



CLINICAL BIOCHEMISTRY AND TOXICOLOGY	
Enrollment year	2018/2019
Academic year	2020/2021
Regulations	DM270
Department	DEPARTMENT OF MOLECULAR MEDICINE
Course	BIOMEDICAL LABORATORY TECHNIQUES
Curriculum	PERCORSO COMUNE
Year of study	3°
Period	1st semester (01/10/2020 - 22/01/2021)
ECTS	5
Language	Italian
Learning outcomes	<p>Two main topics will be discussed.</p> <p>The first deals with the role of the laboratory in the clinical workup of patients, as well as in the assessment of health status. The students will know the biochemical and molecular tools needed to accomplish preventive, diagnostic, and therapeutic intervention on hereditary and acquired disorders.</p> <p>The second topics deals with the knowledge of the theory and lab bases useful for the correct implementation of forensic toxicological and genetic analyses dealing with the search of volatile and non-volatile organic compounds in biological samples and with the genetic characterisation of biological stains and paternity testing samples</p>
Course contents	<p>The course is aimed to describe the molecular diagnostic and the forensic toxicological and genetic lab approaches.</p> <p>At the end of the class, students shall prove to be able to deal with pre-analytical variables, the assessment of the diagnostic performance of laboratory tests according to the clinical setting and with the molecular diagnostics in monoclonal gammopathies, cardiology, nephrology and oncology.</p> <p>The forensic toxicological analytical data will be evaluated according to sensitivity, selectivity, accuracy and precision. Different extraction/purification procedures will be described as well as the qualitative-quantitative analyses of volatile and non volatile organic compounds in biological samples.</p>

Students will prove to be able to describe the methodological approach used in forensic genetic analyses for a correct interpretation of DNA identification casework and paternity or kinship cases.

Teaching methods

Frontal lectures

Laboratory case discussion

Reccomended or required readings

1)Tietz Textbook of Clinical Chemistry and Molecular Diagnostics
2)Elisabetta Bertol - ANALITICA TOSSICOLOGICA - Aspetti tecnici, interpretativi, giuridici e deontologici. I Edizione, 2011. Società Editrice Esculapio. Acquistabile on-line al prezzo di euro 23,00
3)Ricci Ugo, Previderè Carlo, Fattorini Paolo, Corradi Fabio -LA PROVA DEL DNA PER LA RICERCA DELLA VERITA' - Giuffrè Ed. 2006

Assessment methods

Written and oral exams

The activity is split

503657 - **FORENSIC MEDICINE AND TOXICOLOGIC CHEMISTRY**

502027 - **MOLECULAR DIAGNOSTIC METHODOLOGY**



FORENSIC MEDICINE AND TOXICOLOGIC CHEMISTRY

Enrollment year	2018/2019
Academic year	2020/2021
Regulations	DM270
Academic discipline	MED/43 (LEGAL MEDICINE)
Department	DEPARTMENT OF MOLECULAR MEDICINE
Course	BIOMEDICAL LABORATORY TECHNIQUES
Curriculum	PERCORSO COMUNE
Year of study	3°
Period	(01/10/2020 - 22/01/2021)
ECTS	2
Lesson hours	16 lesson hours
Language	Italian
Activity type	ORAL TEST
Teacher	PREVIDERE' CARLO (titolare) - 1 ECTS MORINI LUCA - 1 ECTS
Prerequisites	The students should be appropriately prepared in topics such as chemistry and genetics.
Learning outcomes	The main topic of the course deals with the knowledge of the theory and lab bases useful for the correct implementation of forensic toxicological and genetic analyses dealing with the search of volatile and non-volatile organic compounds in biological samples and with the genetic characterisation of biological stains and paternity testing samples
Course contents	<p>The course is aimed to describe the forensic toxicological and genetic lab approaches.</p> <p>At the end of the class, students shall prove to be able to deal with the forensic toxicological analyses according to sensitivity, selectivity, accuracy and precision. Different extraction/purification procedures will be described as well as the qualitative-quantitative analyses of volatile</p>

	<p>and non volatile organic compounds in biological samples. Students will prove to be able to describe the methodological approaches used in forensic genetic analyses for a correct interpretation of DNA identification casework and paternity or kinship cases.</p>
Teaching methods	Frontal lectures and discussion of lab casework
Reccomended or required readings	<p>1)Elisabetta Bertol - ANALITICA TOSSICOLOGICA - Aspetti tecnici, interpretativi, giuridici e deontologici. I Edizione, 2011. Società Editrice Esculapio. Acquistabile on-line al prezzo di euro 23,00 2)Ricci Ugo, Previderè Carlo, Fattorini Paolo, Corradi Fabio -LA PROVA DEL DNA PER LA RICERCA DELLA VERITA' - Giuffrè Ed. 2006</p>
Assessment methods	Oral or written exam, depending on the number of students.
Further information	The final grade is the grade point average of the two topics (forensic toxicology and forensic genetics)
Sustainable development goals - Agenda 2030	S b legenda sviluppo sostenibile



MOLECULAR DIAGNOSTIC METHODOLOGY

Enrollment year	2018/2019
Academic year	2020/2021
Regulations	DM270
Academic discipline	BIO/12 (CLINICAL BIOCHEMISTRY AND BIOLOGY)
Department	DEPARTMENT OF MOLECULAR MEDICINE
Course	BIOMEDICAL LABORATORY TECHNIQUES
Curriculum	PERCORSO COMUNE
Year of study	3°
Period	(01/10/2020 - 22/01/2021)
ECTS	3
Lesson hours	24 lesson hours
Language	Italian
Activity type	WRITTEN TEST
Teacher	NUVOLONE MARIO ULISSE - 2 ECTS NUVOLONE MARIO ULISSE - 1 ECTS
Prerequisites	=
Learning outcomes	The student: 1) Will know the main techniques of molecular biology for the extraction, amplification and analysis of nucleic acids 2) Will know the main applications of molecular diagnostics
Course contents	1. Nucleic acid extraction techniques 2. Nucleic acid quantification techniques 3. Nucleic acid quality control 4. Nucleic acid amplification techniques: basic principles, main types 5. Polymerase chain reaction: basic principles, assay design, technical considerations, main applications 6. PCR variants: Hot start PCR, Touch down PCR, Nested PCR, Multiplex PCR, Inverse PCR, Direct PCR, GC-rich PCR, Reverse

transcriptase polymerase chain reaction (RT-PCR), Quantitative polymerase chain reaction (qPCR), real time qPCR, Reverse transcriptase qPCR (RT-qPCR), digital PCR

7. Nucleic acid electrophoresis
8. Restriction Fragment Length Polymorphism (RFLP)
9. PCR Restriction Fragment Length Polymorphism (PCR-RFLP)
10. High resolution melting analysis
11. Microarrays: SNV chips, gene expression microarrays, Arrays for comparative genomic hybridization (aCGH)
12. In situ hybridization: Fluorescence in situ hybridization (FISH), Spectral karyotyping (SKY)
13. Dideoxy-Termination Sequencing (Sanger Sequencing)
14. Massively parallel sequencing: basic principles
15. Bridge amplification and reversible dye terminator sequencing
16. Real-Time single molecule sequencing with fluorescent nucleotides
17. Target-enrichment strategies for massively parallel sequencing
18. Whole-exome sequencing (WES)

Teaching methods

- Frontal lectures

Laboratory case discussion

Reccomended or required readings

Elisabetta Albi
 Biochimica Clinica Essenziale
 Zanichelli

Assessment methods

Written exam (multiple choice quiz)

Further information

Written exam (multiple choice quiz)

Sustainable development goals - Agenda 2030

[\\$lbl legenda sviluppo sostenibile](#)