



UNIVERSITÀ DEGLI STUDI DI PALERMO

DEPARTMENT	Scienze e Tecnologie Biologiche, Chimiche e Farmaceutiche		
ACADEMIC YEAR	2019/2020		
MASTER'S DEGREE (MSC)	CHEMISTRY AND PHARMACEUTICAL TECHNOLOGIES		
SUBJECT	PHARMACOLOGY AND TOXICOLOGY		
TYPE OF EDUCATIONAL ACTIVITY	B		
AMBIT	50322-Discipline Biologiche e Farmacologiche		
CODE	08437		
SCIENTIFIC SECTOR(S)	BIO/14		
HEAD PROFESSOR(S)	LABBOZZETTA MANUELA	Ricercatore	Univ. di PALERMO
OTHER PROFESSOR(S)			
CREDITS	6		
INDIVIDUAL STUDY (Hrs)	102		
COURSE ACTIVITY (Hrs)	48		
PROPAEDEUTICAL SUBJECTS	03153 - PHARMACOLOGY AND PHARMACOTHERAPY		
MUTUALIZATION			
YEAR	4		
TERM (SEMESTER)	1° semester		
ATTENDANCE	Not mandatory		
EVALUATION	Out of 30		
TEACHER OFFICE HOURS	LABBOZZETTA MANUELA Wednesday 9:00 11:00 Viale delle Scienze Edificio 16 Per gli studenti del corso di Tossicologia LMU Farmacia con sede Caltanissetta il ricevimento si svolgerà da remoto o presso la sede previo accordo con il docente.		

DOCENTE: Prof.ssa MANUELA LABBOZZETTA

PREREQUISITES	The student must possess preliminary knowledge of pharmacology, biology, physiology and general chemistry
LEARNING OUTCOMES	<p>Knowledge and understanding - acquisition of the most appropriate tools for knowledge of the adverse effects caused by exposure to exogenous and endogenous agents . Acquisition of a scientific language appropriate to the specialized discipline.</p> <p>Ability to apply knowledge and understanding - ability to retain and apply a methodology aimed at consolidating a critical knowledge of the main categories of toxic agents and their direct action on specific organs and systems.</p> <p>Making judgments - acquisition of a dynamic and "analytical" evaluation concerning the fields of applications of toxicology.</p> <p>Communication skills - develop a knowledge and a scientific linguistic register such as to be able to argue the knowledge acquired during the lessons as well as with the teacher even with an audience of non-experts.</p> <p>Learning skills - developing refresher skills by consulting scientific publications specific to the toxicology sector. Ability to participate, employing the knowledge acquired during the course, at II level masters, both in in-depth courses, in seminars and at specialized conferences.</p>
ASSESSMENT METHODS	<p>The examiner will have to answer at least three questions asked orally. The threshold of sufficiency will be reached when the student has shown knowledge and understanding of the topics, at least in general terms, and will have exposed them with appropriate terminology. Below this threshold, the exam will prove insufficient. The more, however, the examiner with his argumentative and expository skills will be able to interact with the examiner, and the more his knowledge and application skills will go into the detail of the discipline subject of verification, being able to make connections between the arguments and examples, the more the evaluation will be positive. The evaluation takes place in thirtieths.</p>
EDUCATIONAL OBJECTIVES	The educational objective of the course is to provide the student with advanced training through the knowledge of the toxicological potential of the main classes of exogenous and endogenous substances and the different fields of application of toxicology. Through this knowledge, students will be able to acquire a critical and dynamic knowledge of clinical, occupational and analytical / forensic toxicology.
TEACHING METHODS	Teaching is organized in 48 hours of lectures
SUGGESTED BIBLIOGRAPHY	<p>Elementi di Tossicologia. CASARETT & DOULL - C. D. Klaassen, J. B. Watkins, Casarett, Doull - Casa Editrice Ambrosiana. Distribuzione esclusiva Zanichelli - 2013</p> <p>Tossicologia – I fondamenti dell'azione delle sostanze tossiche. Casarett & Doull's – settima edizione - EMSI.</p>

SYLLABUS

Hrs	Frontal teaching
2	Description of the objectives of the course and its organization. Indication on recommended learning methods and reference texts. Definition of drug and toxic: toxins, toxic substances. Branches of toxicology: descriptive, molecular, normative, forensic, clinical, industrial, environmental.
6	Characteristic of exposure to a toxic agent. Mechanisms of toxicity. Risk characterization and assessment. Dose-response relationship: gradual, quantal. LD50, Therapeutic index. Safety margin. NOAEL, LOAEL, Acceptable daily intake (ADI). Threshold Limit Value (TLV), Permissible Exposure Levels (PEL).
6	Toxicokinetics: absorption, distribution and excretion of toxic substances. Biotransformation of xenobiotics.
8	Non-direct toxicity to specific organs: chemical carcinogenesis: carcinogenesis from organic, inorganic substances, from fibers; hormonal carcinogenesis. Formation of carcinogenic metabolites. Formation of adducts with DNA. Mechanisms of DNA repair. Induction of mutations. Oncogenes and tumor suppressor genes (tumor suppressor genes). Pathogenesis of neoplasms: initiation, promotion, progression; molecular and cellular mechanisms of the three phases. Genotoxic and non-genotoxic carcinogens: initiation, promotion, progression, complete carcinogens. Carcinogenesis and lifestyles; drug carcinogenesis. Genetic toxicology: types of genetic damage: mutations, chromosomal aberrations, aneuploidy and polyploidy. Effects from genotoxic damage in germ cells and in somatic cells. Developmental toxicology: principles of developmental toxicology. Pharmacokinetics and metabolism in pregnancy, relationships between maternal toxicity and developmental toxicity, maternal factors that influence development
2	Methods for the study of carcinogenic and genotoxic potential. Types of studies used for the evaluation of carcinogenic potential. Animal carcinogenicity studies. Short-term genetic toxicity studies. Mutagenesis test: principles; Ames test; test with mammalian cell lines; test with transgenic animals. Chromosomal aberration test; micronuclei test. Essays for aneuploidy.

SYLLABUS

Hrs	Frontal teaching
12	Direct toxicity to specific organs and systems (functional organization, mechanisms of toxic action, main toxic agents). Toxic responses of the nervous system. Toxic responses of the heart and cardiovascular system. Toxic responses of the liver. Toxic responses of the blood. Kidney responses to toxic substances. Toxic responses of the respiratory system. Toxic responses of the immune system. Toxic skin responses.
4	Toxic effects of metals: lead, mercury, cadmium, chromium, arsenic. Toxic effects of solvents and vapors
2	Environmental toxicology: assessment of the risks associated with air pollution. Environmental pollutants of the outdoor atmosphere: reducing and photochemical air pollution, special material, short and long term exposure to smog. Ecotoxicology: molecular, biochemical, tissue, organ and organism effects.
4	Toxicological role of the main substances of abuse. Neuronal mechanisms underlying pathological addictions. Abuse. Addiction. Tolerance. Abstinence. Intoxications: principles of treatment of intoxication and dependence. Examination and treatment of the poisoned patient: emesis, gastric lavage, activated carbon, purgatives, peritoneal dialysis, hemodialysis, hemoperfusion, forced diuresis, antidotes and antagonists.
2	Applications of toxicology: occupational, food and analytical-forensic toxicology