INVERTEBRATE BIOLOGY

BIO 3020[001-002] (LECTURE) - BIO 3060[001-004] (LAB)

Instructor Information
Instructor: Dr. J. Antonio Baeza
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Office hours: TH 10:45 - 11:45 AM, 226 Long Hall (previous appointment)
Teaching Assistants: Timothy Cronin and Alyssa Baker

The last day to drop a class: January 26th.

Class meeting times

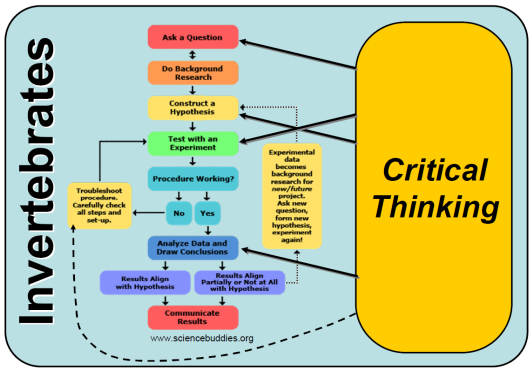
Lecture:	**Tuesday & Thursday 9:30 - 10:45 AM, Freeman Hall 138 / Zoom**
Laboratories:	**(001) Wednesday 12:30-3:20 pm, 305 Jordan / Zoom.**
	(002) Thursday 12:30-3:20 pm, 305 Jordan / Zoom.
	(003) Wednesday 3:30-6:20 pm, 305 Jordan / Zoom.
	(004) Thursday 3:30-6:20 pm, 305 Jordan / Zoom.

Modality: *traditional in person* (option to go online synchronous depending on pandemic situation)

Important: check for information about the pandemic situation at the end of this document

In short: **in this course, we will learn about invertebrates, a species-rich group of multi-cellular animals that lack a backbone and exhibit impressive morphological, behavioral, physiological, and ecological disparity. Perhaps more importantly, I will expose you to the scientific method and you will learn to think critically. We will be using various invertebrates as examples to improve your critical thinking skills.**

Scientific Method



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Course Description / Topical Outline

The 'invertebrates' represent a species-rich and morphologically diverse group of metazoan animals that lack a backbone. These animals are recognized for their impressive disparity in terms of habitats and lifestyles. For instance, many species from numerous phyla have established symbiotic relationships with other marine and terrestrial animals, as well as plants in shallow tropical seas and/or humid tropical terrestrial forests. Many other invertebrates inhabit unique chemoautotrophic environments in the deep sea. While others have conquered semi-terrestrial, fresh-water and terrestrial environments allowing them to inhabit deserts, mountains, plains, and forests at almost all latitudes. All species that have colonized dissimilar environments show varying but remarkable degrees of specialization to their habitats. 'Invertebrate Biology' is an introductory course to the form, function, integrative ecology and evolution of animal biodiversity that focuses on organisms lacking a backbone.

This course has three general topics: (1) *Form and Function*. What are the most important invertebrate phyla? How they can be classified and differentiated from each other? What is the relationship between anatomy/morphology and function so that they can cope with the challenging environments in which they are found? (2) *Evolution*. How did this diversity in terms of form and function arise? (3) – *Ecology, Preservation & Conservation of Invertebrates*, and their relevance to humans. In the lecture part of this course, we will explore invertebrate morphology using a comparative framework. We will also describe their integrative ecology/biology (e.g., behavior, physiology, life history) to reveal the putative evolutionary pathways that have led to their diversity and success in the different environments they are found. In the laboratory, we will examine live and preserved specimens to reveal their phylogenetic history.

Clemson Thinks^2

This course is now part of the Clemson Thinks^2 (CT^2) critical thinking experiment, a program aimed at improving student critical thinking skills. Simple memorization of facts and repetition of definitions is not a sufficient skill set to address the complex problems our world faces today! **As a Clemson undergraduate, we expect you to develop the ability to think critically and to evaluate how knowledge is constructed and the assumptions underlying such knowledge**.

Critical thinking is reasoned and reflective judgment applied to solving problems or making decisions about what to believe or do. Critical thinking gives reasoned consideration to defining and analyzing problems, identifying and evaluating options, inferring likely outcomes and probable consequences, and explaining the reasons, evidence, methods and standards used in making those analyses, inferences and evaluations. Critical thinking is "*skeptical without being cynical, evaluative without being judgmental, and purposefully focused on following reasons and evidence wherever they may lead*". Please, visit https://www.insightassessment.com/FAQ/FAQs-General-Critical-Thinking/What-is-Critical-Thinking for additional information. Also. you can find more information on the CT^2 program at **http://www.clemson.edu/assessment/thinks2**/.

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Student Learning Outcomes

- Analyze taxonomies and infer systematic relationships among extant invertebrates.
- Explore invertebrate form and function to evaluate their relevance in natural ecosystems.
- Explore invertebrate lifestyle and life cycle to evaluate their importance in human disease
- Interpret quantitative relationships in manuscript graphs and tables.
- Explain the limitations of correlational data published in scientific papers.
- Analyze data to identify and summarize problems as part of the scientific method.
- Integrate information/data to solve a problem as part of the scientific method.
- Develop and justify one or more than one hypotheses.
- Identify the limitations of one or more than one hypotheses.
- Identify alternative interpretations of the data or observations.
- Evaluate competing interpretations, explanations, evidence, and conclusions.
- Effectively communicate complex ideas.

Critical Thinking Assessment and In-Class Participation Activities (*ICPA*- CT^2)

First, you might be assessed by the CT^2 program through the application of a 'pre-course' test (California Critical Thinking Test) which will assess your initial critical thinking status and a second 'post-course' follow-up test to measure the difference. Dates for taking the pre- or post-course tests will be announced by the instructor during the semester.

Then, throughout the semester, there will be announced in-class activities (see below) during the lecture period worth 100 points towards your final grade (= 10% of your final grade combined). At least two of these in-class activities include the discussion of a scientific paper that will be provided to you with a week of anticipation each time. The different papers will be presenting information on specific attributes of particular species of invertebrates (e.g., behavior, negative effect on humans, etc). **During the activities, you will be exposed to the scientific method and critical thinking**. I will lead the discussion so that you can: i.) identify, develop, and/or justify one or more than one hypothesis covered in the paper you read, ii.) identify the limitations of one or more than one hypothesis proposed in the paper, iii.) understand experimental design and its different components to test one or more than one hypothesis, iv.) evaluate competing interpretations, explanations, evidence, and conclusions related to the experiment described in the paper, and v.) identify alternative interpretations of the data or experimental observations. The activity will also allow you to vi.) integrate information/data to understand and solve a problem, and vii.) effectively communicate complex ideas. Those students absent for the *ICPA* will receive zero points. **You need to read the paper and participate to perform well in the in-class activities.**

Important: There will be no opportunity to make up missed ***ICPA*- CT^2**. In the case that a student misses an ***ICPA*- CT^2** and has a University- or instructor- approved excuse **in advance**, the student will be excused from that ***ICPA*- CT^2** and scores will be prorated.

If the instructor is more than 15 minutes late for lecture without notice, students may leave without penalty.

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Required* - Lecture Text - *Required - Mandatory

Brusca et al. (2016) Invertebrates - Third Edition. Sinauer Associates.

This book is extremely useful and detailed. All exam material will be taken from the lectures, the book above, and non-textbook assigned readings.

You need a **dissecting kit** for laboratory activities (i.e., dissections, etc). Dissecting kits can be purchased from the Clemson University bookstore. Alternatively, you can purchase a similar dissecting kit online (e.g., Amazon, Carolina Supply, etc). You also need a **Lab Notebook** (it may not be available at the bookstore). The notebook must have blank white pages (no lines) and be of standard (or larger) size.
Example: https://www.amazon.com/Blank-Notebook-Unlined-Numbers-Contents/dp/153009481X).
Also, you need to use typical proper protecting attire during lab hours.

Lecture Grading

Final Lecture Grade: total nº of points earned out of a maximum of 1000 points.
Scale: 900-1000 = A, 800-899.9 = B, 700-799.9 = C, 600-699.9 = D, <600 = Failed

Important Note: Grades will not be rounded up. Thus, the above are hard cutoffs.

Important Note: **You need to bring a white paper to every lecture**

Lecture grades will be based on three ~55-minute exams, one final exam, and five (or more) class participation activities.

The breakdown of points is described below. You will be expected to understand all material presented in lecture, recommended book, and assigned outside readings.

Important: There are no make-up exams given in this course without a University- and instructor-approved excuse. **Considering time constraints, you may be required to take your makeup exam in a different format (e.g., oral exam) in the case you miss a lecture exam and have a University approved excuse.**

Important: **It is mandatory that you take all four exams**. The lowest of the first three exam grades will be dropped. **The final Exam IV grade cannot be dropped**.

Exam I 300 pts
Exam II 300 pts
Exam III 300 pts
Exam IV 300 pts
Class participation (5 @ 20 points each) 100 pts
Total points for lecture **1000 pts**

Lecture Exams

Each lecture exam will cover **all** of the material presented since the previous exam **plus** most material presented since the start of the course. The above, considering that many terms and concepts in the first lectures (e.g., Patterns & Processes) do carry over from segment (lecture/book chapter) to segment (lecture/book chapter).

Each exam will consist of one or all of the following:
1. Multiple-choice questions,
2. Diagrams / Problems,
3. Short questions & answers
4. Essays

In-Class & Off-Class Participation Activities (*ICPA*)

Throughout the semester, there will be unannounced in-class activities (6 [or more] in total) during the lecture period worth 100 points towards your final grade (= 2% of your final grade each, 10% of your final grade combined). These activities may include taking a quiz, working problems, discussing issues, guest lectures and/or participation in departmental seminars. Those students absent for the *ICPA* will receive zero points. **You need to read the different chapters of Brusca et al. with anticipation to perform well in the in-class activities.**

Important: As with your exams, the top five *ICPA* grades will be counted towards the final grade. The lowest grade will be dropped.

There will be no opportunity to make up missed *ICPA*. In the case that a student misses an ICPA and has a University- and instructor- approved excuse **in advance**, the student will be excused from that *ICPA* and scores will be prorated.

Important: **Honor students will develop extra activities during the semester**. **These activities will be discussed with the instructor at the beginning of the semester. Activities include the production of two artifacts: one video and one poster (topics to define with instructor).**

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LECTURE SCHEDULE

IMPORTANT NOTICE: *topics and order are subject to minor / moderate change*

Date	Chapter	Topics	Presentation File
Jan 13 (Thu)	Ch. 1 - 4	Patterns, Processes, Concepts	Patterns_1
Jan 18 (Tue)	Ch. 1 - 4	Patterns, Processes, Concepts	Patterns_2
Jan 20 (Thu)	Ch. 5 - 7	Protista, Porifera	Protista / Porifera
Jan 25 (Tue)	Ch. 5 - 7	Porifera and Mesozoa	Porifera
Jan 27 (Thu)	Ch. 8	Mesozoa & Cnidaria	Cnidaria_1
Feb 01 (Tue)	Ch. 8	Cnidaria	Cnidaria_2
Feb 03 (Thu)	Ch. 8 & 9	Cnidaria & Ctenophora	Cnidaria / Ctenophora
Feb 08 (Tue)	Ch. 1 - 9	Exam I Catch Up, Remarks, Review	All of the above
Feb 10 (Thu)		**Exam I**	
Feb 15 (Tue)	Ch. 10	Ctenophora & Platyhelminthes	Platyhelminthes_1
Feb 17 (Thu)	Ch. 10 - 11	Platyhelminthes & Nemertea	Platyhelminthes_2
Feb 22 (Tue)	Ch. 11 - 12	Nemertea & Blastocoelomates	Nemertea / Blastocoelo
Feb 24 (Thu)	Ch. 12	Blastocoelomates	Blastocoelo
Mar 01 (Tue)	Ch. 13 - 14	Annelida & related	Annelida_1
Mar 03 (Thu)	Ch. 13 - 14	Annelida & related	Annelida_2
Mar 08 (Tue)	Ch. 1 - 14	Exam II Catch Up, Remarks, Review	All of the above
Mar 10 (Thu)		**Exam II**	
Mar 15 (Tue)	Ch. 13 - 14	Annelida & related	Annelida_3
Mar 17 (Thu)	Ch. 15 - 16	Annelida related & Arthropoda	Crustacea_1
Mar 22 (Tue)		**Spring Break - No Class - No Lab**	
Mar 24 (Thu)		**Spring Break - No Class - No Lab**	
Mar 29 (Tue)	Ch. 15 - 16	Mollusca	Crustacea_2
Mar 31 (Thu)	Ch. 15 - 16	Mollusca, Lophophorates	Crustacea_3
Apr 05 (Tue)	Ch. 17 - 19	Arthropoda: special ref. Crustacea	Arthro_1
Apr 07 (Thu)	Ch. 20	Arthropoda: special ref. Crustacea	Mollusca_1
Apr 12 (Tue)	Ch. 1 - 19	Exam III Catch Up, Remarks, Review	All of the above
Apr 14 (Thu)		**Exam III**	
Apr 19 (Tue)	Ch. 20	Arthropoda: Others	Mollusca_2
Apr 21 (Thu)	Ch. 20 - 22	Equinodermata	Mollusca / Echinoderm
Apr 26 (Tue)	Ch. 20 - 22	Equinodermata	Mollusca / Echinoderm
Apr 28 (Thu)	Ch. 22 - 23	Hemichordates & Chordates	Echinoderm / Deutero
May 02 - 06	Exact date:	**Exam IV - FINAL** **Wed 8:00 AM to 10:30 AM**	All of the above

Laboratory Grading

Final Laboratory Grade: total nº of points earned out of a maximum of 1000 points. Scale: 900-1000 = A, 800-899.9 = B, 700-799.9 = C, 600-699.9 = D, <600 = Failed

Laboratory grades: Based on **two practical exams** and completion of **a cumulative laboratory notebook** that you will add to throughout the laboratory course.

There are **no** make-up labs given in this course due to logistic (e.g., specimen availability) and time constraints. If you miss a lab, there will be no opportunity for makeup. If you have a University- and instructor-approved excuse, and if the lab is excused before (or, in case of unavoidable circumstances, immediately or as soon as possible after) the lab, your grade will be determined by a pro-rated point total from the rest of the laboratories you attended. You are expected to attend and participate in the laboratory activities every week and you must turn in your in-class assignment before leaving lab. If you miss lab or leave lab early without turning in your in-class assignment you will receive a zero for that lab. If you know you will have to miss your regularly scheduled lab, but are able to attend another lab section, you must ask the instructor and both TAs in advance for approval.

Laboratory Practical Exams (2 @ 188): 376 pts
Lab Notebook (12 labs @ 52 pts): 624 pts

Total points for laboratory: **1000 pts**

Lab Notebook

A lab handout will be posted the evening or night before each lab. This handout will contain the list of activities that can be done in the lab that day. Print the handouts and bring them to the lab. Some activities are mandatory (they need to be logged in your notebook) while others are not (they are optional).

Lab activities will include a combination of drawings of the external and/or internal anatomy from prepped specimens (including permanent slides), and/or from specimens you dissect yourself; observations on behavior; data and write-ups from short (including virtual) experiments; and notes on field trips, movies, or short guest presentations.

For each anatomy activity you will draw both the external and internal anatomy of each specimen and label, at a minimum, all the structures listed in your laboratory handout. You will be graded on neatness, accuracy, and completeness.

For each predominantly experimental (including virtual) lab, you will be required to write up data results and a discussion for inclusion in your notebook. Further details will be given during each lab period.

Lab notebooks will be graded based on how well you complete each of the required laboratory activities. There will be optional activities in each lab and including these

optional activities in your notebook is encouraged and can (if they are completed correctly) make up for some of the points lost from required activities. Make sure to interact frequently with your TA and instructor and ask for feedback on your notebook if you are uncertain as to how to complete an activity.

Remember. There can be no makeup labs during this semester. Thus, we will try to set up a time each Friday (or a different day of the week, pending space availability) when you can come in and study for the practical exams and work on any activities that you were unable to complete in lab. Also, and importantly, we encourage you to work on previous labs if you have time in a regular lab period as long as the material is still available. Because of space and materials issues, some lab activities will not be possible on Fridays (or a different day of the week, pending space availability). Work done on Fridays (or a different day of the week, pending space availability) will not substitute for missed labs unless your absence from lab was excused in advance by the instructors.

If due to catastrophic or unavoidable events you must miss a lab and you have a University- and instructor-approved excuse, submitted in advance, your grade will be prorated over 11 labs instead of 12. If you miss a lab without instructor approval, your grade for that lab will be a zero.

Notebooks will be turned in twice for grading; once early in the semester, and once at the end. After an assignment has been graded, that assignment **cannot** be revised and re-graded.

IMPORTANT: A penalty (up to 90% of your grade) will be given to students providing assignments and turning notebooks after the deadline that will set up by the TA (deadline is also available in the syllabus).

Lab Practical Exams

There will be two laboratory practical exams that will focus on your knowledge of both anatomy and taxonomy. These practical exams will involve rotating among 10-20 stations of labeled specimens. Each station will have 2-3 questions. You may be asked to identify: Kingdom, Phylum (or Subphylum), Class (or Subclass), Order, or other lower taxonomic level/unit, life history stage, external anatomy, internal anatomy, habitat, **or any other question** regarding the specimen. In certain cases, identification of species by scientific name will earn you bonus points (when properly written) on some specimens.

IMPORTANT DUE DATES for LAB NOTEBOOKS:

Lab Note Book 1st: March 9th and 10th
Lab Note Book 2nd: April 27th and 28th

LABORATORY SCHEDULE

IMPORTANT NOTICE: *topics and order are subject to minor / moderate change*

WEEK	Laboratory	Topics	Main Activities
Jan 13 (Thu)	NO LAB		
Jan 19 (Wed) Jan 20 (Thu)	Laboratory 01 Laboratory 01	Microscopy, Phylogenetics, Protista	Protista: Diversity Taxonomy, Microscopes Phylogenetic Trees
Jan 26 (Wed) Jan 27 (Thu)	Laboratory 02 Laboratory 02	Porifera	Porifera: Diversity
Feb 02 (Wed) Feb 03 (Thu)	Laboratory 03 Laboratory 03	Cnidaria	Diversity Dissection: Anemone
Feb 09 (Wed) Feb 10 (Thu)	Laboratory 04 Laboratory 04	Development	Embryonic development Diversity
Feb 16 (Wed) Feb 17 (Thu)	Laboratory 05 Laboratory 05	Platyhelminthes & Nemertea	Diversity
Feb 23 (Wed) Feb 24 (Thu)	Laboratory 06 Laboratory 06	Allometric Growth & others	Diversity Dissections
Mar 02 (Wed) Mar 03 (Thu)		***Laboratory Practical***	***Laboratory Practical***
Mar 09 (Wed) Mar 10 (Thu)	Laboratory 07 Laboratory 07	Blastocoelomates	Diversity Dissections (2)
Mar 16 (Wed) Mar 17 (Thu)	Laboratory 08 Laboratory 08	Annelida	Math/Stat exercise
Mar 23 (Wed) Mar 24 (Thu)		**Spring Break - No Class - No Lab** **Spring Break - No Class - No Lab**	
Mar 30 (Wed) Mar 31 (Thu)	Laboratory 09 Laboratory 09	Mollusca & Lophophorates	Diversity Dissection
Apr 06 (Wed) Apr 07 (Thu)	Laboratory 10 Laboratory 10	Field Trip (Collecting & Studying)	Field trip (on-Campus)
Apr 13 (Wed) Apr 14 (Thu)	Laboratory 11 Laboratory 11	Arthropoda	Diversity Dissection
Apr 20 (Wed) Apr 21 (Thu)	Laboratory 12 Laboratory 12	Equinodermata, Hemichordates & Chordates	Diversity Dissection
Apr 27 (Wed) Apr 28 (Thu)		***Laboratory Practical***	***Laboratory Practical***
May 02 - 06			

How to Perform Optimally in BIOSC 3020/3060

How to Perform Optimally in Lecture

1. Classes are not mandatory. However, if you come to classes, you will have the opportunity to participate in several in-class activities. Combined, these activities are worth 10% of your grade. These points are there to help you!

2. Remember to download the lecture PowerPoint files (outline format) from Canvas before class. I recommend printing the lecture outline files and bringing them to the classroom. You will need to fill in drawing labels and lecture bullet points. It is important that you take notes during lectures either in the margins of the lecture outlines or in a separate notebook (both strategies work). It will be difficult for you to follow up/understand the material if you do not put attention during lectures and you simply download the lecture outline files and fill in the blanks. As a consequence, your performance in the exams will be deficient. Concentration and attention during lectures is really important.

3. Make sure to attend the in-class review session the period before each lecture exam. During these review sessions, I will be highlighting the information that I believe is really important for you to understand and that I expect you to learn well and be clear about before each exam.

4. Remember that there are going to be pre-lecture quiz questions. Be sure to answer all of these; they will be valuable preparation for the exams.

How to Perform Optimally in the Laboratory

1. Remember to download the lab handouts from Canvas before each lab. I recommend printing the handouts, reading them in advance, and bringing them to the laboratory.
2. Listen carefully to and take notes during your TA's pre-lab lecture.
3. Make sure to accomplish all obligatory activities indicated in the pre-lab lecture and lab handouts. Work concentrated at your own pace but also collaborate with others. During dissections, it is quite helpful to compare your specimen and dissection to others'.
4. Come to the open-lab (if we are able to execute them, to be announced) and review-lab periods to review/complete your work and add to your notebook.
5. Draw the best you can and label all drawings. Be prepare to answer all questions (meaning, study before the lab), and ask questions that you have not been able answer yourself after completing your own research.
6. At the end of each lab, before leaving, review and quiz yourself about all the activities you have accomplished (e.g., specimen identification, general morphology, anatomy). If you have extra time, go back and review previous labs.
7. In addition to asking the TAs questions in lab, utilize their office hours to ask any questions you may have, to get additional tips on how to study, and to double check your lab notebooks to ensure you are studying the material necessary.

8. While some of the lab activities only require you to draw and label one specimen from a group of organisms, it is important to examine all specimen are available as the one you choose to draw may not be the one included on the practical.
9. As we are going to be looking at microscope slides, it is important to examine multiple slides of the same structure/species. While the slides represent the same thing, intraspecific differences between organisms and preparation of the slides may result in slightly different looking microscope slides.
10. While you will be drawing many of the specimen we will be observing, taking photographs of the specimen is encouraged as it will help you study for the practicals.

Instructor Statement on Attendance Policy
You must participate during the first week of class. If you have not participated by January 12 (last day to add a class) or you accumulate excessive absences, you may be dropped from the course (**Important**: ***missing two classes [and/or examinations] constitutes excessive absences***).

You should speak with me as soon as possible regarding any absence and develop a plan for any make-up work. It is your responsibility to let me know if you need to make any changes due to the pandemic. In the event of an emergency, you should make direct contact with me, preferably before a class or an exam takes place. You may find it helpful to use the Notification of Absence module in Canvas. If you have difficulty or are unable to electronically report the absence, you may call the Office of Advocacy and Success at 864-656-0935 for assistance and guidance.

If the instructor is more than 15 minutes late for lecture without notice, students may leave without penalty.

Any exam that was scheduled at the time of a class cancellation due to inclement weather will be given at the next class meeting unless contacted by the instructor. Any assignments due at the time of a class cancellation due to inclement weather will be due at the next class meeting unless the instructor contacts students. Any extension or postponement of assignments or exams must be granted by the instructor via email or Canvas within 24 hours of the weather related cancellation.

** COVID-19 Related Information

This is an in-person course and will be delivered in a traditional modified format but it can transition to online depending upon the pandemic situation. This means that this course is **in-person** unless circumstances arise that require us to move to an online format. Should the instructor become ill or quarantined, it may be necessary to hold sessions in Zoom. If I need to be out for medical reasons, the lectures will be delivered asynchronously and over video recordings. I will maintain you fully updated if that is the case.

If you test positive or are asked to quarantine/isolate because of exposure to the virus, let me know as soon as possible by using the Notification of Absence module in Canvas. If you need to be out for medical reasons ask one of your peers to help you out with notes. Make sure to consult the

handouts that will become available to you regularly during the semester. If you study the handouts and read the book, you should be able to perform well during the semester in the case you are not able to attend classes due to an infection.

To maintain an inclusive and safe environment so that all members of this course may succeed, it is also expected that those in attendance follow health guidelines for everyone's safety. As biologists that are working to understand concepts of ecology, immunology, and disease spread, all students should wear masks while inside the classroom. ***There is currently a mandate to wear masks inside university buildings***. In the absence of a mandate, the use of masks will still be expected in my classroom. It is a sign of understanding biological principles, public health responsibilities, and looking out for your fellow students and their families that may not be able to be vaccinated yet.

If you need, please, check this document online:
"Checklist for Keeping Up in Class During Quarantine or Isolation"
https://www.clemson.edu/asc/documents/checklist-for-keeping-up-in-class-during-quarantine-or-isolation.pdf

The academic resources of Clemson University are provided for the intellectual growth and development of students. Class attendance is critical to the educational process; therefore, students should attend scheduled courses regularly if they are to attain their academic goals. In the event of an emergency, the student should make direct contact with the course instructor, preferably before a class or an exam takes place. Students should speak with their course instructors regarding any scheduled absence as soon as possible and develop a plan for any make-up work. It is the student's responsibility to secure documentation of emergencies, if required. A student with an excessive number of absences may be withdrawn at the discretion of the course instructor. Course instructors must implement fair grading procedures and provide an opportunity to make up missed assignments and examinations that does not unfairly penalize the student when an excused absence is accepted. Such make-up work shall be at the same level of difficulty with the missed assignment or examination. Course instructors shall hold all students with excused absences to the same standard for making up missed assignments or examinations. While course instructors should seek to make reasonable accommodation for a student involved in University-sponsored activities, students should understand that not every course can accommodate absences and that absences do not lessen the need to meet all course objectives.

Absence from class is detrimental to the learning process, so course instructors may use reasonable academic penalties which reflect the importance of work missed because of unexcused absences. Course instructors who penalize students for unexcused absences must specify attendance requirements as related to grading in the course syllabus and must keep accurate attendance records. Course instructors are obligated to honor exceptions to the university attendance policy for students covered by the Americans with Disabilities Act, as verified through paperwork issued by Student Disability Services.

Notification of Absence

The Notification of Absence module in Canvas allows students to quickly notify instructors (via an email) of an absence from class and provides for the following categories: court attendance, death of family member, illness, illness of family member, injury, military duty, religious observance, scheduled surgery, university

function, unscheduled hospitalization, other anticipated absence, or other unanticipated absence. The notification form requires a brief explanation, dates and times. Based on the dates and times indicated, instructors are automatically selected, but students may decide which instructors will receive the notification. This does not serve as an "excuse" from class, and students are encouraged to discuss the absence with their instructors, as the instructor is the only person who can excuse an absence. If a student is unable to report the absence electronically, he/she may call the Office of Advocacy and Success at 864-656-0935 for assistance and guidance.

The Office of Advocacy and Success also assists students in identifying various appropriate methods of documenting absences and assists families in using the electronic Notification of Absence system when students are unable to do so themselves.

Instructor Statement on Missing Class, Lab or Exams

The course lectures are designed and presented in classroom (or Zoom) using Microsoft PowerPoint. I will attempt to make each PowerPoint presentation available to you (as an outline file) the evening or night before a specific lecture topic is covered during class hours. This material will be posted in Canvas. Remember, you need a valid Clemson computer account to access all these materials. The different files I will be posting will be organized by topic. Also, the file names are listed on the lecture schedule above. Ideally, you do need to read the different book chapters before the lectures for optimal understanding and performance during the course. The outline file is useful as a guide during lectures. You do need to take additional in-class notes and read the different book chapters in Brusca & Brusca (2016) to enrich the outline file and understand the material/ information transmitted during lectures. Remember, you need to (1) attend lecture, (2) take notes, and (3) read the book, in order to do well on the lecture quizzes and exams.

Important: If you fail to participate in an activity (e.g., ICPA or exam) you will have a zero grade for that activity. If, for major reasons, you know that will be unable to attend a regularly scheduled class, exam or lab you need to contact the instructor in advance to make arrangements to take the exam early or attend another section of lab (please, see attendance policy above). In the case of an unplanned absence due to illness or death in the family, contact your instructor as soon as possible.

Important: The material presented in lecture most probably will go beyond what is presented in your textbook and lecture PowerPoint slides. The above explains why is important for you to attend lectures!. If you miss a lecture, I recommend seeking the notes of a classmate(s) and study with him/her(them) for exams.

Expectations

While on campus, face coverings are required in all buildings and classrooms. Face coverings might also be required in outdoor spaces where physical distance cannot be guaranteed. Please be familiar with the additional information on the Healthy Clemson website.

Please use appropriate online conduct to help maintain a safe learning environment. Participants should:
- Never transmit or promote content known to be illegal.
- Respect people's privacy as well as your own.
- Forgive other people's mistakes.
- Never use harassing, threatening, embarrassing, or abusive language or actions.

UNIVERSITY POLICIES

Instructor Statement on Accessibility /Accessibility Services

Clemson University values the diversity of our student body as a strength and a critical component of our dynamic community. Students with disabilities or temporary injuries/conditions may require accommodations due to barriers in the structure of facilities, course design, technology used for curricular purposes, or other campus resources. Students who experience a barrier to full access to this class should let the instructor know and make an appointment to meet with a staff member in Student Accessibility Services as soon as possible. You can make an appointment by calling 864-656-6848, by emailing studentaccess@lists.clemson.edu, or by visiting Suite 239 in the Academic Success Center building. Appointments are strongly encouraged – drop-ins will be seen if at all possible, but there could be a significant wait due to scheduled appointments. Students who have accommodations are strongly

encouraged to request, obtain and send these to their instructors through their AIM portal as early in the semester as possible so that accommodations can be made in a timely manner. It is the student's responsibility to follow this process each semester. You can access further information at the Student Accessibility website. Other information is at the university's Accessibility Portal.

Non-Discrimination / The Clemson University Title IX (Sexual Harassment) statement

Clemson University is committed to a policy of equal opportunity for all persons and does not discriminate on the basis of race, color, religion, sex, sexual orientation, gender, pregnancy, national origin, age, disability, veteran's status, genetic information or protected activity in employment, educational programs and activities, admissions and financial aid. This includes a prohibition against sexual harassment and sexual violence as mandated by Title IX of the Education Amendments of 1972.

This Title IX policy is located on the Campus Life website. Ms. Alesia Smith is the Clemson University Title IX Coordinator, and the Executive Director of Equity Compliance. Her office is located at 223 Brackett Hall, 864.656.0620.

Remember, email is not a fully secured method of communication and should not be used to discuss Title IX issues.

The University is committed to combating sexual discrimination including sexual harassment and sexual violence. As a result, you should know that University faculty and staff members who work directly with students are required to report any instances of sexual harassment and sexual violence, to the University's Title IX Coordinator. What this means is that as your professor, I am required to report any incidents of sexual harassment, sexual violence or misconduct, stalking, domestic and/or relationship violence that are directly reported to me, or of which I am somehow made aware.

There are two important exceptions to this requirement about which you should be aware:

• Confidential Resources and facilitators of sexual awareness programs such as "Take Back the Night and Aspire to be Well" when acting in those capacities, are not required to report incidents of sexual discrimination.

• Another important exception to the reporting requirement exists for academic work. Disclosures about sexual harassment, sexual violence, stalking, domestic and/or relationship violence that are shared as part of an academic project, a research project, classroom discussion, or course assignment, are not required to be disclosed to the University's Title IX Coordinator.

This policy is located at http://www.clemson.edu/campus-life/campus-services/access/title-ix/. Ms. Alesia Smith is the Executive Director for Equity Compliance and the Title IX Coordinator. Her office is located at 223 Holtzendorff Hall, phone number is 864.656.3181, and email address is alesias@clemson.edu.

**** COVID-19 Face Covering Expectation**

While on campus, face coverings are required in all buildings and classrooms. Face coverings might also be required in outdoor spaces where physical distance cannot be guaranteed. Please be familiar with the additional information on the Healthy Clemson website, such as the use of wipes for in-person classes

Student Safety

Clemson University is committed to providing a safe campus environment for students, faculty, staff, and visitors. As members of the community, we encourage you to take the following actions to be better prepared in case of an emergency:
a. Ensure you are signed up for emergency alerts (https://www.getrave.com/login/clemson),
b. Download the Rave Guardian app to your phone (https://www.clemson.edu/cusafety/cupd/rave-guardian/)
c. Learn what you can do to prepare yourself in the event of an active threat(http://www.clemson.edu/cusafety/EmergencyManagement/)

Academic Integrity

BIOSC 3020 / 3060 Invertebrate Biology Syllabus Spring 2022

As members of the Clemson University community, we have inherited Thomas Green Clemson's vision of this institution as a "high seminary of learning." Fundamental to this vision is a mutual commitment to truthfulness, honor, and responsibility, without which we cannot earn the trust and respect of others. Furthermore, we recognize that academic dishonesty detracts from the value of a Clemson degree. Therefore, we shall not tolerate lying, cheating, or stealing in any form. All infractions of academic dishonesty by undergraduates must be reported to Undergraduate Studies for resolution through that office. In cases of plagiarism instructors may use the Plagiarism Resolution Form. See the Undergraduate Academic Integrity Policy website for additional information and the current catalogue for the policy. For graduate students, see the current graduate student handbook for all policies.

Copyright Statement

Materials in some of the courses are copyrighted. They are intended for use only by students registered and enrolled in a particular course and only for instructional activities associated with and for the duration of the course.

Academic Continuity Plan for This Course

Clemson has developed an Academic Continuity Plan for academic operations. Should university administration officially determine that the physical classroom facility is not available to conduct classes, class will be conducted in a virtual (online) form. The university issues official disruption notifications through email, website, text notification and Social Media. When notified, use one of the following links to navigate to Clemson Canvas where you will find important information about how we will conduct class:
o Primary access link: http://www.clemson.edu/canvas
o Secondary access link, if needed: https://clemson.instructure.com/
o You can also use the Canvas Student App. Visit the downloads page for this app.
Course activities will occur through the Canvas course.

Animal Care and Use: Instructor Statement on the Use of Animals in Research and Teaching Laboratories

Failure to treat animals with proper consideration for their health, well being and comfort will not be tolerated. Students who are uncomfortable with the use of animals in lab are encouraged to discuss their concerns with their classmates, TAs and instructor. For more information regarding the proper and ethical use of animals in teaching and research please visit: http://www.clemson.edu/research/compliance/iacuc as well as the following sites: Ethologists for the Ethical Treatment of Animals (www.ethologicalethics.org/) and American Psychological Association (www.apa.org/science/anguide.html)

Helpful Resources

The Department of Biological Sciences is committed to providing a supportive learning environment for all students. If you are facing tough times, please utilize these resources. You may also reach out to me directly.

a. Financial Assistance: Clemson Student Financial Aid (http://www.clemson.edu/financial-aid/index.html), and Anderson Interfaith Ministries (https://www.aimcharity.org/)
b. Food Insecurity: Clemson Paw Pantry (http://facebook.com/CUpawpantry)
c. Textbook Assistance: Clemson Library FAQs (https://clemson.libanswers.com/faq/100017) and Clemson Bookstore Open Education Resources copies (https://clemson.bncollege.com/shop/clemson/page/find-oer)
d. General Resources: (https://www.clemson.edu/studentaffairs/advocacy-success/resources/index.html)
e. Multicultural Resources and Support: Gantt Multicultural Center (https://www.clemson.edu/centers-institutes/gantt/multicultural-programs)
f. LGBTQ Support: Gantt Multicultural Center –LGBTQ Programs (https://www.clemson.edu/centers-institutes/gantt/lgbtq-programs/resources.html)
g. Adjustment and Transition: Counseling and Psychological Services (https://www.clemson.edu/campus-life/student-health/caps) and Student Transitions and Family Programs (http://www.clemson.edu/studentaffairs/stfp/index.html)
h. Interpersonal Violence: Healthy Campus (https://www.clemson.edu/campus-life/healthy-

campus/interpersonal-violence/index.html)

i. Addiction and Recovery: SC: (https://www.daodas.sc.gov/), Web: (https://addictionresource.com/) and Vaping (https://vapingdaily.com/health/).

Emergency Procedures

Emergency procedures have been posted in all buildings and on all elevators. Students should be reminded to review these procedures for their own safety.

Copyright Statement

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General Education Competencies

This course has the ability to satisfy or contribute to the satisfaction of several General Education competencies. This course is designed to satisfy or contribute to the following competencies: 1. Natural Science, 2. Science, Technology, and Society, 3. Communication, 4. Critical Thinking Skills, and 5. Ethical Judgment. Please, consult the Undergraduate Catalog for a complete discussion of the nine competencies.