Code: 1736 **Forest Pests and Diseases**
Degree: 2nd cycle – Forestry and Natural Resources
Stream: Forestry; Natural Resources Management; Arboriculture and Urban Forestry
Curricular Year: 1st / 2nd (NRManag) **Semester Course: 1st**
Credits: 6 ECTS **Compulsory** (Forestry; Arboriculture and Urban Forestry)
Language: Portuguese/English **Optional** (Natural Resources Management)
Responsible: Manuela Rodrigues Branco Simões
Other lecturer(s): Ana Paula Ferreira Ramos and Maria Helena Reis de Noronha Ribeiro de Almeida
Web Site: http://www.isa.utl.pt/home/node/3812

1. Contact hours:
Lectures 14 **Lecture/Practicals** 28 **Praticals/Laboratory** 28 **Others** 14 **Total** 84

2. Objectives:

To understand the ecology of forest pests and diseases, including host-plant interactions, population dynamics, natural enemies and antagonists of insects and pathogens.
To know methods for evaluation of pest and disease incidence in forest ecosystems: monitoring, forecasting and assessing the risk of insect outbreaks or pathogens epidemics.
To recognize the cultural, silvicultural, physical, biological, biotechnical and chemical strategies for preventing, controlling and managing forest pests and diseases.
To realize the economic and ecological impacts of the different control strategies to cope with forest pests and diseases and appreciate it in base of benefits and costs.

3. Programme:

1. Ecology of forest pests and diseases. Population dynamics: regulation factors, . negative and positive density-dependence, population outbreaks. Host-plant interactions. Role of natural enemies. Epidemiologic models and quantification of the disease parameters. Ecological and economical impacts of pests and diseases on forest resources.
2. Monitoring and forecasting pests and diseases
Early detection and monitoring methods of pests and diseases considering: the individual tree, stand level and territory level.
Risk assessment at the stand and individual tree level. Hazard and risk models.
3. Preventive and prophylactic measures. Effect of silvicultural practices on forest protection
Habitat management for beneficial organisms.
Preventing exotic pests and diseases: measures of embargo, quarantine and legislation.
4. Control of pests and diseases:
Chemical strategies: classification and composition of pesticides. Formulations, techniques and materials for application of pesticides. Ecological impacts and human health problems caused by pesticides. Homologation requirements.
Biotechnical control: pheromones and kairomones, use of pheromone and other semiochemicals based traps (e.g. mass trapping, "push & pull", mating disruption)
Biological control: biotic agents, evaluation of efficacy and safety of biological control organisms, ecological impacts. Mass rearing and releasing methods of biotic agents
Resistance tree breeding: genetic variation and genetic improvement for tree resistance against pests and diseases. Biotechnological methods.
Cultural and physical strategies.
Treatment of stored forest products.
5. Impact estimation of pest and diseases management strategies. Integration of pests and diseases management in forest management Cost-benefit analysis.

4. Bibliography:

Main Bibliography

Agrios, GN 2005. Plant Pathology. 5th ed., Academic Press, Inc., San Diego, USA.
Edmonds, RL, Agee, JK, Gara, RI 2000. Forest Health and Protection. McGraw-Hill Companies.
Manion, PD 1991. Tree Disease Concepts. 2nd ed., Prentice Hall, USA.
Wainhouse D. 2005, Ecological Methods in Forest Pest Management. Oxford University Press Inc., New York.

Other Bibliography

Speight, MR, Wainhouse, D 1989. Ecology and Management of Forest Insects. Oxford University Clarendon Press, USA.
Starnge, RN 2003. Introduction to Plant Pathology. John Wiley & Sons, Ltd, West Sussex, England.
Texts and articles provided by the teacher in the classes.

5. Assessment:

A. Bibliographic review and synthesis on proposed themes or a project with oral presentations (50%); theoretical tests (50%).
B. Final examination, optional, obligatory for the students with less than 10 / 20 on the theoretical tests (60%B +40% A)

6. Estimated Workload: 168 Hours

7. Last Update: 21/7/2010