GENETIC PEST MANAGEMENT SYLLABUS (FALL 2012)

INTRODUCTION

Aug. 16 Th Overview of course---Fred, Marce, Max

Aug. 21 Tu Ecology of populations ---Fred
Aug. 23 Th Ecology of populations ---Fred

Aug. 28 Tu Genetics of populations ---Fred
Aug. 30 Th Genetics of populations ---Fred

Sept. 4 Tu Introduction to Cellular Genetics ---Max
Sept. 6 Th Introduction to Cellular Genetics ---Max

Sept. 11 Tu Genetics of reproduction ---Marce
Sept. 13 Th Genetics of reproduction ---Marce

Exam #1 (format to be determined)

OVERVIEW OF GENETIC PEST MANAGEMENT

Sept. 18 Tu History of the sterile insect technique ---Max
Sept. 20 Th History of the sterile insect technique ---Max

Sept. 25 Tu History of other classical methods of genetic control—Fred
Sept. 27 Th History of other classical methods of genetic control--Fred

Oct. 2 Tu Introduction to transgenesis approaches---Marce and Esther and field trip*
Oct. 4 Th Introduction to transgenesis approaches---Marce and Esther and field trip*
*Moving beyond the lab to large scale rearing and release: Economic and operational issues ---Max (Ken Bloem, Allen Cohen) ---Insectary field trip

Exam #2 (format to be determined)

Oct. 9 Tu Introduction to ecological and social issues related to GPM (Fred and others)
Oct. 11 Th Introduction to ecological and social issues related to GPM (Fred and others)

SPECIFIC TRANSGENIC APPROACHES

Oct. 16 Tu Female killing genes and sex reversal ---Max
Oct. 18 Th Female killing genes and sex reversal ---Max

Oct. 23 Tu Medea and homing endonucleases – Marce

Oct. 25 Th Medea and homing endonucleases -- Marce

Oct. 30 Tu Meiotic Drive and engineered underdominance –Fred
Nov. 1 Tu Meiotic Drive and engineered underdominance --Fred

Exam #3 (format to be determined)

IMPLEMENTATION CHALLENGES FOR TARGET SPECIES (TRANSGENISIS, REARING, FIELD ECOLOGY, SOCIAL ISSUES

Nov. 6 Tu Case study of genetic control of the mosquito vector of disease (students)
Nov. 8 Th Case study of genetic control of the mosquito vector of disease (students)

Entomological Society meeting Nov 11-14

Nov. 15 Th Case study of genetic-based eradication of agricultural pests (students)
Nov. 20 Tu Case study of genetic-based eradication of agricultural pests (students)

Thanksgiving

Nov. 27 Tu Case study of genetic-based eradication of invasive environmental pests
Nov. 29 Th Case study of genetic-based eradication of invasive environmental pests

Baseline learning outcomes
After completing the course, students will be able to:
1) Describe the molecular basis of sexual reproduction and embryogenesis,
2) Accurately explain the general population genetic concepts undergirding population suppression and strain replacement GPM approaches,
3) Describe the molecular biology concepts, transgenesis techniques and practical challenges involved in building specific engineered pest strains,
4) Discuss how the ecology of specific pests and their habitats affect their status as feasible targets for specific GPM strategies,
5) Provide detailed examples where pest population suppression could result in displacement of human populations and indirectly decrease or increase biodiversity,
6) Discuss the social, biological and policy histories of GPM, and
7) Participate in debates about specific proposed GPM projects and how to assess these projects effectively.

Exams –15% each

Participation—30%

Final presentation –25%