Biology 4435 **Herpetology - Course Outline** **2023**

Instructor: Dr. Stephen J. Hecnar **Office**: CB 4039
Lectures: 11:30 am – 1:00 pm Tues. & Thurs., RB 3046. **Res. Lab**: CB 3021
Laboratory: Friday 2:30-5:30 pm, CB 3015 **Tel**: 343-8010 Ext. 8250
Office hours: contact by email with questions or to arrange appointment on Zoom
Email: shecnar@lakeheadu.ca
Website: http://shecnar.lakeheadu.ca/
Teaching Assistants: Janak Khatiwada <jkhatiwa@lakeheadu.ca>, Ian E. Wick <iewick@lakeheadu.ca>
Office: CB 3021 **Tel**: 343-8010 Ext. 8670

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.

Textbooks:

1) Vitt, L.J., and J.P. Caldwell. 2014. Herpetology: An Introductory Biology of Amphibians and Reptiles, 4th edition. Academic Press, San Diego. 734 pp. ISBN: 978-0-12-386919-7 **Recommended** *or earlier edition*

or Pough, F.H., R.M. Andrews, M.L. Crump, A.H. Savitzsky, K.D. Wells, and M.C. Brandley. 2015. Herpetology, 4th 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. 4th edition. Houghton Mifflin Company, Boston. 494 pp. ISBN 978-0-544-12997-9 **Required**

3) Powell, R., J.T. Collins, and E.D. Hooper, Jr. 2016. A Key to the Herpetofauna of the Continental United States and Canada. 2nd Edition. University Press of Kansas, Lawrence KS. 66049. 160 pp. ISBN 978-0-7006-28902 **Required**

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. 3rd 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, 3nd edition. Prentice Hall, Upper Saddle River, NJ. 07458. 612 pp. ISBN 0-13-100849-8 *Earlier edition to current textbook.*

Pough, F.H., R.M. Andrews, M.L. Crump, A.H. Savitzsky, K.D. Wells, and M.C. Brandley. 2015. Herpetology, 4th edition. Sinauer Associates, Sunderland, MS. 591 + 128 pp. ISBN: 978-1-60535-233-6

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.*

Molnar, R.E. 2004. Dragons in the Dust: The Paleobiology of the Giant Monitor Lizard *Megalania*. Indiana University Press, Bloomington, IN. Xviii + 210 pp. ISBN: 978-0253-343741 *A thorough account of the top predator in Australia's Pleistocene.*

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.*

Zug, G.R., L.J. Vitt, J.P. Caldwell. 2001. Herpetology: An Introductory Biology of Amphibians and Reptiles, 2nd edition. Academic Press, San Diego. 630 pp. ISBN 0-12-782622-X . *A used copy of the previous edition of the text will suffice.*

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

Examination Dates: Midterm **Thursday, March 2nd**., Lab Exam: **Friday, March 31st**.
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 and numerous other journals that contain articles in involving amphibians and reptiles. These journals can be accessed using the library OMNI search link. Topics of papers should be chosen to complement or augment lecture topics or for students to investigate topics of personal interest involving herpetofauna. **Each student must provide evidence that they have read and comprehend at least five papers** from the primary literature. Many papers can be found and downloaded as pdfs 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, or submitted electronically to one of the TAs by midnight Tuesday March 28th**. Each paper read should be cited at the top of its summary/critique. 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/> Database on reptiles of the world.

<http://www.natureconservancy.ca/en/quiz/test-your-knowledge-on-reptiles-amphibians> Accounts of Canadian species.

<http://www.naturewatch.ca/frogwatch/how-to-guide/identifying-frogs/> Identifying Canadian species by

photographs or calls.

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

<http://www.naturenorth.com/Amph_Rept/Amph_Rept_MB.html > Species descriptions of Manitoba's amphibians and reptiles and frog calls.

<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/education/michigan-species/reptiles> 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*. Official names of species listed and pdfs of journal articles can be downloaded.

<http://ontarionature.org/programs/community-science/reptile-amphibian-atlas/> Ontario Nature's Herpetofaunal Atlas which now supercedes the OHS atlas noted above. The site contains information on species in Ontario and maps of their distribution.

<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.

Pandemic Health and Safety: As we start this semester, the incidence of covid, influenza, and other respiratory illnesses remain high in Thunder Bay. Course delivery will start being face-to-face and all labs are in person and tests are planned to be on paper. Students are advised to follow the university's health and safety recommendations. Social distancing, use of masks, and hand washing are strongly

recommended. **Do not come to class if you have any symptoms of illness.** If you cannot attend class because of illness contact the instructor as soon as you are able for further information. Please be aware that methods of course delivery may rapidly change if advised by the university, or if any outbreaks occur.

Biology 4435 Herpetology - Tentative Schedule of Topics

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 - Crocodilians
12. Survey of Ontario Amphibians
13. Survey of Ontario Reptiles

Midterm Exam Thursday, March 2nd 2023

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 28th, 2023)

Lab Topics

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 31st, 2023**
