

**Syllabus:** TOXICOLOGY  
**Code number:** 71 ΝΠ 18-47  
**Cycle:** UNDERGRADUATE  
**Semester:** 7<sup>th</sup>

**Course type**

	Background/General knowledge
X	Scientific area (pharmacy)

**Credit Units (ECTS):** 5.5

**Lectures (hours/week):** 3

**Tutorial (hours/week):**

**Laboratory work (hours/week): 1**

Write and defence of a bibliographic toxicology topic on a voluntary basis

**Course coordinator:** Theodoros Sklaviadis, Professor

**Tutors in lectures:**

1. Theodoros Sklaviadis, Professor
2. Lefkothea Papadopoulou, Associate Professor
3. Konstantinos Xanthopoulos, Assistant Professor

**Aims of the course:**

- To acquire knowledge on basic concepts and tests of Toxicology, mechanisms of action of various toxic substances and their toxic effects on various organs and tissues of the body.
- To acquire knowledge of clinical toxicology (symptoms, therapeutic measures, antidotes, detoxification measures) of various toxic substances or drugs, and to acquire knowledge about substances used for doping of athletes (doping)
- Study of the toxicity of various environmental factors [based either on the biological responses (e.g., carcinogenicity and teratogenicity) or on the effects on specific target organs] as well as protection capacities.
- Correlation of the physiological processes and the molecular mechanisms responsible for the corresponding toxicity

- Students are taught how to search for the relevant information so that they can later seek bibliography and deepen and other issues not covered during the one semester

**Skills:**

Lectures

**Teaching methods:** Lectures and bibliographic group work

**Contents of the course:**

1) Theodoros Sklaviadis

Introduction to Toxicology. Basic principles of the action of toxic substances. Toxicity testing in animals. Toxicokinetics: Absorption, distribution and excretion of toxic substances. Metabolism of toxic substances (xenobiotics). Mechanisms of nephrotoxicity and renal failure. Mechanisms of hepatotoxicity. Mechanisms of toxicity to the skin. Poisons and poisoning. Therapeutic management of poisoning - general and specific antidotes. Drug abuse of drugs and substances in sport (doping): Anabolics/Androgens, CNS stimulants, beta-blockers, diuretics, narcotics/analgesics, human growth hormone, erythropoietin and blood, ergogenic vitamins, non-pharmaceutical doping, control of doping.

2) Lefkothea Papadopoulou

Mutagenesis – Toxicogenomics – New technologies - Protocols for the detection of mutagenic substances –

Carcinogenesis from environmental factors (chemicals, viruses, drugs, radiation)

Teratogenesis

3) Konstantinos Xanthopoulos

Mechanisms of toxicity in the nervous, hematopoietic, respiratory and cardiovascular systems

Clinical Toxicology I: Toxicokinetics, treatment of acute poisoning, supportive measures, measures to reduce absorption of toxic substances, measures to increase excretion of toxic substances. Clinical Toxicology II: Paracetamol, salicylates, cardiac glycosides, ethanol, tricyclic antidepressants, benzodiazepines, derivatives phenothiazines, anticholinergics, amphetamine and related compounds, opioids, pesticides (chlorinated hydrocarbons, organophosphorus esters, carbamates), cyanide, iron, mercury.

**Proposed literature:**

- 1) ΤΣΙΦΤΣΟΓΛΟΥ ΑΣΤΕΡΙΟΣ «ΒΑΣΙΚΗ ΚΑΙ ΚΛΙΝΙΚΗ ΤΟΞΙΚΟΛΟΓΙΑ», Έκδοση: 1/1997, Εκδότης: ΧΑΡΙΣ ΕΠΕ
- 2) Α. ΚΟΥΤΣΕΛΙΝΗΣ «Τοξικολογία (επίτομο)», Έκδοση: 1η έκδ./2004, Εκδότης: ΠΑΡΙΣΙΑΝΟΥ ΑΝΩΝΥΜΗ ΕΚΔΟΤΙΚΗ ΕΙΣΑΓΩΓΙΚΗ ΕΜΠΟΡΙΚΗ ΕΤΑΙΡΙΑ ΕΠΙΣΤΗΜΟΝΙΚΩΝ ΒΙΒΛΙΩΝ
- 3) Νέου Π. «Κλινική Τοξικολογία & Θεραπευτική Αντιμετώπιση Δηλητηριάσεων», Έκδοση: 1η εκδ., Εκδότης: ΕΚΔΟΣΕΙΣ Π.Χ. ΠΑΣΧΑΛΙΔΗΣ

- 4) Ιωάννης Νιώπας «Σημειώσεις Αναλυτικής - Κλινικής Τοξικολογίας» (είναι αναρτημένες στο **eClass** του μαθήματος)
- 5) Lecture updates as .pdfs: <http://www.pharm.auth.gr/papadopoulou/lessonsgr.html>
- 6) Casarett & Doull «Βασική Τοξικολογία». Έκδοση 2/2015. Εκδότης: Παρισιάνου Α.Ε.

**Educational activities:**

Lectures, discussion with students. Supervision and guidance concerning the bibliographical work (search for valid and updated literature, power point presentation and defense)

**Evaluation process and methods:**

Examination of the course at the end of the semester performed at dates, time and place arranged by the department (grade  $\geq 5$ ). The duration of the examination is 3 hours.

**Use of ICTs (Information and Communication Technologies) / Electronic distribution of the lectures**

Powerpoint presentation is used in the lectures

**Teaching:**

**Lectures.**

Lectures are given 3 hours per week (and additionally if required)

Lecture	lecture	lecture
1	Introduction to Toxicology. Basic principles of the action of toxic substances. Toxicity testing in animals.	Sklaviadis T
2	Toxicokinetics: Absorption, distribution and excretion of toxic substances. Metabolism of toxic substances (xenobiotics).	Sklaviadis T
3	Mechanisms of nephrotoxicity and renal failure. Mechanisms of hepatotoxicity. Mechanisms of toxicity to the skin.	Sklaviadis T
4	Poisons and poisoning. Therapeutic management of poisoning - general and specific antidotes. Drug abuse of drugs and substances in sport (doping): Anabolics/Androgens, CNS stimulants, beta-blockers, diuretics, narcotics/analgesics, human growth hormone, erythropoietin and blood, ergogenic vitamins, non-pharmaceutical doping, control of doping.	Sklaviadis T
5	Clinical Toxicology I: Toxicokinetics, treatment	Xanthopoulos K.

	of acute poisoning, supportive measures, measures to reduce absorption of toxic substances, measures to increase excretion of toxic substances.	
6	Clinical Toxicology II: Paracetamol, salicylates, cardiac glycosides, ethanol, tricyclic antidepressants, benzodiazepines, derivatives phenothiazins, anticholinergics, amphetamine and related compounds, opioids	Xanthopoulos K.
7	Pesticides (chlorinated hydrocarbons, organophosphorus esters, carbamates), cyanide, iron, mercury.	Xanthopoulos K.
8	Mutagenesis / Toxicogenomics	Papadopoulou L
9	Novel <i>in vitro</i> methods for the identification of mutagens	Papadopoulou L
10	Carcinogenesis from environmental factors (chemicals, viruses, drugs, radiation)	Papadopoulou L
11	Embryogenesis and Teratogenesis	Papadopoulou L
12	Mechanisms of toxicity in the nervous and haemopoietic systems	Xanthopoulos K.
13	Mechanisms of toxicity in the respiratory and cardiovascular systems	Xanthopoulos K.