



UNIVERSITÀ DEGLI STUDI DI PALERMO

SCHOOL	POLYTECHNIC SCHOOL
ACADEMIC YEAR	2016/2017
SECOND CYCLE (7TH LEVEL) COURSE	AEROSPACE ENGINEERING
SUBJECT	AERONAUTICAL PRODUCTION TECHNOLOGIES
TYPE OF EDUCATIONAL ACTIVITY	C
AMBIT	20907-Attività formative affini o integrative
CODE	14427
SCIENTIFIC SECTOR(S)	ING-IND/16
HEAD PROFESSOR(S)	FRATINI LIVAN Professore Ordinario Univ. di PALERMO
OTHER PROFESSOR(S)	
CREDITS	9
INDIVIDUAL STUDY (Hrs)	144
COURSE ACTIVITY (Hrs)	81
PROPAEDEUTICAL SUBJECTS	
YEAR	1
TERM (SEMESTER)	1° semester
ATTENDANCE	Not mandatory
EVALUATION	Out of 30
TEACHER OFFICE HOURS	FRATINI LIVAN Monday 12:00 13:00 Tuesday 12:00 13:00

DOCENTE: Prof. LIVAN FRATINI

TEACHING METHODS	Lessons, exercises, lab experiences.
ASSESSMENT METHODS	<p>Oral exam: an interview is carried out with the aim to verify the level of competences and knowledges.</p> <p>The proposed questions either open ones, or semi-structured ones, will be aimed to verify the acquired expertise, the elaboration capabilities and the presentation ability.</p> <p>As far as the verification of the acquired expertise is regarded, the capability to establish connections between the contents of the courses, will be required.</p> <p>As the verification of the elaboration capabilities, the comprehension of the proposed manufacturing processes and of the related consequences in the manufacturing routings in the aerospace's industries.</p> <p>The maximum score is obtained as the judgement capability on specific and innovative aspects of the course, the capability to represent the impact and consequences of the contents of the course within the scenario of the discipline and the full ability to express ideas and innovative solutions within the professional and technological frame, are shown.</p> <p>As the exposition ability is regarded, a minimum evaluation is given for those who demonstrate a sufficient skill on the topics of the course, while the maximum score will be given to those who will demonstrate a full knowledge of the topics and of the specific language.</p>
LEARNING OUTCOMES	<p>Knowledge and comprehension capability.</p> <p>Specific acquired knowledge on:</p> <ul style="list-style-type: none"> . Materials used in the aerospace sector; . Theory of plasticity; . Bulk metal forming operations; . Sheet metal forming and joining operations; . Composites panels working operations; . Boundary conditions definition in sheet metal forming operations; . Plastic behavior definition (also in temperature) of metallic materials; . Insights regarding the deformation mechanics of metallic materials through numerical simulation based on the finite element method. <p>The student at the end of the course will be able to carry out activities of computer aided engineering of metal forming processes and to set up technological processes on composites materials.</p>
EDUCATIONAL OBJECTIVES	At the end of the course the student will have acquired knowledges and practical methodologies to carry out of forming operations on both metals and composites. He will be able to analyze results on simulations and experiments and to tune the model in order to get a close representation of the process mechanics. He will be able to carry out the engineering of manufacturing processes.
PREREQUISITES	<p>The following are considered fundamental prerequisites in order to reach the targets of the course:</p> <ul style="list-style-type: none"> - knowledges on material sciences and technologies (for metals and polymers); - knowledges on material mechanics; - basic knowledges on manufacturing processes.
SUGGESTED BIBLIOGRAPHY	<ul style="list-style-type: none"> • Dispense del corso. • Presentazioni del corso • F. Micari, R. Ippolito, F. Gabrielli "Tecnologia Meccanica", Mc Graw Hill

SYLLABUS

Hrs	Frontal teaching
10	Materials to be used in the aerospace sector.
11	Elements of theory of plasticity and characterization of metallic materials.
12	Bulk and sheet metal forming operations.
7	Joining technologies of metal parts.
9	Manufacturing processes on composites panels.
4	Joining technologies for composites materials.
Hrs	Practice
16	Exercises and lab experiences on sheet and bulk metal forming processes.
12	Exercises and lab experiences on joining operations on metals and composites materials.