



# UNIVERSITÀ DEGLI STUDI DI PALERMO

DEPARTMENT	Scienze e Tecnologie Biologiche, Chimiche e Farmaceutiche		
ACADEMIC YEAR	2022/2023		
MASTER'S DEGREE (MSC)	MOLECULAR AND HEALTH BIOLOGY		
SUBJECT	APPLIED CELLULAR BIOTECHNOLOGIES FOR FORENSIC STUDIES		
TYPE OF EDUCATIONAL ACTIVITY	C		
AMBIT	20879-Attività formative affini o integrative		
CODE	10038		
SCIENTIFIC SECTOR(S)	BIO/06		
HEAD PROFESSOR(S)	CARRA ELENA	Ricercatore	Univ. di PALERMO
OTHER PROFESSOR(S)			
CREDITS	6		
INDIVIDUAL STUDY (Hrs)	98		
COURSE ACTIVITY (Hrs)	52		
PROPAEDEUTICAL SUBJECTS			
MUTUALIZATION			
YEAR	1		
TERM (SEMESTER)	2° semester		
ATTENDANCE	Mandatory		
EVALUATION	Out of 30		
TEACHER OFFICE HOURS	<b>CARRA ELENA</b> Tuesday 12:00 14:00 Studio del Docente, Dipartimento STEBICEF viale delle Scienze Ed. 16, piano primo, oppure anche su piattaforma Microsoft Teams previo contatto ed accordo con il docente all'indirizzo @unipa.it; il ricevimento potrà essere svolto in altro giorno e/o orario previo accordo con il docente.		

<b>PREREQUISITES</b>	Knowledge required for the access test of Master's Degree in Molecular Biology and Health
<b>LEARNING OUTCOMES</b>	<p>Knowledge of the basic interpretation for autosomal STR typing by forensic DNA test for human identification purposes. Comprehension of the biological, legal and statistical terminology related to this discipline. Ability to interpret a paternity test in a correct and rigorous way, in case of autosomal STR typing or STR markers on the X and Y chromosomes.</p> <p>Ability to describe a DNA profile from the electropherogram of DNA typing results from single source or mixed samples.</p> <p>Ability to show the acquired knowledge of DNA forensic identification by performing "in itinere" exercises, aimed to the auto-evaluation of the personal level of learning and to the identification of failings, if any.</p> <p>Skills in understanding in Vitro Fertilization Techniques (IVF) and the consequences of a Law introduced in Italy in 2004 that forbids the fertilization or injection of more than three oocytes for assisted reproduction and does not allow any embryo selection or cryopreservation. The Italian Law and the Court Sentence n.151 of 2009 and n. 162 of 2014 on heterologous Artificial Insemination.</p> <p>Through the exemplification of concrete judicial cases the student will be facilitated for the analysis of errors and, at the same time, will be favoured to develop a correct ability in the communication of biological data for forensic purposes. The learning ability can be ensured by the use of university-level texts, but also by the administration of specific monographs relating to the discipline.</p>
<b>ASSESSMENT METHODS</b>	<p>1. Learning assessment. The exam consists of oral exposition of a work done during the course.</p> <p>2. Criteria for the assessment of learning Oral exam. A topic of the student's care plus a minimum of two questions and the exam is aimed to evaluate the level of self-reliance and in-depth examination shown by student. During the first part of the exam students must demonstrate the ability to describe and interconnect the different aspect of DNA Forensic Identification for criminal investigation according to Italian criminal justice system. The student must to use correct approach for a paternity test, to interpret the electropherogram of DNA typing results from single source for human identification purpose, to interpret DNA typing results from mixed samples with two or multiple contributors, and to know the basic issues with analysis of low amounts of DNA. The learner will be able to know the Italian Law 40/2004 on assisted reproduction technology (ART) and the Judgment n.151 of Constitutional Court of 2009.</p> <p>3. Criteria for measuring learning. The vote is expressed in thirtieths. The student will surpass the exam if will get at least 18. It is expected to be awarded the highest marks with honors (30 and honors).</p> <p>4. Criteria for award of the final grade. The threshold of sufficiency will be reached when the student shows knowledge and comprehension of the topics at least in their outline. The more the student will successfully interact with the examiner through various lines of arguments and his/her exposition ability, and the more his/her knowledge and application abilities (recognition of paternity test, ability to interpret DNA typing results and DNA profiles for mixed samples, ability to describe the correct statistical approach for DNA typing results), get into details, the more the evaluation will be positive. The exposure of the student's care will affect the overall assessment of the exam. If the students demonstrate a critical, analytical, thorough and exhaustive understanding of the theoretical and practical content for the forensic application show during the course they will be awarded a maximum of 26/30; the next two questions will have to evaluate the overall preparation.</p>
<b>EDUCATIONAL OBJECTIVES</b>	To know autosomal STR typing by forensic DNA test. To develop a global perspective to know what DNA profiling or DNA typing means when forensic technique are used to identify individuals or trace found on crime scene. To know the guidelines for forensic DNA testing Laboratories. To Know the new Italian law on assisted reproduction technology (Law 40/2004).
<b>TEACHING METHODS</b>	Oral lessons; Tutorials;
<b>SUGGESTED BIBLIOGRAPHY</b>	<p>Medicina Legale Orientata per Problemi ( Seconda Edizione)- M.Zagra, A.Argo, E. Bertol, E. Carra, G. Di Vella, L. Milone, C. Scorretti- Edra S.p.A. (2018) ISBN 978-88-241-4773-0 / eISBN 978-88-214-4774-7;</p> <p>Introduzione alla Genetica Forense - Indagini di identificazione personale e di paternità, Adriano Tagliabracci et. al., (2010) Springer-Verlag Italia, ISBN 978-88-470-1511-1 / ISBN 978-88-470-1512-8 ( eBook).</p> <p>Materiale didattico Powerpoint fornito dal docente;</p>

## SYLLABUS

Hrs	Frontal teaching
16	Introduction on assisted reproduction technology (ART): Italian Law 40/2004; WHO ART guidelines from 2004 to 2015 at comparison; the Judgment n.151 of Constitutional Court of 2009; the Judgment n.162 of Constitutional Court of 2014; Male infertility and P.M.A;
2	Introduction to forensic science and DNA forensics. The general organization of Italian Justice system. Case Report.
4	DNA typing.
6	Methods in Forensic Molecular Genetics
6	The electropherogram of DNA typing: RFU value, allele designation, locus designation, allelic ladder, virtual bin, stutter, analytical artifacts (e.g. spikes), peak height values, Thresholds, Thresholds to allelic peaks.
6	DNA Paternity Testing. The deficient case: motherless or alleged father not available. Probability and likelihood: the Bayesian approach. The Probability of Paternity Case report and exercise.
Hrs	Practice
12	Biological evidence evaluation; characteristic of blood and physiological fluids (i.e. semen, saliva, urine, and other); Blood identification: presumptive tests and confirmatory tests; evidence collection, sample collection for DNA analysis of forensic evidence.