



UNIVERSITÀ DEGLI STUDI DI PALERMO

DEPARTMENT	Ingegneria
ACADEMIC YEAR	2022/2023
MASTER'S DEGREE (MSC)	MANAGEMENT ENGINEERING
SUBJECT	ADDITIVE MANUFACTURING
TYPE OF EDUCATIONAL ACTIVITY	B
AMBIT	50368-Ingegneria gestionale
CODE	22341
SCIENTIFIC SECTOR(S)	ING-IND/16
HEAD PROFESSOR(S)	PALMERI DINA Ricercatore a tempo determinato Univ. di PALERMO
OTHER PROFESSOR(S)	
CREDITS	6
INDIVIDUAL STUDY (Hrs)	96
COURSE ACTIVITY (Hrs)	54
PROPAEDEUTICAL SUBJECTS	
MUTUALIZATION	
YEAR	2
TERM (SEMESTER)	2° semester
ATTENDANCE	Not mandatory
EVALUATION	Out of 30
TEACHER OFFICE HOURS	PALMERI DINA Wednesday 15:00 18:00 Stanza del docente Thursday 15:00 18:00 Stanza del docente

DOCENTE: Prof.ssa DINA PALMERI

PREREQUISITES	In order to understand the topics and to easily achieve the learning goals of the teaching course, the student must be confident with the following subjects: Physics, Technical Physics, Mechanics Of Materials And Theory Of Structures
LEARNING OUTCOMES	Knowledge and understanding At the end of the module the student will have acquired knowledge on the main established and innovative additive manufacturing techniques of the materials utilized in industrial applications. The didactic approach is aimed to define the technological and physical problem and to link it with the basic knowledge and similar problems Applying knowledge and understanding The student will be able to understand the most advanced manufacturing techniques and optimize the process parameters. The student will be able to identify and select proper additive manufacturing technique for a given application Making judgements The student will be able to understand the choice of the main parameters for the different processes and to modify them based on specific needs. Additionally, he will have acquired the ability to identify the correct material for a given application. Communication skills The student will acquire the ability to express and discuss the main issues related to the studied processes. He will be able to hold a conversation on topics related to the manufacturing of metals Learning skills The student will be able to independently tackle any issue related to the identification of the main mechanical properties of metallic materials, to their characterization and to the optimization of the additive production process and applications
ASSESSMENT METHODS	a)The evaluation will be based on an interview. b)The interview aims to assess the competences and the knowledge learnt during the course. The questions will verify: acquired knowledge; elaboration capability; talking capability; ability to build autonomous connections not bound to the referring textbooks; capability to produce autonomous evaluations inherent the course topics; capability to understand the applications connected with the discipline areas; capability to connect the discipline topics with the referring professional and technological context. c) d)The final assessment is on a 30 basis according to the criteria reported below: e)30-30+: excellent knowledge of the topics, excellent language and vocabulary, good analytical capability, the student is able to apply knowledge to solve the proposed problems f)26-29: Good management of the topics, nice language and vocabulary, the student is able to apply knowledge to solve the proposed problems g)24-25: basic knowledge of the topics, fair language and vocabulary, limited capability to apply autonomously knowledge to solve the proposed problems h)21-23: the student does not show full management of the main topics while possessing the knowledge, satisfactorily language and vocabulary, poor capability to apply autonomously the acquired knowledge i)18-20: minimal basic knowledge of the main topics and of the technical language and vocabulary, poor or no capability to apply autonomously the acquired knowledge. j)The exam will be not passed if the student will show a not acceptable knowledge of the topics.
EDUCATIONAL OBJECTIVES	Proper knowledge of the methodology and operative aspects of the main advanced and innovative manufacturing processes of materials used in industrial engineering as well as the capability to use this knowledge to identify, understand and describe the main issues relative to the studied processes
TEACHING METHODS	Frontal lectures and tutorials; Laboratory tutorials
SUGGESTED BIBLIOGRAPHY	Lecture notes and presentations Ian Gibson, David Rosen, Brent Stucker. Additive Manufacturing Technologies 3D Printing, Rapid Prototyping, and Direct Digital Manufacturing, second edition, Springer, 2015.

SYLLABUS

Hrs	Frontal teaching
2	Introduction to the course
12	Additive manufacturing processes
8	Analysis and definition of the 3D additive processes – STL file structure

SYLLABUS

Hrs	Frontal teaching
7	3D printing technologies applications
Hrs	Practice
10	Use of a CAD/CAM commercial software (Fusion 360)
6	3D printing: CAD model, STL file and object construction
9	Practical activities in the Additive Manufacturing LAB