**Instructor:**  Dr. Steven Juliano

**Office:**Felmley Annex (FSA) 335.  **E-mail:** sajulian@ilstu.edu  **phone:**309 438-2642

**Office Hours:** Mon. 2:00-3:00 PM, Thur. 11:00 AM-12:00 noon, & by appointment

**Web page:**<https://about.illinoisstate.edu/sajulian/>

**Teaching Assistant:** Kate Evans

**Office:**Felmley Annex (FSA) 342   **E-mail:** kgevans@ilstu.edu  **phone:**309 438-5278

**Syllabus, Lectures, Other Course materials:**Posted on ReggieNet

**Lecture:    Online & Synchronous -** MWF 9:00 – 9:50AM via Zoom

**Laboratory:   Hybrid -** T 9:00-11:50AM, SLB 421 & Zoom

**Required Textbook:** *The Insects: An outline of Entomology,* 5th ed.

(PJ Gullan & PS Cranston), Wiley-Blackwell

**Examination Schedule** (Dates may be adjusted):

In class examinations: **Online - 21 September; 23 October**

Final examination: **Online - Week of 7 December,** As scheduled by the university

**Course goals:** Entomology is a major's course designed to introduce students to the biology of the Class Insecta and related taxa. This potentially includes all aspects of insect science, but the emphasis of this course will be on the evolution, classification, ecology, structure, and function of this group. This course is designed for people seeking a career in biology and biology education.  After successfully completing this course, you should have a thorough understanding of the biology and evolution of insects, their diversity, their role in natural ecosystems, the basics of their physiology, development, and behavior, and the many important ways they affect human life.

**Grades:**

***Lecture - 60%.***There will be **2** in-class exams during the semester (see above for dates).  These exams will be essay and short answer and will be open book/open note. There will also be a **cumulative final** given during final examination week, (Week of 7 December; Schedule to be determined by the university).  The 2 in-class exams together are worth 40% of your lecture grade and the final is worth 60% of your lecture grade.

***Laboratory - 40%.*** The laboratory grade will be based on your **insect collection** (see Laboratory Schedule, below), **2 laboratory practical exams,** and an **Independent project**.  See below for how much each component is worth.

**Overall grading system:** Lecture and laboratory grades will be combined and you will be graded based on the following scale:  **90-100% -- A; 80-89% -- B; 70-79% -- C; 60-69% -- D; <60% -- F**

**Grading of essay exams:  Essays on exams will rated on a 100% scale as follows:**

|  |  |
| --- | --- |
| 90-100% | Excellent.  All necessary information; well organized; good examples; no irrelevant material. |
| 80-89% | Good.  All major points made; no major errors; good examples. |
| 70-79% | Mostly adequate, but some major point missing or wrong, or with inappropriate examples. |
| 60-69% | Inadequate.  Major errors or omissions; evidence of serious misunderstanding of the material. |
|   <60% | Complete lack of understanding, or did not answer the question that was asked.   |

Questions about scores on examinations must be presented within one week after the exams are returned.

**Lecture Outline**

*The instructor reserves the right to change the lecture schedule any time it seems like a good idea.*

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Topics** | **Lectures** | **Reading** |
| Week 1 | Introduction; Insect Biodiversity; Collecting and preserving insects  | 1 | Chs. 1, 18 |
|  | Insect external anatomy | 2 | Ch. 2 |
| Week 2 | Insect internal anatomy & physiology | 3 | Ch. 3 |
| Week 3 | Development, life history | 3 | Ch. 6 |
| Week 4 | Reproduction and reproductive physiology | 3 | Ch. 5 |
| Week 5 | Sensory systems and behavior | 3 | Ch. 4 |

## ***Exam #1: ON LINE – Monday 21 September***

|  |  |  |  |
| --- | --- | --- | --- |
| Week 6 | Systematics and Classification | 2 | Ch. 7 |
| Week 7 | Evolution  | 3 | Ch. 8 |
| Week 8 | Insects and plants | 3 | Ch. 11 |
| Week 9 | Predators and parasitoids | 3 | Ch. 13 |
| Week 10 | Ground dwelling insects | 2 | Ch. 9 |

***Exam #2: ON LINE - Friday 23 October***

|  |  |  |  |
| --- | --- | --- | --- |
| Week 11 | Aquatic insects | 3 | Ch. 10 |
| Week 12 | Social Insects | 3 | Ch. 12 |
| Week 13 | Insect defenses | 3 | Ch. 14 |
| Week 14 | Medical, veterinary, forensic entomology | 3 | Ch. 15 |
|  | *Thanksgiving break* |  |  |
| Week 15 | Insect pests; Global change | 3 | Ch. 16, 17 |

*Final Exam: ON LINE - as scheduled by the university*



**Academic Dishonesty**

We, your instructors, have a professional and ethical obligation to prevent cheating and plagiarism during lecture examinations and in the preparation of laboratory reports. We take this obligation very seriously, and will maintain a zero-tolerance policy toward any academic dishonesty. If cheating occurs, the student will receive a zero on that examination or laboratory report, and the incident will be reported to the Director of the School of Biological Sciences and to the Student Dispute Resolution Services (SDRS). Your laboratory and lecture instructors assume that you understand your obligations concerning academic honesty and the consequences of not meeting those obligations. Indeed, we shouldn’t even have to say these things … honest effort should be the minimum expectation of university students. Because it is vital that you understand those responsibilities and the University’s policies on academic honesty, we urge you to read the Academic Dishonesty portion of the Student Code of Conduct: <http://deanofstudents.illinoisstate.edu/conflict/conduct/code/>

- Read, in particular, pages 6, 31-32, and 36-37

**Laboratory Schedule**

*Instructor and TA reserve the right to change the lab schedule whenever it seems like a good idea.*

|  |  |  |  |
| --- | --- | --- | --- |
|  | GROUP#1 | **GROUP#2** | **Due**  |
| Week 1 (18 Aug.) | Introduction, Insect collection, Arthropod systematics | Class collecting trip #1 [Quad] |  |
| Week 2 (25 Aug.) | Class collecting trip #1 [Quad] | Introduction, Insect collection, Arthropod systematics |  |
| Week 3 (1 Sept.) | External & Internal anatomy | Class collecting trip #2 [Site TBA] |  |
| Week 4 (8 Sept.) | Class collecting trip #2 [Site TBA] | External & Internal anatomy | Project proposal **Friday** |
| Week 5(15 Sept.) | Entognatha, Archaeognatha, Zygentoma, & Paleoptera | Class collecting trip #3 [Site TBA] |  |
| Week 6(22 Sept.) | Class collecting trip #3 [Site TBA] | Entognatha, Archaeognatha, Zygentoma, & Paleoptera |  |
| Week 7 (29 Sept.) | Polyneoptera & Paraneoptera | **On your own:**  Collect, Pin, ID, Research |  |
| Week 8(6 Oct.) | **Online Lab practical #1** | Polyneoptera & Paraneoptera |  |
| Week 9 (13 Oct.) | Neuropteroidea, Diptera, Mecoptera, & Siphonaptera | **Online Lab practical #1** | 1st draft: collection **Friday** |
| Week 10 (20 Oct.) | **On your own:**  Collect, Pin, ID, Research | Neuropteroidea, Diptera, Mecoptera, & Siphonaptera |  |
| Week 11 (27 Oct.) | Lepidoptera, Trichoptera, Hymenoptera | **On your own:**  Collect, Pin, ID, Research |  |
| Week 12(3 Nov.) | ***Election day – State holiday******No meeting*** | ***Election day – State holiday******No meeting*** |  |
| Week 13 (10 Nov.) | **On your own:**  Collect, Pin, ID, Research | Lepidoptera, Trichoptera, Hymenoptera |  |
| Week 14(17 Nov.) | **Online project presentations** | **Online project presentations** | PowerPt., Video, Paper **Tuesday** |
| (24 Nov.) | ***Thanksgiving break – no meeting*** | ***Thanksgiving break – no meeting*** |  |
| Week 15 (1 Dec.) | **Online Lab practical #2** | **Online Lab practical #2** | Final collection **Friday** |

Field laboratory. **Be on time.**

**Attendance & participation in the labs, both in-lab and field, are required**.

**In-lab laboratories meet in SLB 421.** **Online Lab practicals** will consist of images that you will examine, and about which you will answer questions (e.g., identify the specimen, identify the part indicated, identify the life cycle stage, describe something about its natural history or ecology or development).

**Field labs meet in front of SLB.**  Dress appropriately – long pants, sturdy shoes, and clothes suitable for rooting around in vegetation. Waterproof clothes or warm clothes should be worn when the weather dictates. Central Illinois weather is very rarely bad enough to cause cancellation of a field laboratory, so show up for the laboratory regardless of the weather.

The lab includes **a Collection** (explained below) and an **Independent project** (explained in a separate handout)that can take on several alternative forms, including a PowerPoint presentation, a video, or a data-based paper on entomological research you do during this semester. The subject is your choice, with approval by the instructor and TA, done with hexapods. This should **not be a term paper** or other literature-based project, but rather something done with hexapods in the flesh.

**Entomology in the time of COVID-19**

The COVID-19 pandemic has required substantial changes to how Entomology will operate this semester. Most obviously, **lectures will be totally online through Zoom** and **lecture exams will be online through ReggieNet**. Lectures will be taught **synchronously**; that is, I will present the lecture over Zoom at the scheduled time. You should attend those Zoom sessions, hear the lecture, take notes that suit your needs, ask questions, and participate in discussion. Zoom lectures will be recorded to help you to study for the course, but there is no substitute for being there in person. For a class this small, I expect there will be informative, important discussion about the topics we cover.

**Labs** will be a mix of live instruction and online sessions, with the class split into two groups that will work in different locations on alternating weeks (see lab schedule). Splitting the class in two this way is a concession to **physical distancing** necessitated by COVID-19. That is why in lab you will have **assigned seats**, and why in the field you pay attention to **distance to others**. We value your (and our) health and safety, so we will pay close attention to distance. Also, for everyone’s health, **properly worn masks will be mandatory for both the lab and the field, and we will enforce that.** You are entitled to your opinion about whether masks are good, bad, or indifferent, but without a mask, you won’t be in this lab. A very detailed set of safety rules for live labs in biology will be given to you as a separate handout.

Live sessions will have **half the class in lab,** hearing lab-oriented lectures, examining specimens, and learning the designated content for each lab (see lab schedule). Those sessions are designed to teach you about insect identification, natural history, ecology, morphology, and behavior, and will be vital for you as preparation for the collection, the online lab practicals, and the project. You should take those sessions seriously, because what you learn will have a big effect on how you do in the course (and of course the knowledge you gain for your future as biologists). The other **half the class will be in the field** collecting insects in the first part of the semester and free to work independently on collections and projects later in the semester. In alternate weeks the two groups will switch locations (see lab schedule). The field portion of labs is important for you for two reasons. The minor one is it is planned time for you to collect insects for your collection. The more important reason is field labs are a chance for you to learn about insects, including how and where to find them, how to catch and handle them, how they behave, and their ecology. You can learn these things by watching and noting things about their behavior and environment. They are much more interesting alive and in their natural environment than they are on the end of a pin. As biologists you should be eager to learn about these important and fascinating animals in their environment. That knowledge is likely the most important thing you will keep after this course is over.

Another consequence of the COVID-19 pandemic is that what we do in lab could change at any time, and those changes are likely to be largely out of our control. So, we all will need to be adaptable.

**GRADE**

**Overall grade (based on 1250 pts)**

 **Laboratory Lecture**

Two lab practicals 200 pts Two in-class exams 300 pts

Collection 200 pts Cumulative Final 450 pts

Project 100 pts **Total (60%) 750 pts**

**Total (40%) 500 pts**

**Insect Collection**

You will turn in a collection of properly preserved (pinned, pointed, in ethanol, etc. as appropriate), properly labeled **hexapods** as part of the lab. Traditional entomology collections require a certain number of taxa. For this class we are going to emphasize ecology, natural history, and behavior of insects, hence your collection will require not a certain number of taxa, but representatives of the major ecological roles of insects.

Your collection will be graded the following requirements (**200 pts total)**:

|  |  |
| --- | --- |
| **Requirement** | **Maximum points** |
| 1. **60 numbered** specimens, properly preserved and labeled; identified to family (1/2 pt each). **Up to 15 specimens must be turned in as digital photographs, and 15 specimens must be turned in as correctly preserved insects. The remaining 30 are your choice.** | **30 pts** |
| 2. Up to 20 specimens identified to genus (1 pt each) | **20 pts** |
| 3. Up to 10 specimens identified to species (2 pts each) | **20 pts** |
| 4. An annotated list of specimen numbers with information about the biology of the specimen. In addition to identifying the required habitats, trophic groups, and natural history groups (see item 5) for each specimen, this list could include additional information on any aspect of the biology of the specimen (e.g., host plant identity for herbivores, prey consumed for predators, hosts for parasitoids or parasites, origin & history of non-native species, pest status, etc.). This list will be graded based on thoroughness, accuracy, and clarity  | **30 pts** |
| 5. 2 specimens from each of the ecological groups listed in the table below (2 pts each) | **80 pts** |
| 6. One-page summary of a research publication from the primary literature (i.e., scientific journals) about one or more of the specimens in your collection. This should particularly address the scientific issues, hypotheses, and data concerning the taxa in question. The choice of specimens and research area is up to you, but you may consult with us about how to choose specimens and research topics. | **20 pts** |

|  |  |  |
| --- | --- | --- |
| **Habitats** | **Trophic groups** | **Natural history groups** |
| Forest | Herbivores | Cryptic coloration |
| Grassland/Prairie | Predators | Aposematic coloration |
| Agricultural | Parasitoids | Chemical defense |
| Aquatic | Parasites | Mimic |
| Domestic | Detritus/Carrion/Microbial | Non-native to North America |
| Subterranean/Soil | Pollen/Nectar | Social |
|  |  | Pest |
|  |  | Disease vector |
| **24 pts**  | **24 pts** | **32 pts** |

Within each column you are required to have **2** specimens in each group, which are worth **4 pts** per group (yielding the total points in each column). The same specimen can fulfill requirements in >1 column (but not **within** a column; e.g., a honeybee collected in an alfalfa field can fulfill the requirements of Non-native to N. America, Pollen/Nectar feeding, and Agricultural habitat, but cannot fulfill the requirements of Non-native to N. America and Social). These requirements will obviously demand that you look up and learn quite a bit about the biology of the insects you collected. **That is exactly the point.**

**Several kinds of specimens are not allowed: 1**. No non-hexapods; **2**. No commercially purchased specimens of any kind. **3.** For photo specimens, nothing you get off the internet.

**If in doubt about using a specimen, ask us.**