



UNIVERSITÀ DEGLI STUDI DI PALERMO

DEPARTMENT	Culture e società
ACADEMIC YEAR	2022/2023
MASTER'S DEGREE (MSC)	ARCHAEOLOGY
SUBJECT	3D SURVEY FOR ARCHAEOLOGY
TYPE OF EDUCATIONAL ACTIVITY	B
AMBIT	50347-Archeologia e antichità classiche e medievali
CODE	21551
SCIENTIFIC SECTOR(S)	ICAR/06
HEAD PROFESSOR(S)	LO BRUTTO MAURO Professore Associato Univ. di PALERMO
OTHER PROFESSOR(S)	
CREDITS	6
INDIVIDUAL STUDY (Hrs)	120
COURSE ACTIVITY (Hrs)	30
PROPAEDEUTICAL SUBJECTS	
MUTUALIZATION	
YEAR	2
TERM (SEMESTER)	1° semester
ATTENDANCE	Not mandatory
EVALUATION	Out of 30
TEACHER OFFICE HOURS	LO BRUTTO MAURO Monday 09:00 12:00 Dipartimento di Ingegneria - Area Geomatica - viale delle Scienze - Edificio 8 - scala F6 - secondo piano. Tuesday 09:00 12:00 Dipartimento di Ingegneria - Area Geomatica - viale delle Scienze - Edificio 8 - scala F6 - secondo piano.

DOCENTE: Prof. MAURO LO BRUTTO

PREREQUISITES	No preliminary knowledge is required
LEARNING OUTCOMES	Knowledge and understanding The course provides the preliminary information necessary to an understanding the 3D survey techniques. In particular, the student will acquire the knowledge on the topographic, photogrammetric and laser scanning methods for the representation and documentation of archaeological heritage. Applying knowledge and understanding The student will be able to use tools for 3D surveys in areas of limited extension, to perform photogrammetric surveys, to use photogrammetric and laser scanning software for archaeological applications. Making judgments The student will be able to evaluate surveying techniques for the professional applications and the accuracy and limitations of the 3D surveys techniques. Communication skills The student will be instructed to present the results of surveys through technical and graphical representations. Learning skills During the course, the student will understand the evolution of the techniques as regards the theoretical and practical aspects.
ASSESSMENT METHODS	The student will have to answer at least three or four oral questions, on all parts of the program. The final examination aims to assess if the student has knowledge of the course topics and has acquired competence over the main 3D survey methods. The level of sufficiency is achieved when the student shows at least the basic theoretical skills of the main topics of the teaching. Moreover, he should be able to use the main terms of technical language and to exhibit his basic knowledge to the examiner. Below this threshold, the examination will be insufficient. More the student will show his knowledge of the discipline and his ability to interact with the examiner, more the evaluation will be positive. The evaluation, out of thirty, will be assessed on the basis of the student level.
EDUCATIONAL OBJECTIVES	The aim of the course is to provide students with the theoretical and methodological knowledge for 3D survey of Archaeological Cultural Heritage. These operations are very common both during archaeological excavations and in documentation and cataloging phases. This course provides the basics of topography, photogrammetry, and laser scanning and some information for the critical evaluation of the results obtained during all phases of the survey.
TEACHING METHODS	Lectures, practices
SUGGESTED BIBLIOGRAPHY	Bianchini M., Manuale di rilievo e di documentazione digitale in archeologia. Copia online http://www.rilievoarcheologico.it/manuale_rilievo8_index.htm R. Cannarozzo, L. Cucchiari, W. Meschieri. Misure Rilievo Progetto per Costruzioni, Ambiente e Territorio. Vol. 1, Quinta edizione, Zanichelli Editore, 2017. ISBN: 9788808520906 R. Cannarozzo, L. Cucchiari, W. Meschieri. Misure Rilievo Progetto per Costruzioni, Ambiente e Territorio. Vol. 2, Quinta edizione, Zanichelli Editore, 2017. ISBN: 9788808438812 A. Riggio, R. Carlucci. Topografia di base. Fondamentali della geomatica per la misura e la rappresentazione del territorio. EPC editore, 2015. ISBN: 978-88-6310-579-7 L. De Luca. La fotomodellazione architettonica. Rilievo, modellazione, rappresentazione di edifici a partire da fotografie. Dario Flaccovio Editore, 2010. ISBN 978-88-579-0070-4 G. Guidi, M. Russo, J.A. Beraldin. Acquisizione 3D e modellazione poligonale. McGraw-Hill Companies, 2010. ISBN-10 : 8838665311 - ISBN-13: 978-8838665318

SYLLABUS

Hrs	Frontal teaching
4	General information about surveying. Measurement of angles, distances, and height differences. Characteristics of the total station.
4	Theoretical principles of the terrestrial laser scanner. Procedures for surveying. The terrestrial laser scanner for 3D modelling.
4	Laser scanner survey phases: pre-processing, alignment, and mosaicking of scans.
4	Theoretical principles of photogrammetry, operating phases of a photogrammetric survey. Photogrammetric network, photogrammetric camera.
4	Ground control point, images orientation, photogrammetric triangulation, rectified imagery
Hrs	Practice
5	Applications of laser scanner survey to archaeology. Practical examples.

Hrs	Practice
5	Photogrammetric survey of archaeological sites. Photogrammetric 3D models