



## DISCIPLINE FILE

### 1. Data about the programme

<b>1.1.</b>	<b>“CAROL DAVILA” UNIVERSITY OF MEDICINE AND PHARMACY</b>
<b>1.2.</b>	<b>FACULTY OF MEDICINE</b>
<b>1.3.</b>	<b>DEPARTMENT - CLINICAL DEPARTMENT – 14</b>
<b>1.4.</b>	<b>DISCIPLINE - CLINICAL TOXICOLOGY</b>
<b>1.5.</b>	<b>DOMAIN OF STUDY: HEALTH – Sectorally regulated within the European Union</b>
<b>1.6.</b>	<b>STUDY CYCLE: LICENCE</b>
<b>1.7.</b>	<b>STUDY PROGRAMME: MEDICINE – ENGLISH MODULE</b>

### 2.2. Data about discipline

<b>2.1.</b>	<b>Name of the discipline in the educational plan: CLINICAL TOXICOLOGY</b>				
<b>2.2.</b>	<b>Discipline code: DD V 10M</b>				
<b>2.3.</b>	<b>Discipline type (FD/SD/CD): CD</b>				
<b>2.4.</b>	<b>Discipline regimen (MD/OPD/): MD</b>				
<b>2.5.</b>	<b>The holder of the course activities</b> <b>Prof. Dr. RADU CIPRIAN TINCU – 43 y – 13 years seniority in teaching activity</b>				
<b>2.6.</b>	<b>The holder of the seminar activities :</b> <b>1. Head of Discipline</b> <b>Prof. Dr. RADU CIPRIAN TINCU – 43 y – 13 years seniority in teaching activity</b> <b>2. Asist.prof.dr. IULIA-RALUCA DARIE - 32 y – 1 year seniority in teaching activity</b> <b>3. 2. Asist.prof.dr. LIVIU IULIAN LOVIN - 30 y</b>				
<b>2.7. Year of study</b>	<b>V</b>	<b>2.8. Semester</b>	<b>I; II</b>	<b>2.9. Type of evaluation (E/C)</b>	<b>E</b>

### 2. Total estimated time (hours/semester of didactic activity an self preparation/study

<b>I. Academic training (teaching, practical application, assessment)</b>						
<b>3.1. Nr hours/week</b>	<b>4</b>	<b>From which:</b>	<b>3.2. lecture</b>	<b>2</b>	<b>3.3. seminary/ laboratory</b>	<b>2</b>
<b>3.4. Total hours of educational plan</b>	<b>32</b>	<b>From which:</b>	<b>3.5. lecture</b>	<b>16</b>	<b>3.6. seminary/ laboratory</b>	<b>16</b>
<b>Evaluation (nr. of hours ) : 7</b>						
<b>II. Self preparation/study</b>						
<b>Time allocation</b>						<b>hours</b>
<b>Study of course materials, textbooks, books, study of the recommended minimal bibliography</b>						<b>24</b>
<b>Additional research in the library, research through the internet</b>						<b>22</b>
<b>Performing specific activities for preparing projects, laboratories, elaborating reviews or other tasks</b>						
<b>Specific preparation activities for projects, laboratory work, assignments, and reports</b>						<b>22</b>

<b>Tutoring</b>		
<b>Other activities</b>		
<b>3.7. Total individual study hours</b>		68
<b>3.9. Total hours per semester (3.4.+ 3.7.)</b>	100	
<b>3.10. Number of credits</b>	4	

### 3. Preconditions (where applicable)

<b>4.1. of curriculum</b>	
<b>4.2. of competences</b>	

### 4. Conditions (where applicable)

<b>5.1. to conduct the lecture</b>	PowerPoint presentations, use of multimedia systems, and projector
<b>5.2. to conduct the seminar / laboratory</b>	Equipped with the necessary apparatus for conducting practical activities

### 6. Learning outcomes

<b>Knowledge</b>	<b>Skills</b>	<b>Responsibility and autonomy</b>
<p>To describe the mechanisms of general acute toxicity and toxicity specific to different types of poisoning.</p> <p>2. To understand the parameters of acute toxicity, including concepts of mutagenicity, toxicogenomics, and carcinogenesis, as well as toxicodynamic receptors and specific receptor interactions.</p> <p>3. To master information related to general stabilization measures in acute poisoning, including acid–base balance and neurological assessment.</p> <p>4. To acquire knowledge of methods aimed at enhancing toxin elimination.</p> <p>5. To understand the main antidotes and their highly specific antidotal mechanisms.</p> <p>6. To recognize and describe the major toxidromes, and to understand the effects of xenobiotics on target organs (hematologic, immunologic, hepatic, renal, pulmonary, central nervous system, cardiovascular, dermatologic, and endocrine).</p> <p>7. To master the principles of acute intoxications involving psychotropic substances, alcohols and glycols, metals, and opioids.</p> <p>8. To understand the main principles of supportive therapy and</p>	<p>The student/graduate correctly applies and integrates clinical and paraclinical assessment methods and techniques, and further develops practical skills under appropriate supervision.</p>	<p>The student/graduate collaborates with and supports the activities of the medical team, actively participating under appropriate supervision.</p>

<p>monitoring in toxicological intensive care units.</p> <p>9. To understand the effects of new psychoactive substances of abuse, plant-induced toxicities, and the toxic effects of carbon monoxide, cyanides, and hydrogen sulfide.</p> <p>10. To understand the toxic effects of heavy metals (lead, arsenic, mercury), air pollutants, and the impact of microplastics on the human body.</p>		
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## 7. Course objectives (aligned with the learning outcomes)

<b>7.1. General objective</b>	<p>Acquisition of knowledge and concepts necessary for establishing the etiopathogenesis and diagnosis of acute poisonings.</p> <ul style="list-style-type: none"> <li>• Acquisition of knowledge, skills, competencies, behaviors, attitudes, abilities, and values required for medical practice in the fields of clinical medicine and intensive care.</li> <li>• Internalization of medical and human ethical values, ethical standards of care for poisoned patients, and appropriate methods of communication with patients and their families.</li> <li>• Integration and correlation between concepts taught in Clinical Toxicology and the student's previous medical experience.</li> <li>• Evaluation of student performance based on continuous (periodic) and final assessment of knowledge and practical skills.</li> <li>• Awareness and understanding of course objectives, enabling students to assume their professional responsibilities appropriately.</li> </ul>
<b>7.2. Specific objective</b>	<p>Understand, define, and explain the mechanisms of acute toxicity;</p> <ul style="list-style-type: none"> <li>• Recognize and understand the clinical and paraclinical features of acute poisonings;</li> <li>• Acquire knowledge of the therapeutic methods used in the management of acute intoxications;</li> <li>• Understand the principles of analytical toxicology laboratory methods;</li> <li>• Acquire knowledge related to antidotes and their antidotal mechanisms.</li> </ul>

## 8. Contents

8.1. Lecture	Teaching methods	Observations
<p><b>Course 1:</b></p> <p>1. Introduction - definitions, the purpose of toxicology, sources of toxic substances, the site of action of toxic substances, notions of forensic toxicology.</p> <p>2. Effects of xenobiotics exposure - idiosyncratic reaction, immediate</p>	<p>Course presented orally with power-point slides</p>	<p><b>2h</b></p>

<p>toxicity versus delayed toxicity, reversible versus irreversible toxic effects, interaction between chemicals, tolerance mechanism, addiction mechanism.</p> <p>3. Characteristics of toxic exposure - toxicity mechanisms, classification of poisoning (acute, subacute, chronic), factors that modulate toxicity, route of exposure, dose-effect relationship.</p> <p>4. Mechanisms of toxicity - distribution (absorption vs pre-systemic elimination, distribution to target areas, excretion vs reabsorption, metabolic activation vs detoxification), reaction of the last toxicant with target molecules (types of reactions, toxic effects on target molecules), cellular dysfunction, mechanisms of repair.</p> <p>5. Absorption, distribution, excretion.</p> <p>6. Mutagenicity, toxicogenomics and carcinogenesis associated with exposure to various xenobiotics.</p>		
<p><b>Course 2:</b></p> <p>1. Stabilization of the intoxicated patient - emergency measures - basic/advanced life support (ABCD), indications for orotracheal intubation, management of seizures.</p> <p>2. Decontamination measures - prevention of dermal absorption, induction of emesis, gastric lavage, activated charcoal, laxatives, enemas.</p> <p>3. Plasma and urinary alkalization, forced diuresis - Mechanisms of action.</p> <p>4. Dialysis-principles, toxicological indications, types, contraindications and complications.</p> <p>5. Antidotism. Antidotes. Definitions. Classification of antidotes according to their</p>	<p>Course presented orally with power-point slides</p>	

<p>mechanism of action, antidotes: physical, chemical, pharmacological.</p> <p>Competitive/non-competitive antagonism, chelating agents.</p> <p>Classification of antidotes in relation to the urgency of their use.</p> <p>6. Neurological assessment of the intoxicated patient - assessment scales, miosis, mydriasis, pupillary reflex. Other types of assessment.</p> <p>7. Evaluation of the acid-base and electrolyte balance in the intoxicated patient - osmolar gap, anion gap, oxygen saturation gap, metabolic acidosis, electrolyte disturbances.</p> <p>8. Rhabdomyolysis syndrome due to toxic causes.</p> <p>9. Changes in thermal balance - hyperthermia, hypothermia.</p>		
<p><b>Course 3:</b></p> <ol style="list-style-type: none"> <li>1. Hematological response to different xenobiotics.</li> <li>2. Immunological response to different xenobiotics.</li> <li>3. Hepatic response to different xenobiotics.</li> <li>4. Renal response to different xenobiotics.</li> <li>5. Pulmonary response to different xenobiotics.</li> <li>6. The response of the central nervous system to different xenobiotics.</li> <li>7. Cardiovascular response to different xenobiotics.</li> <li>8. Dermal response to different xenobiotics.</li> <li>9. Endocrine response to different xenobiotics.</li> </ol>	Course presented orally with power-point slides	
<p><b>Course 4:</b></p> <ol style="list-style-type: none"> <li>1. The cholinergic toxidrome.</li> <li>2. The anticholinergic toxidrome.</li> </ol>	Course presented orally with power-point slides	

3. The opioid toxidrome. 4. The sympathomimetic toxidrome. 5. The hypnosedative toxidrome. 6. The serotonin syndrome. The malignant neuroleptic syndrome - malignant hypertemia.		
<b>Course 5:</b> 1. Benzodiazepines. Mechanisms of action, GABA receptor, classification, pathophysiology of acute intoxication, clinical manifestations, specific antidote. Antidote mechanism. Indications and contraindications. 2. Barbiturates. Mechanism of action, classification, early and late clinical manifestations in acute intoxication. Specific methods of increasing elimination. 3. Antidepressants. Mechanism of action, Specific clinical manifestations. Specific aspects in stabilization therapy. Increasing elimination. 4. Neuroleptics. Mechanisms of action. Clinical manifestations. Particular aspects of stabilization therapy and support therapy. 5. Opioids - mechanism of action, opioid receptors, pathophysiology of acute intoxication, antidote, opioid withdrawal syndrome. 6. Paracetamol. Clinical stages of acute intoxication - particularities. Antidotal therapy - mechanisms of action. 7. Acute intoxication with oral antidiabetics. 8. Acute iron poisoning- Mechanism of toxicity. Stages of acute intoxication. Chelator therapy. 9. Acute intoxication with drugs that alter coagulation. 10. Intoxication with cardiovascular drugs: beta-	Course presented orally with power-point slides	

blockers, digoxin, antihypertensives.		
<b>Course 6:</b> 1. Acute poisoning with solvents and vapors - classification, pathophysiology of hydrocarbons poisoning, management of acute poisoning. 2. Ethanol. Stages of metabolic transformation. Clinical effects in different stages depending on the level of blood alcohol content. Principles of therapy in acute alcoholism. 3. Methanol. Stages of metabolic transformation. Systemic clinical manifestations. Hemodialysis in acute methanol intoxication. Indications; efficiency. Antidotism. 4. Ethylene glycol. Stages of metabolic transformation. Clinical manifestations in different stages of intoxication. Hemodialysis in acute ethylene glycol poisoning: indications, efficiency. Antidotism. 5. Acute mushroom poisoning. 6. Chemical burns caused by corrosive and caustic substances. 7. Clinical-therapeutic complex aspects caused by snake bite and other venoms. 8. Acute poisoning with pesticides - classification, mechanisms of toxicity, physiopathology of poisoning, antidotes. 9. Acute nitrate/nitrite poisoning.	Course presented orally with power-point slides	
<b>Course 7:</b> 1. Toxic effects induced by plants. 2. Intoxication with psychoactive substances of abuse (depressants, stimulants, hallucinogens) 3. The new psychoactive substances - definitions, mechanisms of toxicity, diagnosis and treatment. 4. Carbon monoxide. Mechanism of action. Systemic effects correlated	Course presented orally with power-point slides	

<p>with carboxyhemoglobin concentration. Antidotism. Antidote efficiency.</p> <p>5. Cyans and hydrogen sulphide. Toxic mechanism. Clinical manifestations. Aspects of emergency therapy. Antidotism: purpose, method, means.</p>		
<p><b>Course 8:</b></p> <p>1. Bioacceleration and bioaccumulation - principles.</p> <p>2. Lead poisoning. Systemic effects. Chelator therapy.</p> <p>3. Arsenic poisoning. Systemic effects. Chelator therapy.</p> <p>4. Mercury poisoning. Systemic effects, chelator therapy.</p> <p>5. Medium and long-term effects of heavy metals exposure</p> <p>6. Air pollutants - sulfur dioxide, heavy metals, PM particles, nitrogen oxides, acrolein</p> <p>7. The toxic effects of microplastic on the body.</p>	<p>Course presented orally with power-point slides</p>	
<p><b>Recent bibliography:</b></p> <ol style="list-style-type: none"> <li>1. Casarett &amp; Doull's Toxicology: The Basic Science of Poisons, 9th edition.</li> <li>2. Goldfrank's Clinical Manual of Toxicologic Emergencies, Second Edition.</li> <li>3. Barile's Clinical Toxicology Principles and Mechanisms.</li> <li>4. Fundamentals of Toxicology- PK Gupta.</li> <li>5. Jason Armstrong &amp; Ovidiu Pascu Toxicology Handbook 4th edition</li> </ol>		
<b>8.2. Laboratory/ practical lesson</b>	<b>Teaching methods</b>	<b>Observations</b>
<p>CR 1: introduction to clinical toxicology; visit to the clinical department; the distribution of student groups to each teaching staff</p>		2h
<p>CR 2: basic life support - demonstration training session - stabilization of intoxicated patients; basic therapeutic maneuvers necessary to stabilize vital functions</p>		



CR 3: analytical diagnosis - working session in the Analytical Toxicology Laboratory; demonstrative performance of an analytical examination - processing of a biological sample for analytical examination; gas-chromatographic examination coupled with mass spectrometry; other methods of analytical diagnosis		
CR 4: evaluation of the intoxicated patient; evaluation of a state of coma; correlation of clinical aspects with analytical toxicological examination; anamnestic and clinical evaluation of patients addicted to drugs of abuse		
CR 5: evaluation of patients intoxicated with alcohol (ethyl alcohol, ethylene glycol, methanol);		
CR 6: evaluation of patients poisoned with carbon monoxide; clinical and paraclinical evaluation of posthypoxic encephalopathy state		
CR 7: clinical and paraclinical evaluation of patients intoxicated with organo-phosphorus and carbamic anticholinesterases;		
CR 8: evaluation of practical and theoretical knowledge		
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## 9. Evaluation

Activity type	9.1. Evaluation criteria	9.2. Evaluation methods	9.3. Percentage in the final grade
9.4. Lecture	Acquiring theoretical knowledge	Oral exam	100%
9.5. Seminary/ practical activity	Assessment of practical knowledge	Practical evaluation of the patient	Accepted/rejected
9.5.1. Individual project (if applicable)	-	-	-
<b>9.6. Minimum performance standard</b>			
at least 50% of the questions related to the subjects on the exam note			

**Date of completion :**

**Signature of the course holder**

**Signature of the laboratory holder**

**Date of approval by the  
Department Council:**

**Signature of the Department Director**