Herpetology (BIO 484/584) – Syllabus

Instructor: Dr. Katherine (Katy) Greenwald (email: katherine.greenwald@emich.edu)

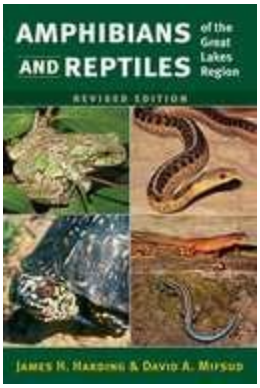
Course description: Taxonomy, distribution, life histories, behavior and ecology of amphibians and reptiles with an emphasis on local species.

Organizational details: The class meets **ALL DAY** (8 a.m. to 5 p.m. plus occasional evening field trips) Thursday, Friday and Saturday on the following dates:

Session 1: May 9-11 – EMU Fish Lake facility (Lapeer, MI)
Session 2: May 23-25 – OSU Stone Lab facility (Gibraltar Island, OH)
Session 3: June 6-8 – EMU Fish Lake facility (Lapeer, MI)

A van will be available for transportation from Ypsilanti for all sessions.

Course Goals: Students will get an in-depth experience in field herpetology and research, with heavy emphasis on the reptiles and amphibians found in the Great Lakes region. The class will cover the biology, life histories and taxonomy of Michigan's herpetological fauna. Students will be exposed to several different types of current data collection techniques including sampling methodology, mark-recapture and tissue sampling for molecular analysis. Additionally, students will have the opportunity to meet and work with experts in the field. Daily field trips are planned to both Michigan and Ohio field sites. Students should be prepared for an exciting and intense hands-on experience in field collection, monitoring and surveying techniques, field identification and taxonomy, and conservation strategies used in herpetology.



Please note! This is a FIELD COURSE. This means it is A LOT of fun, but that you will be outside almost all day. You **WILL** get dirty and wet, you **WILL** encounter insects and other invertebrates, and you **WILL** most likely get bit, slimed, musked, pooped, and/or barfed on. If this does not seem manageable, please reconsider your enrollment in this course!

Required Text: Amphibians and Reptiles of the Great Lakes Region, Revised Edition
James H. Harding & David A. Mifsud; University of Michigan Press (2017)

Also recommended: Peterson Field Guide; Powell, Conant & Collins (2016)
Herpetology, Pough et al.; Sinauer. (2015)

Other supplies: Field Notebook (I recommend Rite-in-the-rain); pencils and pens
Hiking boots, waterproof boots/shoes/sandals (like Keens) if you have them
Appropriate field clothes **(you will get dirty!)**
Sunscreen, insect repellent, hat, camera, water and snacks
See page 3 for more packing and attire tips!

Field Trips and Course Schedule

Note: Activities are weather-dependent and subject to change.

Date	Time	Topic	Readings	Field activity
9-May	a.m.	Evolution and Diversity (V&C 1, 3)	Harding 1997 (pp 1-35)[1]; Brodie 2011	Forest walk (terrestrial survey/set traps in wetlands)
	p.m.	Field techniques	Heyer 1994 (Intro, sections 2, 4, 7, 10; other pp of interest)	Bog; green frog & hylid ponds (set traps)
10-May	a.m.	Ecology & Behavior (V&C 8-13)	Werner et al. 2007	Check minnow traps; tadpole/larva ID
	p.m.		Jaeger et al. 1993; Burghardt & Greene 1988	Port Crescent State Park
11-May	a.m.	Reproduction and Sexual Selection (V&C 4, 5)	Shine 1999; Welch et al. 1998	Project time
	p.m.	Conservation (V&C 14)	Collins 2010; Gibbons et al. 2000	
23-May	a.m.	Turtle Conservation *Guest:* Matt Cross	Lovich et al. 2018; Hasler et al. 2015	Oak Openings MetroPark
	p.m.			Cedar Point NWR; Travel to Stone Lab
24-May	a.m.	Unisexual *Ambystoma*	Bogart et al. 2007; Teltser & Greenwald 2015	Kelleys Island
	p.m.			
25-May	a.m.	Lake Erie Watersnakes *Guest:* Kristin Stanford	King et al. 1997; King & Stanford book chapter	Bass Islands
	p.m.			
6-June	a.m.	Massasauga Rattlesnakes *Guest:* Steven Parrish	Moore & Gillingham 2006	Matthaei Botanical Gardens
	p.m.	Museum Herp Research *Guest:* Greg Schneider		UMMZ Herpetology Collection
7-June	a.m.	Zoo Education/Conservation *Guest:* Ruth Marcec	Wiese & Hutchins 1994	Detroit Zoo
	p.m.	Rare Michigan Herp Species *Guest:* Teresa Yoder-Nowak	Carlson & Szuch 2007	Murphy Lake State Game Area
8-June	a.m.	Review session?		Project time
	p.m.	Presentations Final exam		

[1]See page 5 for complete list of reading citations. Primary literature is posted at canvas.emich.edu

Notes on Food and Attire

Unless otherwise noted, wear/bring every day:

- Long pants (thorns! bugs!) and temperature-appropriate layers
- Hiking boots or Keens/Tevas-type hiking sandals
- Pack a poncho/raincoat for every trip just in case
- Sunscreen, insect repellent, hat, camera, field notebook

Pack SNACKS and WATER every day!

More specifics on MEALS:

Date	Location	Breakfast	Lunch	Dinner
9-May	Fish Lake	Home	FL Lunch* or pack	Pack or restaurant
10-May	Fish Lake	Pack/bring	FL Lunch or pack	Pack or restaurant
11-May	Fish Lake	Pack/bring	FL Lunch or pack	Home
23-May	Northern Ohio sites	Home	Pack or buy	Provided (prepaid)
24-May	Stone Lab	Provided (prepaid)	Provided (prepaid)	Provided (prepaid)
25-May	Stone Lab	Provided (prepaid)	Provided (prepaid)	Home
6-Jun	Ann Arbor sites	Home	Pack for day trip	Home
7-Jun	Detroit Zoo/Murphy Lake	Home	FL Lunch or pack	Pack or restaurant
8-Jun	Fish Lake	Pack/bring	FL Lunch or pack	Home

**Fish Lake lunch; may be purchased for $8/day (charged to your student account on first day of class)*

More specifics on ATTIRE:

Date	Location	Attire notes
9-May	Fish Lake	See "Wear every day" notes above
10-May	Fish Lake	See "Wear every day" notes above
11-May	Fish Lake	See "Wear every day" notes above
23-May	Northern Ohio sites	See "Wear every day" notes above
24-May	Stone Lab	See "Wear every day" notes above
25-May	Stone Lab	Be ready to get wet if it's warm out (bathing suit/shorts/Keens/etc)
6-Jun	Ann Arbor sites	a.m. NO OPEN-TOED SHOES / p.m. Indoor activity
7-Jun	Detroit Zoo/Murphy Lake	See "Wear every day" notes above
8-Jun	Fish Lake	See "Wear every day" notes above

Grading Procedures

Grades will be based on the following scheme (**total=200 points**).

Dichotomous key (30 points): You will make a **dichotomous key** for all reptile and amphibian fauna of Michigan (see example on page 6 of this syllabus). The key is due by the **beginning** of the second session. A species list can be found at http://www.michigan.gov/dnr/

Research presentation (30 points): You will conduct a **group** research project at Fish Lake, concluding with a 15 minute oral presentation on the last day of class. Please be sure to provide background/rationale; description of methods, results and conclusions; and recommendations for future research and/or improvement of the study. All group members must participate!

Natural history report (40 points): Teach me something cool about a local (Great Lakes) herp species! Your paper will summarize research on several topics (e.g., distribution, habitat, behavior). See the posted rubric for details. Minimum 2000 words; must cite at least 12 primary research papers. Due to me (via email) by the end of the day **June 14**.

Percentage	Grade
93-100%	**A**
90-92%	**A–**
87-89%	**B+**
83-86%	**B**
80-82%	**B–**
77-79%	**C+**
73-76%	**C**
70-72%	**C–**
67-69%	**D+**
63-66%	**D**
60-62%	**D–**
<60%	**F**

Final exam (40 points): Questions will come directly from the lectures and field presentations. Identifications of live animals or images/audio recordings may include any species seen during the course. **Common and scientific names are fair game for all Michigan species!**

Participation (20 points per session; 60 points total): This course is designed to provide you with a terrific opportunity to learn field techniques and participate in field research projects. It is the students' responsibility to take advantage of this opportunity by listening, participating, and asking intelligent questions during these trips, not just at the end of the class prior to the final exam. **NOT JUST ATTENDANCE BUT GOOD PARTICIPATION IS MANDATORY TO PASS THIS CLASS.**

GRADUATE STUDENTS ONLY: Fish Lake Species Map and **HerpMapper Entries** will be required as part of your field participation grade. More information on these assignments will be provided on the first day of class.

Reading List

All papers available on the class website at canvas.emich.edu

• Bogart, JP, K Bi, J Fu, DWA Noble and J Niedzwiecki. 2007. Unisexual salamanders (genus *Ambystoma*) present a new reproductive mode for eukaryotes. Genome 50: 119-136.

• Brodie, ED, III. 2011. Patterns, process, and the parable of the coffeepot incident: Arms races between newts and snakes from landscapes to molecules, pp. 93-119 *In* JB Losos (ed.), In the Light of Evolution. Roberts and Company Publishers, Greenwood Village, CO.

• Burghardt, GM and HW Greene. 1988. Predator simulation and duration of death feigning in neonate hognose snakes. Animal Behaviour 36: 1842-1844.

• Carlson, T and E Szuch. 2007. New (un-weathered) artificial cover objects effectively sample terrestrial salamanders in Michigan. Herpetological Review 38: 412-415.

• Collins, JP. 2010. Amphibian decline and extinction: What we know and what we need to learn. Diseases of Aquatic Organisms 92: 93-99.

• Gibbons, JW, DE Scott, TJ Ryan, et al. 2000. The global decline of reptiles, déjà vu amphibians. BioScience 50: 653-666.

• Harding, JH. 1997. Amphibians and Reptiles of the Great Lakes Region. University of Michigan Press, Ann Arbor, MI.

• Hasler, CT, K Robinson, N Stow, and SR Taylor. 2015. Population size and spatial ecology of Blanding's Turtle (*Emydoidea blandingii*) in South March Highlands, Ottawa, Ontario, Canada. Canadian Journal of Zoology 93: 509-514.

• Heyer, WR, editor. 1994. Measuring and Monitoring Biological Diversity: Standard Methods for Amphibians. Smithsonian Press. 364 pages.

• Jaeger, RG, D Fortune, G Hill, A. Palen and G Risher. 1993. Salamander homing behavior and territorial pheromones: Alternative hypotheses. Journal of Herpetology 27: 236-239.

• King, RB, MJ Oldham, WF Weller and D Wynn. 1997. Historic and current amphibian and reptile distributions in the island region of western Lake Erie. American Midland Naturalist 138: 153-173.

• King, RB and KM Stanford. 2019. Decline and Recovery of the Lake Erie Watersnake: A Story of Success in Conservation. [book chapter]

• Lovich, JE, JR Ennen, M Agha, and J Whitfield Gibbons. 2018. Where have all the turtles gone, and why does it matter? BioScience 68: 771-781.

• Moore, JA and JC Gillingham. 2006. Spatial ecology and multi-scale habitat selection by a threatened rattlesnake: the Eastern Massasauga (*Sistrurus catenatus catenatus*). Copeia 4: 742-751.

• Shine, R. 1999. Why is sex determined by nest temperature in many reptiles? Trends in Ecology and Evolution 14: 186-189.

• Teltser, C and KR Greenwald. 2015. Survivorship of Ploidy-variable Unisexual *Ambystoma* Salamanders Across Developmental Stages. Herpetologica 71: 81-87.

• Weise, RJ and M Hutchins. 1994. The role of zoos and aquariums in amphibian and reptile conservation, p. 37-45 *In* JB Murphy, K Adler, and JT Collins (eds.), Captive Management and Conservation of Amphibians and Reptiles. Society for the Study of Amphibians and Reptiles, Ithaca NY. Contributions to Herpetology, volume 11.

• Welch, AM, RD Semlitsch and HC Gerhardt. 1998. Call duration as an indicator of genetic quality in male gray tree frogs. Science 280: 1928-1930.

• Werner, EE, DK Skelly, RA Relyea and KL Yurewicz. 2007. Amphibian species richness across environmental gradients. Oikos 116: 1697-1712.

Dichotomous Key Example

(Taken from: http://www.schools.utah.gov/curr/Science/core/7thgrd/sciber7/Classify/html/TAXOKEY.HTM)

Classification Key of Evergreen Trees in Utah

1.	a.	Leaves scaly-like; cones are small, blue and berry-like.....go to 2
	b.	Leaves needle-like; cones are large and brown.....go to 3
2.	a.	Leaves rough; berry-like cones are about 1 inch in diameter; trunk is forked.....Utah Juniper
	b.	Leaves smooth; berry-like cones less than 1 in.; trunk has central stem .....Rocky Mtn. Juniper
3.	a.	Needles are in bundles of two or more; cone scales are woody.....go to 4
	b.	Needles are not in bundles, they are single; cone scales are papery.....go to 5
4.	a.	Needles are about 2 inches long and twisted; cones are 1.5 inches long; trunk grows straight and tall.....Lodge pole Pine
	b.	Needles less than 2 inches long; cones 1-3 inches with large edible seeds, trunk is short and bushy.....Piñon Pine
5.	a.	Needles are flat and blunt; not sharp to touch.....go to 6
	b.	Needles are square; stiff and sharp to touch.....Blue Spruce
6.	a.	Needles point outward from twig; cone scales have fork-like tongue attached.....Douglas Fir
	b.	Needles bend upward from twig.....White Fir

Course Policies:

Policy on late assignments and attendance: There is a 10%/day deduction for late assignments. Exams may only be made up with a valid, documented excuse (e.g., medical issue, family emergency). *Because of the short and intensive nature of this course, any absences or tardiness will result in substantial deductions in your participation score.*

Statement on disability: I will gladly work with any student who may need accommodations for the effects of an appropriately documented disability. Please contact me to discuss specific needs. For support services, please contact the Students with Disabilities Office (734-487-2470; http://www.emich.edu/drc/).

Statement on diversity: In an ideal world, science would be objective. However, much of science is subjective and is historically built on a small subset of privileged voices. In this class, we will make an effort to read papers from a diverse group of scientists, but limits still exist on this diversity. I acknowledge that it is possible that there may be both overt and covert biases in the material due to the lens with which it was written, even though the material is primarily of a scientific nature. Integrating a diverse set of experiences is important for a more comprehensive understanding of science. I would like to discuss issues of diversity in Herpetology as part of the course from time to time. Please contact me (in person or electronically) or submit anonymous feedback if you have any suggestions to improve the quality of the course materials.

Furthermore, I would like to create a learning environment for my students that supports a diversity of thoughts, perspectives and experiences, and honors your identities (including race, gender, class, sexuality, religion, ability, etc.). To help accomplish this:

If you have a name and/or set of pronouns that differ from those that appear in your official records, please let me know!

If you feel like your performance in the class is being impacted by your experiences outside of class, please don't hesitate to come and talk with me. I want to be a resource for you. Remember that you can also submit anonymous feedback (which may lead to me making a general announcement to the class, if necessary to address your concerns).

If you prefer to speak with someone outside of the course, the Department of Diversity and Community Involvement (734-487-3118; https://www.emich.edu/dci/) is an excellent resource.

I (like many people) am still in the process of learning about diverse perspectives and identities. If something was said in class (by anyone) that made you feel uncomfortable, please talk to me about it. (Again, anonymous feedback is always an option.)

As a participant in course discussions, you should also strive to honor the diversity of your classmates.

Statement on academic integrity: The University's Code of Student Conduct outlines three examples of academic misconduct: cheating, falsification, and plagiarism. **Ignorance of the University's Code of Student Conduct is never considered an "excuse" for academic misconduct.** You will find that this course offers ample opportunity for collaboration and that joint efforts will often be encouraged. However, certain assignments will require that you do your OWN work. If you have any question as to whether your level of cooperation with your peers (or the similarity of your work to that of others) is acceptable, you must contact me to discuss the matter BEFORE handing in the assignment. ***Academic misconduct will result in failure of the course.***

Class schedules and policies are subject to change. Students are responsible for changes announced in class or online.

Stuff the University says has to be here:

In addition to the articulated course specific policies and expectations, students are responsible for understanding all applicable University guidelines, policies, and procedures. The EMU Student Handbook is the primary resource provided to students to ensure that they have access to all university policies, support resources, and student's rights and responsibilities. Changes may be made to the EMU Student Handbook whenever necessary, and shall be effective immediately, and/or as of the date on which a policy is formally adopted, and/or on the date specified in the amendment. Please note: Electing not to access the link provided below does not absolve a student of responsibility. For questions about any university policy, procedure, practice, or resource, please contact the Office of the Ombuds: 248 Student Center, 734.487.0074, emu_ombuds@emich.edu, or visit the website: www.emich.edu/ombuds

SEVIS: The Student and Exchange VISitor Statement (SEVIS) requires students with F and J visas to report the following to the Office of International Student, 244 Student Center, within ten days of the event:
• Changes in your name, local address, major field of study, academic status, or source of funding
• Changes in your degree-completion date or degree level
• Intent to transfer to another school
• Probation or disciplinary action due to a criminal conviction
Prior permission from OIS is needed for the following:
• Dropping all courses as well as carrying or dropping below minimum credit hours
• Employment on or off-campus, including volunteer and observation positions
• Registering for more than one online course per term (F and J visa)
• Endorsing I-20 or DS-2019 for re-entry into the US.
Failure to report may result in the termination of your SEVIS record and even arrest and deportation. If you have questions or concerns, contact the Office of International Students at 734-887-3116.