



DATOS DE LA ASIGNATURA

Denominación: ADVANCED FORENSIC BIOLOGY

Código: 102265

Plan de estudios: MÁSTER UNIVERSITARIO ERASMUS MUNDUS EN CIENCIAS FORENSES **Curso:** 2

Denominación del módulo al que pertenece:

Materia:

Carácter:

Créditos ECTS: 6

Porcentaje de presencialidad: 40%

Plataforma virtual:

Duración:

Horas de trabajo presencial: 60

Horas de trabajo no presencial: 90

DATOS DEL PROFESORADO

Nombre: AGUILAR CABALLOS, MARIA PAZ

Centro: the above mentioned is the coordinator at UCO, the lecturer is Dr. Ross Williams, rwilliams@lincoln.ac.uk

Departamento: QUÍMICA ANALÍTICA

Área: QUÍMICA ANALÍTICA

Ubicación del despacho: the lecturer belongs to the University of Lincoln, UK. The module will be taught there

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DATOS ESPECÍFICOS DE LA ASIGNATURA

REQUISITOS Y RECOMENDACIONES

Requisitos previos establecidos en el plan de estudios

Ninguno.

Recomendaciones

Ninguna especificada.

COMPETENCIAS

- D3 Students should have the ability to integrate knowledge and handle complexity, and formulate judgements with incomplete or limited information, but that include reflecting on social and ethical responsibilities linked to the application of their knowledge and judgements.
- S2 Students should be able to document correctly evidence and results in an unambiguous way.
- S3 Students should be able to use and select scientific methodologies to collect, classify and analyse forensic evidences and data that ensure the chain of custody and observe all the requirements of a quality assurance system, including the absence of contamination in the samples.
- S6 Students should be able to assimilate and understand the role of forensic scientists as expert witnesses.
- S12 Students should be able to acquire skills in evidence sampling, preservation and identification for forensic purposes.
- S13 Students should be able to acquire skills in the field for evidence sampling.
- S14 Students should be able to know how to analyze the procedures useful from a forensic prospect and to project the implementation of alternative methods.

OBJETIVOS

In each of the specialist areas, the syllabus addresses sufficient depth and detail combined with engagement with practical activities wherever this is appropriate to allow the students to meet the outcomes. One of the strengths of the unit is the integrated approach to theory and practice. Current issues in forensic biology will be highlighted through the unit to embed the students learning in real-world problems.

On completion of the unit the student will be able to:

- detect a variety of fraudulent food materials using appropriate methods.
- apply DNA and protein based molecular biological techniques to the identification of foodstuffs, plant, microbial, animal and trace human material in a manner suitable for presentation as evidence.
- understand the principles of human population biology and random match probability as they apply to DNA evidence.
- understand the ethical implications of DNA testing and DNA databases.
- apply the principles of the mechanical properties of tissues to understanding wounds.
- interpret the meaning of particular blood spatter patterns.
- understand how to apply biological expertise to solve a forensic problem.
- understand why certain organisms or their products can be weaponized and how they may be detected and countered.

CONTENIDOS

1. Contenidos teóricos

1. Food Authenticity and Fraud

- Including the detection of undeclared ingredients and GM components. Counterfeit foodstuffs, detection of ingredient DNA by PCR, comparisons with immunological, protein and chemical methods.
- 3. Forensic plant identification

4. Identification of botanical evidence. DNA profiling of plants.

5. DNA Typing: in the context of human population biology

6. Significance of families, sub-populations, and racial groups. Bioethics and civil liberties associated with DNA databases. Use of mitochondrial DNA from degraded or decomposed remains. Sources of contamination.

7. Biostructures

- Wound mechanics and the physical properties of biological tissues.
- Endangered Species
- Identification of live plants and animals, materials and artefacts.
- Bioterrorism
- Toxins and drugs of biological origin and biological warfare agents: risk, detection and protection.
- Blood Pattern Analysis

Spatter patterns and their interpretation.

2. Contenidos prácticos

Laboratory courses

Seminars

METODOLOGÍA

Aclaraciones generales sobre la metodología y adaptaciones metodológicas para los alumnos a tiempo parcial

The learning outcomes will be achieved through lectures, seminars, practical laboratory investigation, problem-based learning, group work and directed study.

Interactive lectures provide an ideal opportunity for the group to gel and engage with and be inspired by the specialist staff on the module. Seminars can allow deeper understanding of key concepts to be explored through problem solving. Hands on practical experience, particularly of the molecular biology techniques, wound ballistics, blood spatter and forensic botany will equip the students with the skills essential to a forensic biologist. Working in small groups will support the development of the social skills necessary for forensic team building.

PART-TIME STUDY

Methodological adaptations for these students will be done attending the particular requirements for each case and according to the guidelines provided by the institution and the Consortium

Actividades presenciales

Actividad	Grupo completo	Grupo mediano	Total
<i>Actividades de evaluación</i>	3	-	3
<i>Estudio de casos</i>	7	-	7
<i>Laboratorio</i>	15	-	15
<i>Lección magistral</i>	30	-	30
<i>Seminario</i>	5	-	5
Total horas:	60	-	60

Actividades no presenciales

Actividad	Total
<i>Análisis</i>	45
<i>Estudio</i>	45
Total horas:	90

MATERIAL DE TRABAJO PARA EL ALUMNADO

Casos y supuestos prácticos
Cuaderno de Prácticas
Dossier de documentación
Ejercicios y problemas
Manual de la asignatura

Aclaraciones:

These materials will be provided in electronic form and/or hardcopy

EVALUACIÓN

Competencias	Instrumentos		
	Casos y supuestos prácticos	Listas de control	Trabajos y proyectos
D3			
S12			
S13			
S14			
S2			
S3			
S6			
Total (100%)	40%	10%	50%

Periodo de validez de las calificaciones parciales: *Marks will be valid until the period stipulated for the consortium and the institution to re-sit the subject, generally, the lecturing semester*

Aclaraciones generales sobre la evaluación y adaptaciones metodológicas para los alumnos a tiempo parcial:

Coursework 100%

PART-TIME STUDENTS

Assessment methodologies for these students will be performed attending the particular requirements for each case and according to the guidelines provided by the institution and the consortium

BIBLIOGRAFÍA

1. Bibliografía básica:

Adar, M.D. (1999) *Automated DNA sequencing and analysis* Academic Press.

Alberts, B., Lewis, J., Raff, M., *et al* (Eds) (1994) *Molecular Biology of the Cell* (3rd ed.)

Bock, J.H., Norris, D.O., (2003) *Handbook of Forensic Botany*, Totowa, Humana Press.

Coyle, H.M., (2004) *Forensic Botany: Principles and Applications to criminal Casework*, London, Taylor and Francis.

Bloom, M.V., Freyer, G.A., Micklos, D.A. (1996) *Laboratory DNA Analysis*

Benjamin Cummings Publishing Co.

Bevel, V.T. and Gardner, R.M., (2001) *Bloodstain Pattern with an Introduction to Crime Scene Reconstruction*, CRC Press.

Brown, T.A. (2001) *Gene Cloning and DNA Analysis – an introduction (4thed.)* Blackwell Science.

Brown, T.A. (1998) *Genetics – a molecular approach* Stanley Thornes.

Butler, J.M. (2001) *Forensic DNA typing*. Academic Press.

Connor, T.M. & Fergusson-Smith (1993) *Essential Medical Genetics (4th ed)* Blackwell Scientific.

Cummings, M.R. (1994) *Human Heredity: Principles and Issues (3rd ed)* West Publishing Co.

Di Maio, V.J.M. (1999) *Gunshot wounds: Practical aspects of firearms, ballistics and forensic techniques (2nd ed)* CRC Press.

Evetts, I.W. and Weir, B.S., (1998) *Interpreting DNA Evidence*, Sinaver.
Fisher, B.A.J. (2000) *Techniques of Crime Scene Investigation*, CRC Press.

Goodwin, W., Linacre, A., Hadi, S. (2007) *An introduction to Forensic Genetics*, Wiley

Griffiths, A.J.F., Miller, J.H., Suzuki, D.T., et al (1993) *An Introduction to Genetic Analysis (5th ed.)* W.H.Freeman & Co.

Gunn, A. (2006). *Essential Forensic Biology*. Wiley.

James S.H. & Eckert, W.G (1999) *Interpretation of bloodstain evidence at crime scenes (2nd ed)* CRC Press.

James S.H. & Nordby, J.J. (Eds.) (2003) *Forensic Science: An Introduction to Scientific and Investigative Techniques*, CRC Press.

Krawczak, M & Schindtke, J 3rd edition (2000) *DNA fingerprinting* Bios Scientific

2. Bibliografía complementaria:

Ninguna.

CRITERIOS DE COORDINACIÓN

Ningún criterio introducido.