

## NRES 499 – Freshwater Invertebrates (3 hrs, Fall 2024)

**Lecture:** Tuesday, 4:00 to 4:50 pm, Turner W115

**Identification:** Thursday, 3:00 to 4:50 pm, Turner W9 (basement)

**Field Trips:** Saturday, September 7<sup>th</sup> – 8 am to noon

Saturday, September 21<sup>st</sup> – 8 am to noon

**Instructor:** Dr. Eric R. Larson, erlanson@illinois.edu

**Teaching Assistant:** Olivia Reves, reves@illinois.edu

**Course Overview:** Invertebrates are important members of freshwater ecosystems, affecting both lower trophic levels by their own foraging and higher trophic levels as prey. Further, freshwater invertebrates include taxa with both high extinction risk and costly impacts as invasive species globally.

Many careers in natural resources and environmental sciences benefit from knowledge of the ecology and taxonomy of freshwater invertebrates. Both fisheries and wildlife biologists often need to identify freshwater invertebrates as prey for vertebrates. For example, the majority of freshwater insects mature to terrestrial adults that are consumed by riparian birds and bats. Conservation biologists work on the recovery of Endangered Species Act-listed freshwater invertebrates in the United States, such as unionid mussels. Managers in water quality routinely use freshwater invertebrates as bioindicators for compliance with state and federal environmental laws like the Clean Water Act. Freshwater invertebrate identification is a consistently employable skill in natural resources and environmental sciences, and is in-demand for undergraduate technicians on our campus through employers like the Illinois Natural History Survey.

NRES 499 – Freshwater Invertebrates will survey the diversity of freshwater invertebrates, including their life history and ecology, and introduce students to the identification of these organisms through a weekly lab and two field trips. Students will learn to identify common freshwater invertebrates of North America. Students will be evaluated by a short paper, a series of brief identification quizzes, the completion of a freshwater invertebrate collection they will keep at the end of the class, and a lab practical for a final exam. Through NRES 499, students will also be exposed to common sampling methods for freshwater invertebrates in both flowing (lotic) and standing (lentic) ecosystems, and interact with experts on our campus through field trips and tours of natural history collections.

**Learning Objectives:** Students will

1. Understand the diversity of freshwater invertebrates, including ecological and life history differences between major taxa
2. Apply common field sampling techniques for freshwater invertebrates in flowing (lotic) and standing (lentic) ecosystems
3. Identify common freshwater invertebrates of North America
4. Analyze primary scientific literature as related to ecology and life history of freshwater invertebrates
5. Create a personal reference collection of freshwater invertebrates for their future use

**Evaluation:** Performance in NRES 499 will be assessed by:

1. Ten short identification quizzes each worth 5 points. - **50**
2. A brief paper on the ecology and life history of a freshwater invertebrate of the student's choice. - **10**
3. Completion of an invertebrate collection, using specimens collected during the class field trips, which will be evaluated by the instructor for accuracy. This collection will require a minimum of 20 taxa. Students are anticipated to work on their collection during each week's lab following completion of the lab activity (i.e., identify your Plecoptera on Plecoptera week). - **20**
4. An identification practical for the final exam - **20**

**Text:** This course recommends *Thorp and Covich's Freshwater Invertebrates* (Fourth Edition), Volume I (*Ecology and General Biology*) and Volume II (*Keys to Nearctic Fauna*), available as an eBook at the University of Illinois Library and *Field Guide to Wisconsin Streams* (University of Wisconsin Press, \$24 new).

**Course Fee:** \$25 van fee. Students will need to purchase some of their own supplies (e.g., screw-cap glass vials for their invertebrate collection).

## Schedule:

<u>Week</u>	<u>Tues Lecture</u>	<u>Thurs ID</u>	<u>Field Trip</u>
1	<i>Aug 27</i> – Introduction to freshwater invertebrates	<i>Aug 29</i> – Introduction to lab equipment	
2	<i>Sept 3</i> – Meiofauna + <u>collection assigned</u>	<i>Sept 5</i> – Meiofauna (Ostracods, Nematodes, Water Mites, etc.)	<i>Sept 7</i> - Jordan Creek
3	<i>Sept 10</i> – Mollusks (Gastropods)	<i>Sept 12</i> – Gastropods + <u>paper assigned</u>	
4	<i>Sept 17</i> – Mollusks (Bivalves)	<i>Sept 19</i> – INHS Mollusk collection tour	<i>Sept 21</i> - River Bend
5	<i>Sept 24</i> – Zooplankton	<i>Sept 26</i> – Zooplankton + <u>2x quiz (Gastropods, Bivalves)</u>	
6	<i>Oct 1</i> – Crustacea	<i>Oct 3</i> – INHS Crustacean collection	
7	<i>Oct 8</i> – Ephemeroptera	<i>Oct 10</i> – Ephemeroptera + <u>quiz (Crustaceans)</u>	
8	<i>Oct 15</i> – Plecoptera	<i>Oct 17</i> – Plecoptera + <u>quiz (Ephemeroptera)</u>	
9	<i>Oct 22</i> – Trichoptera	<i>Oct 24</i> – Trichoptera + <u>quiz (Plecoptera)</u>	
10	<i>Oct 29</i> – Odonata + <u>paper due</u>	<i>Oct 31</i> - Odonata + <u>quiz (Trichoptera)</u>	
11	<i>Nov 5</i> – Coleoptera	<i>Nov 7</i> – Coleoptera + <u>quiz (Odonata)</u>	
12	<i>Nov 12</i> – Hemiptera	<i>Nov 14</i> – Hemiptera + <u>quiz (Coleoptera)</u>	
13	<i>Nov 19</i> – Diptera	<i>Nov 21</i> – Diptera + <u>quiz (Hemiptera)</u>	
14	←-----Fall Break-----→		
15	<i>Dec 3</i> – Other insects	<i>Dec 5</i> - Megaloptera, Neuroptera, Lepidoptera + <u>quiz (Diptera)</u>	
16	<i>Dec 10</i> - Bioassessment + <u>collection due</u>		
Final	<i>Dec 18</i> - <u>Identification practical</u> , 1:30 to 4:30 pm in Turner W-9		

### **Evaluation Scale:**

<b>A+</b>	97 - 100	<b>C</b>	73 - 76.9
<b>A</b>	93 - 96.9	<b>C-</b>	70 - 72.9
<b>A-</b>	90 - 92.9	<b>D+</b>	67 - 69.9
<b>B+</b>	87 - 89.9	<b>D</b>	63 - 66.9
<b>B</b>	83 - 86.9	<b>D-</b>	60 - 62.9
<b>B-</b>	80 - 82.9	<b>F</b>	< 59.9
<b>C+</b>	77 - 79.9		

Missed identification quizzes can only be made-up with an excused absence for illness or other unexpected event with instructor approval. When possible, notify the instructor of an anticipated absence before the lab.

Late papers or invertebrate collections will be penalized 5% of the maximum grade for every day late (after 11:59 pm of the due date).

**Academic Integrity Statement:** The University of Illinois at Urbana-Champaign Student Code should also be considered as a part of this syllabus. Students should pay particular attention to Article 1, Part 4: Academic Integrity. Read the Code at the following URL: <http://studentcode.illinois.edu/>. Academic dishonesty may result in a failing grade. Ignorance is not an excuse for any academic dishonesty. It is your responsibility to read this policy to avoid any misunderstanding. Do not hesitate to ask the instructor(s) if you are ever in doubt about what constitutes plagiarism, cheating, or any other breach of academic integrity.

**Students with Disabilities Statement:** To obtain disability-related academic adjustments and/or auxiliary aids, students with disabilities must contact the course instructor and the Disability Resources and Educational Services (DRES) as soon as possible. DRES provides students with academic accommodations, access, and support services. To contact DRES you may visit 1207 S. Oak St., Champaign, call 333-4603 (V/TDD), or e-mail a message to [disability@illinois.edu](mailto:disability@illinois.edu). Visit <https://www.disability.illinois.edu/> for more information.

**Family Educational Rights and Privacy Act (FERPA) Statement:** Any student who has suppressed their directory information pursuant to Family Educational Rights and Privacy Act (FERPA) should self-identify to the instructor to ensure protection of the privacy of their attendance in this course. See <https://registrar.illinois.edu/academic-records/ferpa/> for more information on FERPA.

**Sexual Misconduct Policy and Reporting:** The University of Illinois is committed to combating sexual misconduct. Faculty and staff members are required to report any instances of sexual misconduct to the University's Title IX and Disability Office. In turn, an individual with the Title IX and Disability Office will provide information about rights and options, including accommodations, support services, the campus disciplinary process, and law enforcement options. A list of the designated University employees who, as counselors, confidential advisors, and medical professionals, do not have this reporting responsibility and can maintain confidentiality, can be found at

<https://wecare.illinois.edu/resources/students/#confidential>

Other information about resources and reporting is available at

<https://wecare.illinois.edu/>.

**Inclusivity Statement:** The effectiveness of this course is dependent upon the creation of an encouraging and safe classroom environment. Exclusionary, offensive or harmful speech (such as racism, sexism, homophobia, transphobia, etc.) will not be tolerated and in some cases is subject to University harassment procedures. We are all responsible for creating a positive and safe environment that allows all students equal respect and comfort. I expect each of you to help establish and maintain an environment where you and your peers can contribute without fear of ridicule or intolerant or offensive language.

**Emergency Response Recommendations:** Emergency response recommendations can be found at the following website:

<http://police.illinois.edu/emergency-preparedness/>. I encourage you to review this website and the campus building floor plans website within the first 10 days of class. <http://police.illinois.edu/emergency-preparedness/building-emergency-action-plans/>.