



Asignatura	Forest Biological Threats and Climate Change		
Materia			
Módulo	Winter School		
Titulación	Erasmus Mundus Mediterranean Forestry and Natural Resource management		
Plan	506	Código	53024
Periodo de impartición	1º Semestre	Tipo/Carácter	OB
Nivel/Ciclo	MASTER	Curso	1º
Créditos ECTS	3		
Lengua en que se imparte	Inglés		
Profesor/es responsable/s	Juan A Pajares Alonso, Julio J. Díez Casero		
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Horario de tutorías			
Departamento	Producción Vegetal y Recursos Forestales		

Asignatura: Nombre de la asignatura

Materia: Indicar el nombre de la materia a la que pertenece la asignatura

Módulo: En el caso de que la titulación esté estructurada en Módulo/Materia/Asignatura, indicar el nombre del módulo al que pertenece la asignatura.

Titulación: Nombre de la titulación a la que pertenece la asignatura.

Plan: Nº identificativo del plan

Nivel/ ciclo: Grado/ Posgrado (Master Universitario/ Doctorado)

Créditos ECTS: Nº de créditos ECTS

Lengua: Idioma en el que se imparte la asignatura.

Profesores: Profesor o profesores responsables de la asignatura

Datos de contacto: Requerido al menos el correo electrónico del profesor o profesores responsables de las asignaturas.

Horario de tutorías: Enlace a la página web donde se encuentra el horario de tutorías.

Departamento: Departamento responsable de la asignatura.

Código: Código de la asignatura

Tipo/ Carácter: FB: Formación Básica / OB: Obligatoria / OP: Optativa / TF: Trabajo Fin de Grado o Master / PE: prácticas Externas

Curso: Curso en el que se imparte la asignatura



1. Situación / Sentido de la Asignatura

1.1 Contextualización

Forests are nowadays assumed to provide different services to society. These multifunctional contribution is dependent on preservation of forested areas. Historically these ecosystems have been subjected to the action of biological agents, including human activities, particularly of several insect pests and fungal diseases that had threatened their survival and multi-functionality. These processes are currently strongly increasing due to global change and the accelerated intercontinental exchange of invasive foreign species. The course on Forest Biological Threats and Climate change is aimed to provide the student with the basic principles governing these processes, studying the most relevant cases and at the same time presenting the main tools, methods and strategies of sustainable management to cope with these problems.

1.2 Relación con otras materias

Knowledge of main problems associated with global change, that is, the occurrence and spread to new areas of invasive species, is related with those courses that are addressed to sustainable forest management in general and to the management of forest pests and diseases in particular. Thus, Seminar of Model forest concept, Annual young researcher meeting, both included in the Winter School Module, and Forest Pest and Diseases are related courses.

1.3 Prerrequisitos

None



2. Competencias

Indicar las competencias que se desarrollan, de las descritas en el punto 3.2. de la memoria de verificación de la titulación y seleccionadas en el módulo, materia o asignatura correspondiente. Es conveniente identificarlas mediante letra y número, tal y como aparecen en la lista mencionada anteriormente.

2.1 Generales

General competences will be aimed (G1 a G27), particularly the ability: to analyze and synthesize information and contents (G3), critically reasoning on changes in science and globally and to communicate and express in written form (G5)

2.2 Específicas

Ability to identify main processes underlying the global change on forest systems.

Ability to know main principles of sustainable forest pest and diseases management.

Ability to know main factors fuelling processes of invasions of pests and pathogens from foreign areas

Ability to know the tactics and strategies environmentally sustainable currently available to eradicate or minimize damage caused by foreign invasive agents.

Ability to search for, analyse, discuss, synthesize and present knowledge related to management of invasive agents.



3. Objetivos

- . To provide the student with knowledge on current advanced tactics and strategies on sustainable pest and diseases management of invasive species.
- . To qualify the student for the gathering, managing and critical discussing of information relevant to invasive organisms and processes.
- . To develop in the student its ability to efficiently and orderly present concepts and results





4. Tabla de dedicación del estudiante a la asignatura

ACTIVIDADES PRESENCIALES	HORAS	ACTIVIDADES NO PRESENCIALES	HORAS
Theoretical classes	10	Autonomous individual study	15
Practical classes and Field trips	17	Individual report	30
Seminars	3		
Total presential	30	Total non presential	45





5. Bloques temáticos¹

Bloque 1: Forest Biological threats and climate change

Carga de trabajo en créditos ECTS:

a. Contextualización y justificación

Described in 1,1

b. Objetivos de aprendizaje

Described in 3

c. Contenidos

1. INVASION OF ALIEN FOREST PESTS.

Processes of invasions. Arrival. Establishment. Expansion. Eradication

2. DYNAMICS OF NATIVE AND INVASIVE FOREST PESTS.

Tree Defences, Abiotic factors. Competition. Responses by natural enemies. Population dynamics. Density dependent feedbacks. Patterns of forest insect dynamics

3. MANAGEMENT OF NATIVE AND INVASIVE FOREST PESTS

Monitoring. Risk rating. Inspections. Silvicultural methods. Obtention of information by semiochemicals. Mating disruption. Population extraction. Manipulation of population. Biological control by conservation, augmentation and introduction.

4. INTERNATIONAL MANAGEMENT FOR INVASIVE ORGANISMS

International advisory organizations: IPPC, EPPO, IOBC. Quarantine organisms. Plant health management within the European Union. Standing Committee on plant health, ESFA.

5. GLOBAL CHANGE AND FOREST DISEASES

Effect of globalization on Forest Diseases, Climate Change and their effect on Forest Diseases, Global Legislation and their effect on the introduction of new diseases.

6. MANAGEMENT OF NATIVE AND INVASIVE FOREST DISEASES

The use of fertilizers replacing fungicides in Oomycetes. Endotherapy. Genetic Control. Biological control of forest diseases: endophytes, mycoviruses. Integrated control.

7 CASE STUDIES

Pine wood nematode, Emerald ash borer, Asian long-horn beetle, Asiatic palm weevil, Oriental chestnut gall wasp, Western seed bug, Chesnut Canker, Pitch Canker, Alder decline, *Pinus pinaster* decline, Ash decline, *Xylella fastidiosa*.

d. Métodos docentes

- . Presentation in the classroom of concepts, contents, and practical cases
- . Presentation of cases in smart board
- . Group discussion in the classroom

¹ **Añada tantas páginas como bloques temáticos considere realizar.**



- . Seminars on current forest health problems by in forest pest managers
- . Field trip visits to forest health canter and forest health experiences
- . Preparation on a written report on invasive species from searching on forest health websites

e. Plan de trabajo

Presential:

Attendance and discussion of concepts, contents and cases in the classroom: 10 hours

Attendance and participation on seminars: 3 hours

Attendance, participation and discussion on issues during external visits and field trips: 17 hours

Non Presential:

Personnel study of material and bibliographic references provided:

Research on websites and preparation of individual report: 30 hours

f. Evaluación

Evaluation will be based on the one hand on attendance and active participation (questioning, discussion, debate) in presential activities in the classroom, seminars and field trips (50%). On the other hand, qualification will be completed by individual report prepared by the students on assigned cases on invasive agents threatening forests worldwide (50%). In the report, quality and suitability of contents and formal aspects of the report (editing, graphical information) will be valued.

Aquellos alumnos que no hayan superado la asignatura en junio, tendrán derecho en la 2ª convocatoria a un examen de evaluación escrito en el que deberán acreditar un conjunto de conocimientos y la capacidad de relacionarlos críticamente.

g. Bibliografía básica

WAINHOUSE D. 2005. *Ecological methods in forest pest management*. Oxford University Press.

CIESLA W.M. 2011. *Forest Entomology. A Global perspective*. Wiley-Blackwell. Oxford.

ZHAO B.G., FUTAI K., SUTHERLAND J.R. y TAKEUCHI (eds). 2009. *Pine wilt Disease*. Springer. Berlín.

h. Bibliografía complementaria

BERRYMAN A. A. (ed.) (2002). *Population cycles: evidence for trophic interactions*. Oxford.

BOLTON, M.D.; THOMMA, B.P. (2012). *Plant fungal pathogens: methods and protocols*. Humana Press/Springer. 648 pp.

CARDÉ R.T., BELL W.J. (eds.) (1995). *Chemical ecology of insects 2*. Chapman & Hall.

CIESLA W M. (2011) *Forest entomology. A global perspective*. Willey-Blackwell, Chichester, UK.

LIEUTIER F., DAY K., BATTISTI A., GREGOIRE J.C. AND EVANS HF (eds). 2004. *Bark and Wood Boring Insects in Living Trees in Europe, a Synthesis*. Kluwer Academic Publishers, Dordrecht.

LUNDQUIST, J.E.; Hamelin, R. C. 2005. *Forest Pathology: From forest to landscapes*. APS Press St. Paul, Minnesota. USA. 175pp.

PÉREZ, G.; DÍEZ J.J.; IBEAS, F.; PAJARES, J.A. (2008). Modelling Pine Wilt Disease Risk under a climate change scenario in North Western Spain. 269-282. En: *Managing forest ecosystems: the challenge of climate change* (Bravo F., LeMay V. and V Gadow K, eds.) Kluger Academic Publishers.

SANZ-ROS, A.V.; PAJARES, J.A., DÍEZ J.J. (2015). Influence of climatic variables on crown condition in pine forests of northern Spain. 103-115. En: *Managing forest ecosystems: the challenge of climate change* (Bravo F., LeMay V. and V Gadow K, eds.) Kluger Academic Publishers.

SCHOWALTER, T.D., FILIIP, G.M. (EDS.) (1993). *Beetle-pathogen interactions in conifer forests*. Academic Press.

WAGNER M.R., CLANCY K.M., LIEUTIER F.; PAINE T.D. (eds.) (2002). *Mechanisms and deployment of resistance in trees to insects*. Kluwer Academica Publishers.

www.ippc.int Internacional for Plant Protection

www.forestry-quarantine.org Inyernational Group on Research on Forest Quarantine www.iefc.net Institute Européen de la Fôret Cultivée

www.icp-forests.org Estate of the Forrest in Europe

www.eppo.org European and Mediterranean Plant Protection Organization

www.iobc-wprs.org International Organization for Biological Control (OILB- IOBC/WPRS)

www.forestpests.org Forest Pest and Diseases

www.fs.fed.us/foresthealth Forest Plant Health

www.iufro.org International Union of Forest Research Organizations

www.cabi.org Commonwealth Agricultural Bureaux International CABI

i. Recursos necesarios

- . Campus virtual
- . Classroom with audiovisuals (digital board, projector)
- . Forest sites containing forest health experiences and cases
- . Forest health facilities in the Autonomous Community
- . Tutorial support during the curse within the assigned timetable

6. Temporalización (por bloques temáticos)

BLOQUE TEMÁTICO	CARGA ECTS	PERIODO PREVISTO DE DESARROLLO
FOREST BIOLOGICAL THREATS	3	January-February

7. Tabla resumen de los instrumentos, procedimientos y sistemas de evaluación/calificación



INSTRUMENTO/PROCEDIMIENTO	PESO EN LA NOTA FINAL	OBSERVACIONES
Attendance and participation in the classroom	50%	Evaluated by the professors
Individual Report	50%	Quality and suitability of contents, and formal aspects will be valued

8. Consideraciones finales

The ability: to analyze and synthesize information and contents (G3), critical reasoning and to communicate and express in written form (G5) will be evaluated by participation in the classroom and by the preparation of a written report

Those student that did no pass and require a 2nd chance, will be asked to present an additional written report on the curse contents.

More information is offered on the webpage of the Sustainable Management Research Institute: <http://sostenible.palencia.uva.es/gfs/formacion/maestrias/7/default.aspx>



