

**Instructor:** Dr. S.J. Hecnar

**Lectures:** 2:30 – 4:00 pm Tues. & Thurs., AT 2015.

**Laboratory:** Friday 2:30-5:30 pm, CB 3015

**Office hours:** 1:30 – 2:30 pm Tues. & Thurs.

**Email:** shecnar@lakeheadu.ca

**Website:** <http://shecnar.lakeheadu.ca/> (Course info and news also available on website)

**Lab Technician:** D.R. Hecnar

**Teaching Assistant:** TBA

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**Course Description:** Origin, structure, life history, distribution, ecology and conservation of amphibians and reptiles. A survey of living families. Special attention is focused on species occurring in Canada, particularly those in Ontario.

**Lecture Materials:** A Desire2Learn site has been set up for this course. Lectures can be downloaded as PowerPoint or PDF files from the D2L site gratis. These files and all of their contents are for personal study purposes only and not for copying or distribution to others.

#### **Required Textbooks:**

- 1) Pough, F.H., R.M. Andrews, M.L. Crump, A.H. Savitzsky, K.D. Wells, and M.C. Brandley. 2015. Herpetology, 4<sup>th</sup> edition. Sinauer Associates, Sunderland, MS. 591 + 128 pp. ISBN: 978-1-60535-233-6
- 2) Powell, R., R. Conant, R., and J.T. Collins. 2016. A Field Guide to Reptiles and Amphibians: Eastern and Central North America. 4<sup>th</sup> edition. Houghton Mifflin Company, Boston. 494 pp. ISBN 978-0-544-12997-9
- 3) Powell, R., J.T. Collins, and E.D. Hooper, Jr. 2016. A Key to the Herpetofauna of the Continental United States and Canada. 2<sup>nd</sup> Edition. University Press of Kansas, Lawrence KS. 66049. 160 pp. ISBN 978-0-7006-1833-0

**Other Required Materials:** The lab manual is available for download gratis on the Desire2Learn site for the course. Audio tapes and CDs of frog calls are available for loan from the technician. A small deposit is required and will be refunded upon return if the media is undamaged. Students should have their own dissecting kit, safety glasses and rubber gloves or may rent/purchase these from the Biology technicians. Proper attire (e.g. rubber boots) should be worn for field trips.

#### **Optional Resource Materials:**

Conant, R., and J.T. Collins. 1998. A Field Guide to Reptiles and Amphibians: Eastern and Central North America. 3<sup>rd</sup> edition. Houghton Mifflin Company, Boston. 616 pp. ISBN 0-395-90452-8 *past edition of the fieldguide that can be used in place of the fourth edition.*

Crump, M. and Fenolio, D.B., 2015. Eye of Newt and Toe of Frog, Adder's Fork and Lizard's Leg: The Lore and Mythology of Amphibians and Reptiles. University of Chicago Press. viii + 320 pp. *A thorough account of human folklore and myths related to amphibians and reptiles.*

- Elliott, L. 1997. The Calls of Frogs and Toads. NatureSound Studio, Ithaca, NY  
<<http://www.naturesound.com/frogs/frogs.html>> *An excellent CD of North American frog calls accompanied by a booklet.*
- Elliot, L., C. Gerhardt, and C. Davidson. 2009. The Frogs and Toads of North America. *A good guide to North American species with excellent photos, brief accounts, and it contains a CD of calls.*
- Gillingwater, S.D. and A.S. MacKenzie. 2015. Photo Field Guide to the Reptiles and Amphibians of Ontario. St. Thomas Field Naturalist Club. 144 pp. ISBN: 978-0-9733179-5-4. *A good brief pocket sized fieldguide.*
- Pough, F.H., R.M. Andrews, J.E. Cadle, M.L. Crump, A.H. Savitsky, and K.D. Wells. 2004. Herpetology, 3<sup>rd</sup> edition. Prentice Hall, Upper Saddle River, NJ. 07458. 612 pp. ISBN 0-13-100849-8 *Earlier edition to current textbook.*
- Harding, J.H., and D.A. Mifsud. 2017. Amphibians and Reptiles of the Great Lakes Region, Revised Edition. University of Michigan Press, Ann Arbor, MI. 408 pp. ISBN-13: 978-0472053384 *A good field guide with detailed natural history information on species occurring in the Great Lakes Basin.*
- MacCulloch, R.D. 2002. The ROM Field Guide to Amphibians and Reptiles of Ontario. McClelland & Stewart Ltd, Toronto. 168 pp. ISBN 0771076517. *A good compact fieldguide with excellent photographs covering Ontario species.*
- Mills, P.B. 2016. Metamorphosis: Ontario's Amphibians at all Stages of Development. Peter B. Mills (privately published) printed by SLG Group Brampton, ON. 104 pp. ISBN: 978-0-9950603-0-2. *A pictorial guide useful for identifying amphibian larvae that occur in Ontario.*
- Powell, R., J.T. Collins, and E.D. Hooper, Jr. 1998. A Key to Amphibians and Reptiles of the Continental United States and Canada. University Press of Kansas, Lawrence KS. 66049. 131 pp. ISBN 0-7006-0929-6 *A used copy of the last edition of the lab key can be used in place of the latest edition.*
- Rowell, J.C. 2012. The Snakes of Ontario: Natural History, Distribution, and Status. Jeffrey C. Rowell (privately published) printed by Art Bookbindery, Winnipeg, MB. 411 pp. ISBN: 978-1-77136-123-1. *An excellent account summarizing the natural history of snakes that occur in Ontario.*
- Sheldon, A.B. 2006. Amphibians & Reptiles of the North Woods: A Field Guide to all 46 Northern Herps. North Woods Naturalist Series, Kollath+Stensaas Publishing, Duluth, MN. 148 pp. ISBN: 978-0-9673793-8-8. *A useful pocket sized fieldguide to herpetofauna occurring in Northwestern Ontario, Minnesota, and Wisconsin.*
- Vitt, L.J., and J.P. Caldwell. 2014. Herpetology: An Introductory Biology of Amphibians and Reptiles, 4<sup>th</sup> edition. Academic Press, San Diego. 734 pp. ISBN: 978-0-12-386919-7 *or earlier edition*
- Zug, G.R., L.J. Vitt, J.P. Caldwell. 2001. Herpetology: An Introductory Biology of Amphibians and Reptiles, 2<sup>nd</sup> edition. Academic Press, San Diego. 630 pp. ISBN 0-12-782622-X . *A used copy of the previous edition of the text will suffice.*

Powell, R., R. Conant, and J.T. Collins. 2016. Peterson Field Guide to Reptiles and Amphibians of Eastern and Central North America, 4<sup>th</sup> Edition. Houghton Mifflin Harcourt, Boston, MS. 494 pp. ISBN: 978-0-544-12997-9

**Marking Scheme:** Midterm 25%, Lab 35%, Final Exam 40%

**Examination Dates:** Midterm **Thursday, February 28<sup>th</sup>**, Lab Exam: **Friday, March 29<sup>th</sup>**.

Examination format - Combination of any or all of the following: fill in the blanks, true or false, multiple choice, definitions, short answers, essays, labeling, drawing.

Lab Mark - Consists of lab examination, quizzes, short assignments.

**Reserve Material/Literature Assignment:** We have been steadily adding to the Paterson Library holdings in herpetology each year depending upon budget. The library now subscribes to several electronic herpetological journals. Supplemental reading material in the form of primary literature may be provided for your use on reserve or on D2L. Topics of papers will be chosen to complement or augment lecture topics. These papers will be available for download on D2L or held in a folder at the circulation desk of the library for loan/copying. **Each student must provide evidence that they have read and comprehend at least five papers** from the reserve collection. Alternatively, if a student has a special interest in herpetology, they may select other papers in herpetology in lieu of the reserve collection. Many papers can be found and downloaded by doing a topic keyword search on Google Scholar. A report consisting of a one page summary and review for each paper read **must be handed in at the end of the lecture, Tuesday March 26th**. This report will not be used in calculating the final mark but must be satisfactorily completed in order for a final mark to be forwarded to the registrar's office. **A grade of 'Incomplete' will be submitted if the report is not received or if it is unsatisfactory.**

**Herpetology on the World Wide Web:** There are many websites dealing with various aspects of herpetology. As with any web-based sites the quality of information varies. Good information can generally be found on academic, government, official non-governmental organization, and herpetological society web pages. Here are a few useful resources....

<<https://armi.usgs.gov/>> U.S.G.S. amphibian site - identification, photos, & distribution of North American species.

<<http://amphibiaweb.org/>> Amphibia Web - U.C. Berkeley project offering information on all species of amphibians.

<<http://www.reptile-database.org/>> EMBL database on reptiles of the world.

<<http://www.naturewatch.ca/cgi-bin/quiz/step1.asp>> The Great Canadian Amphibian and Reptile Quiz - a good interactive test of your knowledge of identifying Canadian species by photographs or calls.

<<http://canadianherpetology.ca/>> Canadian Herpetological Society - Canada's working group website offer information on Canadian herpetological issues.

<[http://www.naturenorth.com/Herps/Manitoba\\_Herps\\_Atlas.html#](http://www.naturenorth.com/Herps/Manitoba_Herps_Atlas.html#)> Manitoba's amphibians and reptiles.

<[https://www.dnr.state.mn.us/reptiles\\_amphibians/index.html](https://www.dnr.state.mn.us/reptiles_amphibians/index.html)> Minnesota's amphibians and reptiles.

<<https://dnr.wi.gov/topic/wildlifehabitat/herps.asp>> Wisconsin Herpetological Webpage - an excellent site offering information on many species that also occur in Ontario. Links to state DNR herp pages.

<[https://www.michigan.gov/dnr/0,4570,7-350-79135\\_79218\\_79616---,00.html](https://www.michigan.gov/dnr/0,4570,7-350-79135_79218_79616---,00.html)> Michigan's Reptiles and Amphibians.

<<http://www.ssarherps.org/>> The Society for the Study of Amphibians and Reptiles which publishes the *Journal of Herpetology* and *Herpetological Review*.

<<http://ontarionature.org/programs/citizen-science/reptile-amphibian-atlas/>> Ontario Nature's Herpetofaunal Atlas which now supercedes the OHS atlas noted above. The site contains details on how to report observations for inclusion in the atlas.

<<http://www.cnah.org/>> Centre for North American Herpetology - a good source of information and links. The site also has a library of herpetological papers in pdf format that can be downloaded gratis.

<<http://www.herpconbio.org/>> Herpetological Conservation and Biology - the first online professional journal of herpetology. Papers can be downloaded as pdfs gratis.

**Other Information:** In this course we will be covering a lot of material. An advantage of an 'ology' course is that it concerns the entire biology of a taxonomic group, in this case two or three vertebrate classes: Amphibia, Reptilia, and Chelonia. Appropriately, as a final year undergraduate course we will delve into many aspects of biology to provide a synthesis of the biological knowledge of these ectothermic tetrapods. In this way, Herpetology can act as a capstone course. Although there are no specific prerequisites beyond first year biology, being a senior course, I assume that students understand basic biological, ecological, and evolutionary principles. Space may be limited so preference in registration may be given to senior biology majors or by special permission of the instructor. Maintaining good attendance is for your own benefit. Examination questions often come from poorly attended lectures. Noise or distractions will not be tolerated. Please have cellular phones turned off during lectures and labs. With good attendance and study the student will leave this course with a good knowledge of herpetology and Ontario's herpetofauna.

## **Biology 4435 Herpetology - Tentative Schedule of Topics**

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### **Lecture Topics**

1. Introduction
2. Differences & Similarities Between Amphibians & Reptiles
3. Origin & Evolution of Tetrapoda: Amphibians
4. Origin & Evolution of Tetrapods: Reptiles
5. Phylogeny & Systematics
6. Classification of Extant Amphibians - Caecilians
7. Classification of Extant Amphibians - Salamanders
8. Classification of Extant Amphibians - Anurans
9. Classification of Extant Reptiles - Turtles, Tortoises & Sphenodonts
10. Classification of Extant Reptiles - Lizards & Snakes

11. Classification of Extant Reptiles - Crocodylians
12. Survey of Ontario Amphibians
13. Survey of Ontario Reptiles

**Midterm Exam Thursday, February 28<sup>th</sup> 2019**

14. Temperature & Water Relations
15. Energetics: Gas Exchange
16. Energetics: Metabolism & Performance
17. Reproduction & Genetics
18. Life Cycles & Life History
19. Feeding
20. Body Structure & Locomotion
21. Movements & Orientation
22. Communication
23. Ecology: Biotic & Abiotic Interactions
24. Ecology: Species Assemblages
25. Ecology: Spatial & Temporal Dynamics
26. Biogeography
27. Human Exploitation
28. Conservation: Amphibians
29. Conservation: Reptiles
30. T.B.A.

**(Literature Assignment due Tuesday, March 26<sup>th</sup>, 2019)**

**Lab**

1. Diversity of Amphibians
2. Diversity of Reptiles
3. Diversity of the Ontario Herpetofauna
4. Frog & Toad Calls
5. Structure of Anurans
6. Structure of Caudata
7. Structure of Squamates
8. Structure of Testudines
9. Field Methods and Equipment
10. Review for Lab Exam
11. **Lab Exam (comprehensive) Friday, March 29<sup>th</sup>, 2019**