

**Code: 1371 Applied Entomology****Degree:** 2<sup>nd</sup> cycle – Agriculture**Stream:** Plant Protection**Curricular Year:** 1<sup>st</sup>**Credits:** 6 ECTS**Language:** Portuguese/English**Responsible:** José Carlos Franco Santos Silva**Other lecture(s):** Elisabete Tavares Lacerda de Figueiredo Oliveira and invited specialists**Web Site:** <http://www.isa.utl.pt/home/node/3823>**Semester Course:** 2<sup>nd</sup>  
**Optional****1. Contact hours:****Lectures 28 Practicals/Laboratory 42 Others 14 Total 84****2. Objectives:**

Basic knowledge on: general aspects of insect ecology; insect demography and population dynamics; interspecific relationships; ecological factors determining pest status of insects in agroecosystems.

Theorico-practical knowledge on: structure, functions, reproduction and development of insects; classification systems and identification of insects, focussing major orders and families of agricultural importance.

**3. Programme:****Sampling insect and mite populations:** sampling methods, techniques and devices; estimating population abundance**Identification and biology of insect and mite pests and their natural enemies:****Insects:** Orthoptera (e.g. grasshoppers), Hemiptera (e.g. scale insects, aphids, whiteflies), Thysanoptera (e.g. thrips), Neuroptera (e.g. green lacewings), Coleoptera (e.g. click beetles, leaf beetles, weevils, bark beetles, ladybeetles, ground beetles); Diptera (e.g. fruit flies, miner flies, hoverflies, gall midges), Lepidoptera (e.g. leaf roller moths, cutworm moths), Hymenoptera (e.g. wasps, bees, ants, hymenopteran parasitoids);**Mites:** Tarsonemidae, Tetranychidae, Tenuipalpidae, Eriophyidae, Phytoseiidae.**Tritrophic Interactions:** insect/mite-plant relationships (e.g. phytophagy, transmission of plant pathogens, polinization), insect/mite- insect/mite relationships (e.g. predation, parasitoidism), insect/mite-microbe (e.g. pathogeny, symbiosis).**Insect and mite population dynamics:** the concept of population, general characteristics of a population, models of population growth, spatial distribution patterns, factors of population regulation, case studies**Project:** insect collection**4. Bibliography:****Main Bibliography**

Barbosa P &amp; Schultz JC (eds) (1987) Insect outbreaks. Academic Press, San Diego

Carmona MM &amp; Dias JCS (1996) Fundamentos de acarologia agrícola. Fund. C. Gulbenkian, Lisboa

Carvalho JPassos de (1986) Introdução à entomologia agrícola. FC Gulbenkian, Lisboa

Chinery M (2007) Insects of Britain and Western Europe (Domino Guide). A &amp; C Black Publishers Ltd, London

Daly HV, Dyen JT &amp; Purcel-III AH (1998) Introduction to insect biology and diversity. Oxford University Press, Oxford

Gullan PJ &amp; Cranston PS (1994) The insects. An outline of Entomology. Chapman &amp; Hall, London

Mateus A (1989) Fundamentos de zoologia sistemática. FC Gulbenkian, Lisboa

Pedigo LP &amp; Buntin, GD (eds) (1994) Handbook of sampling methods for arthropods in agriculture. CRC Press, Boca Raton

**Other Bibliography**

Guimarães JM (1986) Apontamentos de entomologia agrícola. Escola Superior Agrária/Instituto Politécnico de Castelo Branco, Castelo Branco

Borror DJ &amp; Delong DM (1988) Introdução ao estudo dos insectos. Ed Edgard Blücher Lda, São Paulo

Hill DS (1994) Agricultural entomology. Timber Press, Portland

Kim KC &amp; McPheron BA (eds) (1993) Evolution of insect pests: patterns of variation. John Wiley &amp; Sons, New York

Pedigo LP (1996). Entomology &amp; pest management. Prentice-Hall Inc., New Jersey

Richards OW & Davies RG (1977) Imm's general textbook of entomology. 10<sup>a</sup> ed, Chapman and Hall, London.

Tremblay E (1984-94). Entomologia applicata, Vol. 1, 2 e 3. Liguori Ed., Napoli.

**5. Assessment:****Frequency:** to prepare a portfolio**II. Grading****a) Continuous Assessment****Quizzes** (10%)**Tests:** theory (35%)**Oral exam:** practical (25%)**Project:** insect collection (25%)**Portfolio** (5%)**b) Final exam:** for students with course frequency and a grade less than 10 (in 20)**III. Final grade:** the students with a minimal grade of 10 will be dispensed of the final exam; obligatory to obtain a minimal grade of 10 in the tests and the oral exam; in the case of final exam the final grade is the average between the final exam and continuous assessment grades**6. Estimated Workload:**

168 Hours

**7. Last Update:**

22/2/2011