DATOS DE LA ASIGNATURA

Denominación: TOXICOLOGICAL ANALYSIS  
Código: 8715  
Plan de estudios: MÁSTER UNIVERSITARIO ERASMUS MUNDUS EN CIENCIAS FORENSES  
Créditos ECTS: 6  
Porcentaje de presencialidad: 40%  
Plataforma virtual: MOODLE  

DATOS DEL PROFESORADO

Profesorado responsable de la asignatura

Nombre: LUNAR REYES, MARIA LORETO  
Centro: FACULTAD DE CIENCIAS  
Departamento: QUÍMICA ANALÍTICA  
Área: QUÍMICA ANALÍTICA  
Ubicación del despacho: EDIFICIO ANEXO MARIE CURIE. CAMPUS DE RABANALES  
e-Mail: qa1lurem@uco.es  
Teléfono: 34-957218643

DATOS ESPECÍFICOS DE LA ASIGNATURA

REQUISITOS Y RECOMENDACIONES

Requisitos previos establecidos en el plan de estudios

Ninguno.

Recomendaciones

Ninguna especificada.

OBJETIVOS

The objective of this unit is to apply the knowledge achieved in other units, related to sample treatments, instrumental analysis, etc., to the toxicological analysis of different specimens in which various types of toxicants could be determined. The unit also considers how the information obtained from these analyses should be used to the elucidation of questions that could arise in judicial proceeding as well as to discuss all aspects for investigation of different poisons by analysing the specimens collected from patients to investigate presence of toxicants.

COMPETENCIAS

D1 Students should have demonstrated knowledge and understanding that is founded upon and extends and/or enhances that typically associated with Bachelor's level, and that provides a basis or opportunity for originality in developing and/or applying ideas, often within a research context.
Students can communicate their conclusions, and the knowledge and rationale underpinning these, to specialist and non-specialist audiences clearly and unambiguously.

Students should be able to document correctly evidence and results in an unambiguous way.

Students should be able to show and apply their knowledge about analytical techniques and sample treatment in forensic analytical procedures.

Students should be able to understand the dynamic character of toxicological, chemical or biological phenomena in the forensic field in order to correctly interpret the results and date a specific case.

Students should be able to assimilate and understand the role of forensic scientists as expert witnesses.

Students should be able to characterize properly different toxics and agents of interest using suitable instrumentation.

CONTENIDOS

1. Contenidos teóricos

1. Toxicological analysis: Overview

1.1 Introduction

1.2 Types of toxicants

1.3 Provision of analytical toxicology services

1.4 Applications of Analytical toxicology

1.4.1 Clinical toxicology

1.4.2 Forensic toxicology

1.4.3 Drug abuse screening

1.4.4 Occupational and environmental toxicology

2. Specimens

2.1 Introduction

2.2 General considerations about pharmacokinetics and Metabolism

2.3 Conventional samples

2.3.1 Arterial blood

2.3.2 Venous blood

2.3.3 Serum

2.3.4 Plasma

2.3.5 Blood cells

2.3.6 Urine
2.3.7 Stomach contents
2.3.8 Faeces
2.3.9 Tissues

2.4 Alternative specimens
2.4.1 Hair
2.4.2 Oral fluid
2.4.3 Sweat

3. Determination of drugs of abuse

3.1 Introduction

3.2 Commonly abused drugs

3.3 Analysis of seized drugs

3.4 Determination of the main drugs of abuse
3.4.1 Amfetamine and methamfetamine
3.4.2 Cannabis, cannabis resin and cannabis oil
3.4.3 Cocaine
3.4.4 Heroin
3.4.5 LSD
3.4.6 MDMA
3.4.7 Anabolic steroids
3.4.8 Benzodiazepines
3.4.9 Gamma-hydroxybutyrate
3.4.10 Khat
3.4.11 Psilocybe mushrooms

3.5 In utero exposure to drugs of abuse
4. Determination of volatile substances

4.1 Introduction

4.2 Role of analytical toxicology laboratory

4.3 Sample collection, transport and storage

4.4 Analytical methods

4.5 Pharmacokinetic and interpretation of the results

5. Determination of pesticides

5.1 Introduction

5.2 Organophosphorus compounds

5.3 Carbamates

5.4 Chlorinated hydrocarbons

5.5 Pyrethrins and pyrethroids

5.6 Nitrophenols and nitrocresols

5.7 Chlorinated phenoxy acids

5.8 Triazines

5.9 Quaternary ammonium compounds

5.10 Phosphides

5.11 Coumarin antigoagulants

5.12 Organic and inorganic metallic compounds

6. Determination of metals and anions

6.1 Introduction

6.2 Metals
6.2.1 Arsenic
6.2.2 Lead
6.2.3 Mercury
6.2.4 Selenium
6.2.5 Thallium
6.2.6 Others (Aluminium, Antimony, Barium, Beryllium, Bismuth, Cadmium, Copper, Iron, Lithium)

6.3 Analytical methods for metals
6.4 Anions
6.4.1 Cyanide
6.4.2 Nitrites and nitrates
6.4.3 Phosphine and phosphides
6.4.4 Sulfide
6.4.5 Others (Borates, Bromide, Chlorate, Fluoride, Hypochlorites, Oxalate)

6.5 Analytical methods for anions

7. Analysis of natural toxins
7.1 Introduction
7.2 Bacteria
7.3 Fungi
7.4 Higher plants
7.5 Invertebrates
7.6 Vertebrates
7.7 Chemical and biological weapons

8. Therapeutic drug monitoring
8.1 Introduction

8.2 Fundamental concepts

8.3 Criteria to assess the clinical value of drug monitoring

8.4 Indications drug monitoring

8.5 Analytical requirements

8.5.1 Sample

8.5.2 Timing of measurements

8.5.3 Measurements techniques

8.5.4 Chirality

8.6 Interpretation of results

8.7 Pharmacodynamics monitoring and pharmacogenetics

9. Postmortem toxicology

9.1 Introduction

9.2 Specimens and others exhibit

9.3 Analytical toxicology

9.4 Interpretation of postmortem toxicology results

10. Drug abuse in sport

10.1 Introduction

10.2 Rules

10.2.1 Human sport

10.2.2 Horseracing

10.3 Reported analytical finding

10.4 Sampling
10.5 Analytical approach

10.6 Confirmatory methods

11. Alcohol, drugs and driving

11.1 Introduction

11.2 Alcohol and driven

11.2.1 Alcohol measurement

11.2.2 Interpretation and presentation of alcohol results

11.3 Drug and driving

11.3.1 Choice of specimen

11.3.2 Laboratory approaches to drug testing

12. Occupational and environmental toxicology

12.1 Introduction

12.2 Hazard assessments

12.3 Regulatory requirements

12.4 Specific occupational toxicology tests

12.5 Further uses of occupational data

12.6 Future directions for occupational toxicology

2. Contenidos prácticos

-Determination of N-methylcarbamates insecticides and some of their main metabolites in urine with liquid chromatography using ultraviolet detection and confirmatory analysis by LC-mass spectrometry

-Identification of different abuse drugs in seizures carried out by the police

METODOLOGÍA

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Actividades presenciales

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**MATERIAL DE TRABAJO PARA EL ALUMNADO**

Casos y supuestos prácticos
Cuaderno de Prácticas
Dossier de documentación

**EVALUACIÓN**

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**Periodo de validez de las calificaciones parciales:** *six months*

**BIBLIOGRAFÍA**

1. Bibliografía básica:


2. Bibliografía complementaria:
Ninguna.