Term Information

Effective Term	Autumn 2020
Previous Value	*Autumn 2013*

Course Change Information

What change is being proposed? (If more than one, what changes are being proposed?)

Add honors embedded.

Modify goals and learning outcomes to conform with current GE language.

Modify course description to delete reference to a recitation.

Modify specific learning objectives and course content topic list.

What is the rationale for the proposed change(s)?

This will combine two existing courses, 3330 (Social Insects) and 4440H (Honors Social Insects), due to a trend in low enrollment in both courses.

What are the programmatic implications of the proposed change(s)?

(e.g. program requirements to be added or removed, changes to be made in available resources, effect on other programs that use the course)?

None. Both 3330 and 4440H are electives in our major.

Is approval of the requrest contingent upon the approval of other course or curricular program request? No

Is this a request to withdraw the course? No

General Information

Course Bulletin Listing/Subject Area	Entomology
Fiscal Unit/Academic Org	Entomology - D1130
College/Academic Group	Food, Agric & Environ Science
Level/Career	Undergraduate
Course Number/Catalog	3330E
Previous Value	*3330*
Course Title	Social Insects
Transcript Abbreviation	Social Insects
Course Description	Three-hour general education course. Exploration of biological factors that permit ants, bees, wasps, and termites to maintain large complex societies. Content includes basic arthropod biology, basic insect biology, caste determination, organization of labor, defense, symbioses, and pathogens in social insects.
Previous Value	*Three hour general education course. Exploration of biological factors that permit ants, bees, wasps, and termites to maintain large and complex societies. Includes lecture and recitation.*
Semester Credit Hours/Units	Fixed: 3

Offering Information

Length Of Course	14 Week, 12 Week
Flexibly Scheduled Course	Never
Does any section of this course have a distance education component?	No
Grading Basis	Letter Grade
Repeatable	No
Course Components	Lecture
Grade Roster Component	Lecture
Credit Available by Exam	No

Admission Condition Course	No
Off Campus	Never
Campus of Offering	Columbus

Prerequisites and Exclusions

Prerequisites/Corequisites	Prereq: 1101 or BIOLOGY 1101 or 1114, or equiv.
Previous Value	*Prereq: Entmlgy 1101 (101) or Biology 1101 (101), or equiv.*
Exclusions	Not open to students with credit for 4440H or 3330.
Previous Value	Not open to students with credit for Entmlgy 4440H (Entomol 444H) or Entomol 333.
Electronically Enforced	No

Cross-Listings

Cross-Listings

Subject/CIP Code

Subject/CIP Code	26.0702
Subsidy Level	Baccalaureate Course
Intended Rank	Sophomore, Junior, Senior
Previous Value	*Freshman, Sophomore, Junior, Senior*

Requirement/Elective Designation

General Education course:

Biological Science

The course is an elective (for this or other units) or is a service course for other units

Course Details

Course goals or learning objectives/outcomes

- Students will understand the biological facts behind the key components of insect anatomy/physiology/sociality that are key to the ecological dominance of social insects.
- Students will develop testable, falsifiable hypotheses to explain sex ratio, organization of labor, and communication in social insects.
- Students will explore the history of social insect research and describe the progress from relatively simple discoveries to the most current research and the impacts of this research on our understanding of insect and other societies.
- Students will examine the development of technology to understand the chemical communication, development, and modes of defense in social insects.
- Students will understand how discoveries in social insect biology have led to advances in the evolution of sociality, communication, organization of labor, sex ratio, kin recognition, and defensive strategies.

Previous Value

- *Explain the organization of labor, caste determination, communication, kin recognition, symbioses, pathogens, defense, architecture, and social parasitism associated with ants, bees, wasps, termites, and other insect societies.*

Content Topic List

- Biology of Insects/Arthropods
- Ant, Bee, Wasp, and Termite Societies
- Evolution of Sociality
- Perception, Learning, and Orientation
- Pollinators
- Organization of labor
- Caste determination
- Communication
- Honey Bee Dance Language
- Sex Ratio
- Social Parasitism
- Symbioses
- Social Insect Defense
- Social Insect Pathogens
- Other insect societies

Previous Value

- *Natural history of social insects*
- *Organization of labor*
- *Caste determination*
- *Communication*
- *Kin recognition*
- *Symbioses with social insects*
- *Pathogens in social insect colonies*
- *Defense*
- *Architecture*
- *Other insect societies*
- *Social parasitism*

Sought Concurrence

No

Attachments

- ENTMLGY 3330 Embedded Syllabus v3.docx: proposed syllabus

  (Syllabus. Owner: Welty,Celeste)
- Entomology 3330E Rationale Assessment_v2.docx: rationale & assessment

  (GEC Course Assessment Plan. Owner: Welty,Celeste)
- ENTMLGY 4440H SP 19 Syllabus.docx: Syllabus for related course

  (Syllabus. Owner: Welty,Celeste)

Comments

- Per 8/28 JOsborne email *(by Violet,Cynthia Alma on 08/28/2019 12:27 PM)*
- revise and add GE assessment as per email message 22 Aug 2019 *(by Osborne,Jeanne Marie on 08/22/2019 02:20 PM)*

Workflow Information

Status	User(s)	Date/Time	Step
Submitted	Ruisch,Jennifer Robin	08/22/2019 10:38 AM	Submitted for Approval
Approved	Welty,Celeste	08/22/2019 10:38 AM	Unit Approval
Revision Requested	Osborne,Jeanne Marie	08/22/2019 02:20 PM	College Approval
Submitted	Welty,Celeste	08/23/2019 02:53 PM	Submitted for Approval
Approved	Welty,Celeste	08/23/2019 02:54 PM	Unit Approval
Revision Requested	Violet,Cynthia Alma	08/28/2019 12:27 PM	College Approval
Submitted	Welty,Celeste	08/30/2019 03:13 PM	Submitted for Approval
Approved	Welty,Celeste	08/30/2019 03:14 PM	Unit Approval
Approved	Osborne,Jeanne Marie	09/02/2019 06:50 PM	College Approval
Pending Approval	Vankeerbergen,Bernadette Chantal Oldroyd,Shelby Quinn Hanlin,Deborah Kay Jenkins,Mary Ellen Bigler	09/02/2019 06:50 PM	ASCCAO Approval

Syllabus

ENTMLGY 3330E Social Insects

Spring semester 2020

Lecture:
M, W, and F
1:50 PM – 2:45 PM

3 credit hours

Honors embedded: can count for honors credit, but open and accessible to non-honors students

Pre-requisites: ENTMLGY 1101 or BIOLOGY 1101 or 1114, or equiv. Not open to students with credit for ENTMLGY 3330 or 4440H.

Instructor
Dr. Joseph M. Raczkowski
Office: 257 B Howlett Hall
Phone: 614-688-1054
Email: raczkowski.2@osu.edu
Office hours by appointment

Course description
Three-hour general education course. Exploration of biological factors that permit ants, bees, wasps, and termites to maintain large complex societies. Content includes basic arthropod biology, basic insect biology, caste determination, organization of labor, defense, symbioses, and pathogens in social insects.

Goals for the GE Natural Science Category:
Students understand the principles, theories, and methods of modern science, the relationship between science and technology, the implications of scientific discoveries and the potential of science and technology to address problems of the contemporary world.

Course specific goal:
Students understand the importance of arthropods, specifically the importance of social hexapods to the ecology of our planet. Included in this goal is understanding the ways in which social hexapods organize labor, determine caste, communicate, recognize kin, construct nests, and defend their nests.

Expected Learning Outcomes for GE Natural Science (Biological Science)	Specific learning objectives for this course	How do learning objectives address the GE Expected Learning Outcomes
Students understand the basic facts, principles, theories and methods of modern science.	Students will understand the biological facts behind the key components of insect anatomy/physiology/sociality that are key to the ecological dominance of social insects. Students will develop testable, falsifiable hypotheses to explain sex ratio, organization of labor, and communication in social insects.	Many lectures include the evolution of sociality in insects and other organisms. For example, the first two lectures of the course define sociality and the current understanding of how some species of insects evolved to be social. Also included in these lectures are descriptions of the insects "social gut" (the crop), which allows these insects to ingest food and the regurgitate the food to nestmates.
2. Students understand key events in the development of science and recognize that science is an evolving body of knowledge.	Students will explore the history of social insect research and describe the progress from relatively simple discoveries to the most current research and the impacts of this research on our understanding of insect and other societies.	Most lectures include historical perspective of the current research in topics such as kin recognition/kin selection. For example, the first demonstration of individual recognition in invertebrates was with male sweat bees. This discovery lead to further research into the mechanisms of recognition in bees and the advancement of kin selection theory.
3. Students describe the inter-dependence of scientific and technological developments.	Students will examine the development of technology to understand the chemical communication, development, and modes of defense in social insects.	Most social insect communication is chemical, so many lectures include aspects of chemical ecology, which relies heavily on technology to identify individual compounds used to convey information to nest mates.
4. Students recognize social and philosophical implications of scientific discoveries and understand the potential of science	Students will understand how discoveries in social insect biology have led to advances in our understanding of the evolution of sociality, communication,	Throughout the course, lectures will cover the evolution of sociality, communication, organization of labor, sex ratio, kin recognition, and defensive strategies. For example, some ant species are studied for their

and technology to address problems of the contemporary world.	organization of labor, sex ratio, kin recognition, and defensive strategies.	swarm raids that involve possibly a million individuals and seem highly coordinated. Initially, some hypothesized that an individual or small group of individuals controlled the entire swarm raid, but, upon further investigation we now realize each individual makes a series of simple decisions.

Graded elements:
Grading will be based on both factual content and conceptual connections. Grades will be composed of scores from **five quizzes** (20 points each), **two exams** (75 points each), a **final exam** (200), two **essay assignments** (25 points each) related to course material, and **attendance (**80 points). Quizzes and exams will be composed of a mix of multiple choice and short answer questions. Essay assignments turned in late will be charged a penalty of 10% per day.

Embedded Honors: Students who enroll in the embedded honors course for honors credit will be required to complete two additional essay assignments worth 25 points each, for a total of 50 additional points.

From this grand total of 580 points for non-honors students and 630 points for honors students, grades will be calculated as shown on page 3.

Details on required essay assignments

Essay Assignment One: Summarize a recent article about social insects from the popular press. Each summary must include the following:

1. title, source, and date of the article (e.g. “Ants rule the world”, Columbus Dispatch, 14 April 2014)

2. scientific basis for the article
    a. quotes from authorities (e.g. Dr. Joseph Raczkowski states “ants rule the world”)
    b. institution of quoted researcher (e.g. Ohio State University)
    c. where the research was conducted (e.g. Ohio State University; La Selva, Costa Rica; etc.)

3. general summary of the article

4. errors/sensationalism in the writing

The easiest way to find an article is to search Google News or Yahoo News for **social** insects (e.g. ants, termites, social bees, social wasps).

Limit yourself to 300-350 words.

Essay assignments turned in late will be charged a penalty of 10% per day.

*Honors students are required to submit two essays on the due date, whereas non-honors students will submit one essay on the due date.

Essay Assignment Two: Read and summarize one of the articles about non-Hymenopteran / termite social species. Limit your summary to one page. All articles are posted on Carmen.

*Honors students are required to submit two essays on the due date, whereas non-honors students will submit one essay on the due date.

Attendance:
Attendance at all lectures is required (2 points for each of 40 lectures).

If you must miss a lecture for a university-sanctioned event, you must supply appropriate documentation no less than one week before the event. If you are too ill to attend lecture, please contact Dr. Raczkowski, **within 24 hours** of the class period.

Absences:
Missed exams must be made up within a week of the date they were originally given. If you must miss an exam for a university-sanctioned event, you must supply appropriate documentation no less than one week before the event. If you are too ill to take an exam, please contact Dr. Raczkowski, within 24 hours of the class period in which the exam was taken.

Grading scale:

Grade	%
A	93-100
A-	90-92.9
B+	87-89.9
B	83-86.9
B-	80-82.9
C+	77-79.9
C	73-76.9
C-	70-72.9
D+	67-69.9
D	63-66.9
E	62.9 and below

Posting of Grades:
All grades will be posted on CarmenCanvas; you will have 10 working days to challenge any grade or inquire regarding any unposted grade; after that time, grades are final.

Faculty feedback and response time
I am providing the following list to give you an idea of my intended availability throughout the course. (Remember that you can call 614-688-HELP at any time if you have a technical problem.)
• Grading: you can generally expect feedback within 7 calendar days.
• E-mail: I will reply to e-mails within 24 hours on school days.

Course Materials:
CarmenCanvas and **OSU email** are necessary to be an active participant in the course. You must activate your OSU email account to have access to CARMEN. IMPORTANT: Dr. Raczkowski will only send email to your official OSU email account, not yahoo, gmail, or other accounts. The CarmenCanvas URL is www.Carmen.osu.edu and Entomology 3330E should be listed under My Courses on your Carmen homepage. The username to logon is your OSU name.# and the password is the one you use with all OSU email and registration systems. If you have a problem logging in or using CarmenCanvas, contact 688-HELP or carmen@osu.edu. You should check your OSU email account regularly.

Baseline Technical Skills for Course
• Basic computer and web-browsing skills
• Navigating Carmen

Required Equipment
• Computer: current Mac (OS X) or PC (Windows 7+) with high-speed internet connection

Required Software
• Microsoft Office 365: All Ohio State students are now eligible for free Microsoft Office 365 ProPlus through Microsoft's Student Advantage program. Full instructions for downloading and installation can be found https://ocio.osu.edu/kb04733.

Course technology
• For Carmen Support, see: https://resourcecenter.odee.osu.edu/carmencanvas
• For help with your password, university e-mail, CarmenCanvas, or any other technology issues, questions, or requests, contact the OSU IT Service Desk. Standard support hours are available at https://ocio.osu.edu/help/hours, and support for urgent issues is available 24x7.
• Self-Service and Chat support: http://ocio.osu.edu/selfservice
• Phone: 614-688-HELP (4357)
• Email: 8help@osu.edu
• TDD: 614-688-8743

Accessibility of course technology
This course requires use of CarmenCanvas (Ohio State's learning management system) and other online communication and multimedia tools. If you need additional services to use these technologies, please request accommodations with your instructor.

Ohio State's Academic Integrity Policy
Academic integrity is essential to maintaining an environment that fosters excellence in teaching, research, and other educational and scholarly activities. Thus, The Ohio State University and the Committee on Academic Misconduct (COAM) expect that all students have read and understand the University's Code of Student Conduct, and that all students will complete all academic and scholarly assignments with fairness and honesty. Students must recognize that failure to follow the rules and guidelines established in the University's Code of Student Conduct and this syllabus may constitute "Academic Misconduct."

The Ohio State University's Code of Student Conduct (Section 3335-23-04) defines academic misconduct as: "Any activity that tends to compromise the academic integrity of the University, or subvert the educational process." Examples of academic misconduct include (but are not limited to) plagiarism, collusion (unauthorized collaboration), copying the work of another student, and possession of unauthorized materials during an examination. Ignorance of the University's Code of Student Conduct is never considered an "excuse" for academic misconduct, so I recommend that you review the Code of Student Conduct and, specifically, the sections dealing with academic misconduct.

If I suspect that a student has committed academic misconduct in this course, I am obligated by University Rules to report my suspicions to the Committee on Academic Misconduct. If COAM determines that you have violated the University's Code of Student Conduct (i.e., committed academic misconduct), the sanctions for the misconduct could include a failing grade in this course and suspension or dismissal from the University.

If you have any questions about the above policy or what constitutes academic misconduct in this course, please contact Dr. Raczkowski.

Other sources of information on academic misconduct (integrity) to which you can refer include:
• The Committee on Academic Misconduct web pages (COAM Home)
• Ten Suggestions for Preserving Academic Integrity (Ten Suggestions)
• Eight Cardinal Rules of Academic Integrity (www.northwestern.edu/uacc/8cards.htm)

Diversity
The Ohio State University affirms the importance and value of diversity in the student body. Our programs and curricula reflect our multicultural society and global economy

and seek to provide opportunities for students to learn more about persons who are different from them. We are committed to maintaining a community that recognizes and values the inherent worth and dignity of every person; fosters sensitivity, understanding, and mutual respect among each member of our community; and encourages each individual to strive to reach his or her own potential. Discrimination against any individual based upon protected status, which is defined as age, color, disability, gender identity or expression, national origin, race, religion, sex, sexual orientation, or veteran status, is prohibited.

Copyright disclaimer

The materials used in connection with this course may be subject to copyright protection and are only for the use of students officially enrolled in the course for the educational purposes associated with the course. Copyright law must be considered before copying, retaining, or disseminating materials outside of the course.

Statement on title IX

Title IX makes it clear that violence and harassment based on sex and gender are Civil Rights offenses subject to the same kinds of accountability and the same kinds of support applied to offenses against other protected categories (e.g., race). If you or someone you know has been sexually harassed or assaulted, you may find the appropriate resources at http://titleix.osu.edu or by contacting the Ohio State Title IX Coordinator, Kellie Brennan, at titleix@osu.edu

Your mental health

A recent American College Health Survey found stress, sleep problems, anxiety, depression, interpersonal concerns, death of a significant other and alcohol use among the top ten health impediments to academic performance. Students experiencing personal problems or situational crises during the quarter are encouraged to contact the College of Pharmacy Office of Student Services in room 150 Parks Hall (614-292-5001) OR OSU Counseling and Consultation Services (614-292-5766) for assistance, support and advocacy. This service is free and confidential.

Disability Accommodations

The University strives to make all learning experiences as accessible as possible. If you anticipate or experience academic barriers based on your disability (including mental health, chronic or temporary medical conditions), please let Dr. Raczkowski know immediately so that we can privately discuss options. To establish reasonable accommodations, I may request that you register with Student Life Disability Services. After registration, make arrangements with me as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion. SLDS contact information: slds@osu.edu; 614-292-3307; slds.osu.edu; 098 Baker Hall, 113 W. 12th Avenue.

Course Schedule

Week 1
Lecture: Biology of Insects/Arthropods
Lecture: Biology of Insects/Arthropods
Lecture: Ant, Bee, Wasp, and Termite Societies

Week 2
Lecture: Ant, Bee, Wasp, and Termite Societies
Lecture: Ant, Bee, Wasp, and Termite Societies
Lecture: Ant, Bee, Wasp, and Termite Societies, **Quiz 1**

Week 3
Lecture: Ant, Bee, Wasp, and Termite Societies
Lecture: Ant, Bee, Wasp, and Termite Societies
Lecture: Ant, Bee, Wasp, and Termite Societies, **Quiz 2**

Week 4
Lecture: Evolution of Sociality
Lecture: Evolution of Sociality
Lecture: Perception, Learning, and Orientation

Week 5
Lecture: Perception, Learning, and Orientation
Lecture: Pollinators
Lecture: **Exam 1**

Week 6
Lecture: Organization of Labor
Lecture: Organization of Labor
Lecture: Organization of Labor

Week 7
Lecture: Organization of Labor
Lecture: Organization of Labor
Lecture: Caste Determination**, Quiz 3**

Week 8
Lecture: Caste Determination
Lecture: Caste Determination
Lecture: Caste Determination, **Essay 1 due**

Week 9
Lecture: Communication
Lecture: Communication
Lecture: Communication, **Quiz 4**

Week 10
Lecture: Communication
Lecture: Honey Bee Dance Language
Lecture: Sex Ratio

Week 11
Lecture: Social Parasitism
Lecture: Social Parasitism
Lecture: **Exam 2**

Week 12
Lecture: Symbioses
Lecture: Symbioses
Lecture: Symbioses, **Essay 2 due**

Week 13
Lecture: Social Insect Defense
Lecture: Social Insect Defense
Lecture: Social Insect Defense, **Quiz 5**

Week 14
Lecture: Social Insect Pathogens
Lecture: Other Insect Societies
Lecture: Other Insect Societies

Final Exam (TBD)

ENTMLGY 4440H: Honors Social Insects

Spring 2019

Lecturer: Dr. Joseph M. Raczkowski
Office: 257 B Howlett Hall
Phone: 614-688-1054
Email: raczkowski.2@osu.edu
Office hours by appointment

Lecture:
Kottman Hall 116
M, W, and F
1:50 PM – 2:45 PM

Course Materials:
CARMEN and **OSU** email are necessary to be an active participant in the course. You must activate your OSU email account to have access to CARMEN.
IMPORTANT: Dr. Raczkowski will only send email to your official OSU email account, not yahoo, gmail, or other accounts. The Carmen URL is http://carmen.osu.edu and Entomology 4440H should be listed under My Courses on your Carmen homepage. The username to logon is your OSU name.# and the password is the one you use with all OSU email and registration systems. If you have a problem logging in or using Carmen, contact 688-HELP or carmen@osu.edu. You should check your OSU email account regularly.

Grading:
Grading will be based on both factual content and conceptual connections. Grades will be composed of scores from **five quizzes** (20 points each, total of 100 pts), **two exams** (75 points each), a **final exam** (200), and two **essay assignments** (25 points each) related to course material. From this grand total of 500 points, grades will be calculated as shown below. Quizzes and exams will be composed of a mix of multiple choice and short answer questions. Grades will be calculated on the basis of the above sum using the following formula guidelines:

Grade	%
A	93-100
A-	90-92
B+	87-89
B	83-86
B-	80-82
C+	77-79
C	73-76
C-	70-72
D+	67-69
D	63-66
E	62 and below

Posting of Grades:
All grades will be posted on Carmen; you will have 10 working days to challenge any grade or inquire regarding any unposted grade; after that time, grades are final.

Attendance:
Attendance at all lectures is required.

Absences:
Missed exams must be made up within a week of the date they were originally given. If you must miss an exam for a university-sanctioned event, you must supply appropriate documentation no less than one week before the event. If you are too ill to take an exam, please contact Dr. Raczkowski, within 24 hours of the class period in which the exam was taken.

Academic Misconduct:
OSU has a strict code of academic misconduct that requires us to report any and all cases of suspected misconduct (e.g. cheating on an exam, plagiarism in written assignments, using an exam proxy, etc.) to the OSU Committee on Academic Misconduct for adjudication. We will adhere to this policy. Students are also expected to adhere to the code, and neither commit misconduct nor help others conceal it.

Accommodation of Special Needs:
Any students registered with the Office of Disability Services as needing accommodation should speak with Dr. Raczkowski regarding those needs. Please do this within the first two weeks of the quarter, and feel free to contact any of the course instructors either after class or during office hours. Please see the TA directly for authorization of ODS forms. Please fill out those parts of the proctor sheet forms that are to be completed by the student before bringing the form for signature. This will help us ensure that your individual needs will be met appropriately and fairly.

Sexual Harassment
OSU considers sexual harassment to be unacceptable behavior that destroys opportunities for learning. Please report any concerns about questionable or unwanted behavior to Dr. Raczkowski.

Goals and Objectives for the GEC Natural Science Category:
Courses in natural sciences foster an understanding of the principles, theories and methods of modern science, the relationship between science and technology, and the effects of science and technology on the environment.
Learning Objectives:
1. Students understand the basic facts, principles, theories and methods of modern science.
2. Students learn key events in the history of science.
3. Students provide examples of the inter-dependence of scientific and technological developments.
4. Students discuss social and philosophical implications of scientific discoveries and understand the potential of science and technology to address problems of the contemporary world.

Schedule

January 7	Lecture
January 9	Lecture
January 11	Lecture
January 14	Lecture
January 16	Lecture
January 18	Lecture, **Quiz 1**
January 21	**No Classes**
January 23	Lecture
January 25	Lecture
January 28	Lecture
January 30	Lecture
February 1	Lecture, **Quiz 2**
February 4	Lecture
February 6	Lecture
February 8	Lecture
February 11	Lecture
February 13	Lecture
February 15	**Exam 1**
February 18	Lecture
February 20	Lecture
February 22	Lecture
February 25	Lecture
February 27	Lecture
March 1	Lecture, **Quiz 3**
March 4	Lecture
March 6	Lecture
March 8	Lecture, **Essay 1 due**
March 11	**Spring Break**
March 13	**Spring Break**
March 15	**Spring Break**
March 18	Lecture
March 20	Lecture
March 22	Lecture, **Quiz 4**
March 25	Lecture
March 27	Lecture
March 29	Lecture

April 1	Lecture
April 3	Lecture
April 5	Lecture, **Exam 2**
April 8	Lecture
April 10	Lecture
April 12	Lecture, **Essay 2 due**
April 15	Lecture
April 17	Lecture
April 19	Lecture, **Quiz 5**
April 22	Lecture (Optional)
April 30	**Final Exam (4:00 – 5:45 PM)**

Lecture Topics

Biology of Insects/Arthropods
Ant, Bee, Wasp, and Termite Societies
Evolution of Sociality
Perception, Learning, and Orientation
Organization of Labor
Caste Determination
Communication
Sex Ratio
Social Parasitism
Symbioses
Social Insect Pathogens
Social Insect Defense
Other Insect Societies
Honey Bee Dance Language

General Education Rationale and Assessment

Entomology 3330E

Social Insects

How do Learning Objectives address the GE category Expected Learning Outcomes:

Learning Outcome 1: Students understand the basic facts, principles, theories and methods of modern science.

Course-specific Learning Objectives for Learning Outcome 1:

Students will:

Understand the biological facts behind the key components of insect anatomy/physiology/sociality that are key to the ecological dominance of social insects.

Develop testable, falsifiable hypotheses to explain sex ratio, organization of labor, and communication in social insects.

Many lectures include the evolution of sociality in insects and other organisms. For example the first two lectures of the course define sociality and the current understanding of how some species of insects evolved to be social. Also included in these lectures are descriptions of the insects "social gut" (the crop), which allows these insects to ingest food and the regurgitate the food to nestmates.

Learning Outcome 2: Students understand key events in the development of science and recognize that science is an evolving body of knowledge.

Course-specific Learning Objectives for Learning Outcome 2:

Students will:

Explore the history of social insect research and describe the progress from relatively simple discoveries to the most current research and the impacts of this research on our understanding of insect and other societies.

Most lectures include historical perspective of the current research in topics such as kin recognition/kin selection. For example, the first demonstration of individual recognition in invertebrates was with male sweat bees. This discovery lead to further research into the mechanisms of recognition in bees and the advancement of kin selection theory.

Learning Outcome 3: Students describe the inter-dependence of scientific and technological developments

Course-specific Learning Objectives for Learning Outcome 3:

Students will:

Examine the development of technology to understand the chemical communication, development, and modes of defense in social insects.

Most social insect communication is chemical so many lectures include aspects of chemical ecology, which relies heavily on technology to identify individual compounds used to convey information to nest mates.

Learning Outcome 4: Students recognize social and philosophical implications of scientific discoveries and understand the potential of science and technology to address problems of the world.

Course-specific Learning Objectives for Learning Outcome 4:

Students will:

Understand how discoveries in social insect biology have led to advances in our understanding of the evolution of sociality, communication, organization of labor, sex ratio, kin recognition, and defensive strategies.

Throughout the course, lectures will cover the evolution of sociality, communication, organization of labor, sex ratio, kin recognition, and defensive strategies. For example, some ant species are studied for their swarm raids that involve possibly a million individuals and seem highly coordinated. Initially, some hypothesized that an individual or small group of individuals controlled the entire swarm raid, but, upon further investigation we now realize each individual makes a series of simple decisions.

Assessment

GE Learning Objective	Direct Methods	Indirect Methods
1. Students understand the basic facts, principles, theories and methods of modern science.	Embedded questions on exams Analysis of essay assignments	SALG[1] Analysis of Student Discussion
2. Students understand key events in the development of science and recognize that science is an evolving body of knowledge.	Embedded questions on exams Analysis of essay assignments	SALG Analysis of Student Discussion
3. Students describe the inter-dependence of scientific and technological developments.	Embedded questions on exams Analysis of essay assignments	SALG Analysis of Student Discussion
4. Students recognize social and philosophical implications of scientific discoveries and understand the potential of science and technology to address problems of the contemporary world.	Embedded questions on exams Analysis of essay assignments	SALG Analysis of Student Discussion

[1]The Student Assessment of Learning Gains (SALG http://www.wcer.wisc.edu/salgains/ftp/SALGPaperPresentationAtACS.pdf.) uses a Likert scale for assessing student perception of courses. In addition, SALG asks students to self-assess whether they have met the GE learning objectives for this course. The SALG will be used as noted above in conjunction with other indirect methods of assessing progress towards securing the GE Learning Outcomes.

Examples of exam questions for learning outcomes:

LO 1:

Describe kin selection theory, and provide two current criticisms of this theory. Answer must define the variable in Hamilton's inequality (Br>c).

LO 2:

In Greenberg's study of kin recognition in sweat bees, the _____ the coefficient of relationship, the _____ the chance the guard bee allows a bee to pass.
A. lower, greater
B. higher, lower
C. higher, higher
D. none of the above

LO 3:

What is Gas chromatography and how is it used to study social insect communication?

LO 4:

Describe the five simple rules that army ants use during their swarm raids.