developed assigned project. The interview is aimed at determining the student's ability to process the gained knowledge, by using it to solve problems, and the ability to express the teaching content using a technically correct language. The vote is expressed in thirtieths with possible praise
LEARNING OUTCOMES	Knowledge and understanding The student, at the end of the course, will have acquired knowledge and methods to address and solve in an original way problems related to structural vibration, in both deterministic and random field. Applying knowledge and understanding The student at the end of the course will be able to independently develop vibration mitigation projects together with methodologies to study the vibration induced effects.. Making judgments The student will be able to critically analyze and evaluate effectively the risk induced by any dynami loading condition applied to structures. Communication The student will be able to communicate competently and with appropriate language reguarding complex dynamic problems of structures even in highly specialized settings. Learning skills - The student will be able to deal autonomously with issues related to the dynamics of structures. - The student will be able to analyze complex issues such as: dynamic response of linear and nonlinear systems, dynamic stability of complex systems, stochastic dynamics.
EDUCATIONAL OBJECTIVES	The course aims at providing the criteria and methods for the design of any system excited by deterministic or stochastic dynamic loads such as wind, earthquake, sea waves etc.
PREREQUISITES	Continuum mechanics of elastic systems Geometry and linear algebra Structural analysis methods
SUGGESTED BIBLIOGRAPHY	Muscolino G., 2004, Dinamica delle Strutture, McGraw-Hill. Thomson W.T., Dillon Dahleh M., 1997, Theory of Vibration with Applications, Pearson

SYLLABUS

Hrs	Frontal teaching
1	Introduction to multi degree of freedom systems
3	Eigenvalues and eigenvectors properties
4	Modal analysis for multi degree of freedom system
2	Modal analysis for system under dynamic excitation
2	Modal truncation
3	Modal analysis for non-classically damped systems
2	Frequency domain analysis and Transfer function
4	Passive control vibration systems
1	Introduction to stochastic dynamics
2	Characteristic function of a random variable
1	Cumulants
2	Bidimensional random variables
1	N-dimensional random variables
1	Introduction to stochastic processes
2	Stationary process
2	Correlation function
2	Power spectral density function
1	Wide-band stochastic process, narrow-band stochastic process and white noise
2	Multivariate stochastic process

Hrs	Practice
3	Free vibrations of multi degree of freedom systems
3	Forced vibrations of multi degree of freedom systems
6	Three-dimensional structural systems under earthquake excitation for the development of the assigned project
6	Vibration of continuous systems
3	Random vibrations