Multidisciplinary treatment of medical entomology, plant vector entomology, insect pathology and symbiosis. Topics are addressed on evolutionary, ecological and molecular levels.
PEPS 486 – Insect-microbe interactions
Addition of a course

1. What is the course modification?
New course.

2. Why is this course being requested or modified?
Course is requested because of a large gap in UHM and CTAHR curricula in courses available related to insects and their relationship with microbes. This is a topic with large student interest, both at undergraduate and graduate levels, because it covers multidisciplinary topics on evolutionary, ecological and molecular levels. Approval of the proposal will introduce a new multidisciplinary course, which can attract students from various departments of CTAHR and other colleges at UHM.

3. How will the content be organized?
Content will be divided into four major areas: medical entomology, plant vector entomology, insect pathology and symbiosis. Attached syllabus shows proposed material and time allotted to each topic.

4. What other courses at UHM closely parallel the proposed course, and in what way will the latter make a distinct contribution?
There are no courses at UHM that parallel the proposed one. The proposed course is unique in integrating the four content areas and emphasizing entomological aspects. Because this course is being proposed at the 400 level, it can also be taken by graduate students.

5. Where or how does the proposed course fit into the current and future curriculum?
This course will add important, current and unrepresented areas to PEPS curriculum, provide a linkage among various research areas of PEPS and attract students to the Department. The course will also cover areas of microbiology and entomology currently not available to students at UHM.

6. Why is the number of credits and level justified? Explain the prerequisites and the absence of thereof.
Three credit course. It will have two 50-minute lectures per week (2 units), and a third 50-minute discussion session (1 unit) of case studies. This session will require extensive reading of published research articles and reviews on various topics prior to each session.
Prerequisites: BIO103, BIO172, or MICR130; or consent.

7. How will the course assist students to achieve the critical skills and competencies expected of CTAHR graduates?
The ‘Case study’ sessions will address most of the critical skills and competencies expected for CTAHR graduates. It will involve reading of manuscripts on various areas
of the insect microbiology, followed by brief presentations by students of topics during each session. Presentations will be followed by discussion of topics (lead by instructor), which will emphasize the ability of students to critically analyze research problems. Quizzes on "Case study" sessions will also occur to assure prior reading of assignments and allow development of written skills.

8. How will students be evaluated?
Students will be evaluated with three exams (2 midterms, 1 final). Participation on case studies and quizzes will account for 5% of final grade; topics addressed on this section will also be included on written exams.

9. What are the minimum qualifications for teaching this course? Is a qualified instructor now available?
Minimum qualifications for instructor include basic knowledge of entomology, microbiology and familiarity with various sections of course. Instructor (Dr. Rodrigo Almeida, PEPS/CTAHR) is available to teach the course.

10. How will the course be financed, assuming no further cutbacks?
The course will focus on lectures and case studies. Laboratory activities will be done with instructional materials already available or that will be acquired soon and are inexpensive. Small amount of funds necessary for course will be obtained from our Department’s instructional budget.

11. Has the course been offered before? Is there a demand for it?
Course has not been offered before. This is a cross-disciplinary course that should be of interest to students in a variety of majors. Students interested in areas such as entomology, zoology, parasitology, microbiology, ecology and evolution are among those targeted by this course.

12. Is the course cross-listed with another department?
No.
Insect-microbe interactions — PEPS 486

Course description: A multidisciplinary treatment of medical entomology, plant vector entomology, insect pathology and symbiosis. Topics are addressed on evolutionary, ecological and molecular levels. 3 credits.

SYLLABUS

INTRODUCTION
Week 1 M – Introduction to course
Week 1 W – General entomology
Week 1 F – General microbiology

MEDICAL ENTOMOLOGY
Week 2 M – Introduction, terminology, insects
Week 2 W – Direct injury
Week 2 F – Lab – insect identification
Week 3 M – Protozoans
Week 3 W – Filariasis
Week 3 F – Case study – malaria
Week 4 M – Trypanosomes
Week 4 W – Bacteria
Week 4 F – Case study – tse-tse fly and African trypanosomiasis
Week 5 M – Viruses 1
Week 5 W – Viruses 2
Week 5 F – Case study – West Nile virus
Week 6 M – Mechanical transmission of pathogens
Week 6 W – Emerging diseases, climate warming
Week 6 F – Mid-term I

PLANT VECTOR ENTOMOLOGY
Week 7 M – Introduction, terminology, insects
Week 7 W – Toxins, mechanical transmission, fungi
Week 7 F – Lab – insect identification, visit to research laboratory
Week 8 M – Viruses
Week 8 W – Bacteria
Week 8 F – Case study – Pineapple mealybug wilt

INSECT PATHOLOGY
Week 9 M – Introduction, insect immunity
Week 9 W – Bacteria, nematodes
Week 9 F – Case study – Bacillus thuringiensis
Week 10 M – Fungi
Week 10 W – Viruses
Week 10 F – Case study – Baculoviruses
INSECT SYMBIONTS
Week 11 M – Symbiosis and insects
Week 11 W – Nutritional aspects of insect diets
Week 11 F – Midterm II
Week 12 M – Phylogenetic associations
Week 12 W – Social insects – ants and termites
Week 12 F – Case study/Lab: termite gut
Week 13 M – Blood-feeding insects
Week 13 W – Plant sap-feeding insects
Week 13 F – Case study: *Buchnera*
Week 14 M – Polynoviruses
Week 14 W – Spiroplasmas
Week 14 F – Case study: *Dalbulus X Spiroplasma kunkelii*
Week 15 M – Facultative symbionts
Week 15 W – *Wolbachia*
Week 15 F – Case study: *Wolbachia*
Week 16 M – Paratransgenesis
Week 16 W – Symbiotic strategies genome evolution
Week 16 F – Review

FINAL EXAM
Week 17