Biodiversity of Macrofungi (BIOL 3530/5530)

Lecture: MWF, 11:00-11:50am, BC2202
Lab: R, 1:00-3:50pm, BC2070
Field Trip: Aug 31-Sept 3; VSU BioBlitz: Sept 29

Instructor: Dr. Emily Cantonwine; Office: BC 2031
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Course Description – A survey of the biology and diversity of fungi that produce large sporocarps, with an emphasis on identification. Field trips may be required.

Required Materials (unless otherwise stated):

- J.H. Petersen. 2013. The Kingdom of Fungi. Princeton University Press.
- Mushrooms Demystified, David Arora
- Bessette, A.E., Roody, W.C., Bessette, A.R., Dunaway, D.L. 2007. Mushrooms of the Southeastern United States. Syracuse University Press. (Recommended)
- Digital camera
- Pocket knife or similar
- Mushroom collecting basket (medium sized cardboard box acceptable)
- 10X handlens (recommended)

Learning Outcomes

- Students will be able to identify mushrooms with dichotomous keys based on ecological, macroscopic and microscopic data.
- Students will be able to use mycological terminology to describe characteristics of macrofungi.
- Students will be able to analyze and interpret DNA sequence results and build cladograms.
- Students will be able to voucher fungal sporocarps and record digital data.
- Students will be able to group mushrooms by systematic relatedness.

Important Information

- A grade of C or higher is required in the course to count towards a biology degree.
- If you have need for special arrangements to complete the requirements of this course, please contact the Access Office for Students with Disabilities, and discuss this need with me.

GRADE:	**SCALE**
Exams (4): 100 pt*	**A 90-100%**
Discussion Assignments: 100 pt total	**B 80-8**
Macrofungi Collection: 50 pt	**C 70-79.9%**
Mycoflora Project: 50 pt*	**D 60-69.9%**
Lab Practical: 100 pt	**F <60%**
Participation: 50pt	
Total points = 750	
Bonus Points, up to 35pt	

***Higher standards for Honor's Option &/or 5530 students.**

Assessments

Exams. There will be four exams, each worth 100pt. The last exam will cover new material (50%) and cumulative material (50%), and will be scheduled during the final exam period.

Discussion Assignments (DA). A portion of this class is "flipped", which means students will gather information outside of class to share with the rest of the class during the lecture period. Most assignments will be submitted to Blazeview by 9am the day of the discussion as a powerpoint document. These powerpoints will be merged and a selection of students will present their work to the class on the day it is due. Come to class prepared to present on these days! Grades will be based on completion and accuracy of the assignment and presentation, not presentation skills. DA grade = (total # points earned / total # of possible points) x 100

Macrofungi Collection. The class will work together to collect, identify, and voucher 150 unique sporocarps (sample species, different locations acceptable) with all students earning the same grade. More information will be provided in lab.

Mycoflora Project. Each student will work through the North American Mycoflora Project (NAMP) protocol for 5 species, which includes digitally uploading notes, preserving the specimen as a voucher, and sequencing the DNA. Additional species can be done for extra credit (see Bonus opportunities) as a service learning project. Additional details about the Mycoflora project will be provided in lab.

Lab Practical. Students will demonstrate mastery of terminology and identification skills developed while working on the collection in lab.

Participation. This grade will be based on your attendance and participation (which includes attention) during the lectures, laboratories, discussions, and field trip(s). Participation grade = 50 - (total # of infractions)
Rubric:

- Absent from lecture (non-discussion assignment day)
    - 1 absence allowed without penalty (-0pt)
    - excused absences for pre-approved reasons (-0pt)
    - all other absences, even emergencies (-1pt)
- Absent from Lab or Lecture (discussion assignment day)
    - excused absences for pre-approved reasons or emergencies (documentation required) (-0pt)
    - all other absences (-2pt)
- Expectations in lecture
    - fail to meet expectations (-½ to 1pt per meeting depending on extent)
- Expectations in lab
    - fail to meet expectations (-1 to 2pt per meeting depending on extent)
- Expectations on field trip
    - fail to meet expectations (-1 to -5pt depending on extent)

Bonus opportunities. There are two opportunities to earn bonus points. 1) VSU Biology is hosting its first BioBlitz on Saturday, September 29th at Grassy Pond Recreation Area in Lake Park, GA. Students can earn 1pt per volunteer hour, up to 5pt. If you are not able to attend on the 29th, but would like to earn extra points, you can help with event preparations. There may also be opportunities after the event. 2) If there is interest, students can recruit community member involvement in the Mycoflora project by, for example, allowing people to "adopt a mushroom sequence" at the BioBlitz ($10/sequencing). In exchange, students will provide an instructional opportunity at the end of the semester to these people that explains how DNA sequences are processed to identify mushroom species. Students must take the lead on organizing this opportunity (I am just the advisor). The # of possible extra credit points will be negotiated during the planning process, and may be as high as 30pt.

Policies, & procedures

Attendance – Students must sign in at the beginning of each class to be considered present. Attendance is taken into account in the participation grade. Refer to the rubric above.

Participation expectations - Each student is expected to do her/his best work in this class and to provide his/her full attention to the material during instruction. Tardiness, leaving class early, sleeping in class, using a cell phone, & being off-task are examples of conduct that would fail to meet expectations. Refer to the rubric above.

Lecture Notes – Students are expected to take handwritten notes during lecture; electronic aides are only allowed with prior approval. Please bring all BIOL3530/5530 lecture notes to each lecture and lab, as you may be asked to refer to them. Most lectures will be video recorded. If you miss any notes or are absent, please refer to the recording. When there are recording errors, completed powerpoints will be uploaded to Blazeview.

Access to the Lab –We have the lab all to ourselves. Students may use the lab anytime the building is open. An access code will be provided in lab.

Food & Drink in Lecture and Lab – No food or drink is allowed in the laboratory. My policy in lecture is more lenient - you may consume food or drink as long as their use does not cause a disturbance. Each student is responsible to clean up after him or herself.

Title IX Statement: Valdosta State University (VSU) is committed to creating a diverse and inclusive work and learning environment free from discrimination and harassment. VSU is dedicated to creating an environment where all campus community members feel valued, respected, and included. Valdosta State University prohibits discrimination on the basis of race, color, ethnicity, national origin, sex (including pregnancy status, sexual harassment and sexual violence), sexual orientation, gender identity, religion, age, national origin, disability, genetic information, or veteran status, in the University's programs and activities as required by applicable laws and regulations such as Title IX. The individual designated with responsibility for coordination of compliance efforts and receipt of inquiries concerning nondiscrimination policies is the University's Title IX Coordinator: titleix@valosta.edu

Access Statement: Students with disabilities who are experiencing barriers in this course may contact the Access Office for assistance in determining and implementing reasonable accommodations. The Access Office is located in Farbar Hall. The phone numbers are 229-245-2498 (V), 229-375-5871 (VP) and 229-219-1348 (TTY). For more information, please visit VSU's Access Office or email: access@valdosta.edu.

Academic Integrity: I follow the Academic Honesty Policies and Procedures of the University and the Department of Biology's Policy on Plagiarism. For more information, refer to www.valdosta.edu/academic/AcademicHonestyPoliciesandProcedures.shtml and www.valdosta.edu/biology/documents/biologyplagiarism.doc "Academic Integrity/ Honesty" means performing all academic work without plagiarism, cheating, lying, tampering, stealing, receiving unauthorized or illegitimate assistance from any other person, or using any source of information that is not common knowledge.

Tentative Schedule

Week	Lecture Topics	Reading (R) &/or Discussion Assignments (DA)	Lab
August 13-17	Introduction to Macrofungi Basic biology and ecology Basidiomycete sporocarp forms	(W-R) - Petersen 1-23; 34-45, 194-221 (Lab-R) - "collecting for study", "determining odor and taste", "testing chemical reactions" at www.mushroomexpert.com (F-R) - Petersen 102-187	Collection Project: Collection project introduction, collecting sporocarps for study, (field trip)
August 20-24	Basidiomycete forms (cont) Microscopic features of Basidios Spore dispersal - Basidiomycetes	(Lab-R) - "making spore prints" and "using a microscope" at www.mushroomexpert.com	Microscope techniques for macrofungi (basidio & asco)
August 27-31 Aug 31-Sept 3	Ascomycete sporocarp forms Microscopic features of Ascomycetes, spore production & dispersal F- catch-up **Highlands Biological Research Station (F-M)**	(Lab-R) - "descriptions and journals", "identifying mushrooms", "preserving specimens", "mushroom taxonomy" at www.mushroomexpert.com "Tissue Collection" at http://mycoflora.org/resources/protocols	Field and lab notes, photography, using a dichotomous key, Mycoflora project (DNA samples), Preserving specimens
Sept 3-7	Labor day - M (Return to campus) **Exam 1 (Sept 5)** F - Discussion Assignment	(F-DA) - Amanita groups (Lab-R) – "Upload Content" & "Vouchering Specimens" at http://mycoflora.org/resources/protocols	Reporting observations, Vouchering specimens, Processing specimens
Sept 10-14	M-F Discussion Assignments	(M-DA) -selection of "gilled" genera from field trip (W-DA) - Boletes (F-DA) - Polypores	Field Collection/Process specimens
Sept 17-21	M-F Discussion Assignments	(M-DA) - Gasteroids (W-DA) - Clubs & Corals (F-DA) - Toothed & Jellies	Field Collection/Process specimens
Sept 24-28	M-F Discussion Assignments September 29th - BioBlitz@Grassy Pond (8-6)	(M-DA) - Resupinates, Stereoids, cephaloids (W-DA) - Apothecial ascomycetes (F-DA) - Perithecial ascomycetes	Field Collection/Process specimens
October 1-5	M - catch-up or review **W - Exam 2 (Oct 3)** *You've worked hard! No class Friday!*		Process specimens

October 8-12	*Fall Break, No class Monday* Introduction to Basidiomycete Taxonomy & Systematics (past & present) Cladogram production - Friesian system		DNA extraction and PCR
October 15-19	Review of DNA and genes DNA Technologies (PCR & sequencing) Informative DNA regions for fungal systematics		Run gel with PCR products
October 22-26	Current Basidiomycete Classification - Orders & families W-F - Discussion Assignments	(W-DA) - Classification of chanterelle and gilled mushrooms (F-DA) - Classification of Boletes & Polypores	Vouchering
Oct 29-Nov 2	M-W Discussion Assignemnts Fri- Summarize/Review/catch-up	(M-DA) - Classification of Gasteroids, Clubs, & Corals (W-DA) - Classification of Toothed, jellies, resupinates, stereoids, & cephaloids	Field Collection/Process specimens
Nov 5-9	**Exam 3 (Nov 5)** Introduction to Relevant Ascomycete Taxonomy & Systematics (past) Introduction to Relevant Ascomycete Taxonomy & Systematics (present)		Field Collection/Process specimens
Nov 12-16	M-W Discussion Assignments DNA Sequence analyses	(M-DA) - Classification of apothecial ascomycetes (W-DA) - Classification of perithecial ascomycetes	Collection Project Due Clean-up lab
Nov 19-23	Catch-up if needed THANKSGIVING		No Lab
Nov 26-30	Mycoflora project		Lab Practical
Dec 3-7	Mycoflora project due **FINAL EXAM (R, Dec 6, 10:15-12:15)**		