If you strive to think and communicate like a scientist in your work throughout the semester, in the end, you will be a scientist and really know biology (Think like a serious scientist, not like a pretend one).

LECTURER*
Douglas B. Luckie (he/him/his), Associate Professor, Lyman Briggs College & Dept. of Physiology
Zoom Office: 517-353-4606 (pass: Doug), luckie@msu.edu, W-26D Holmes, ☏: 517-353-4606

LEARNING ASSISTANTS*
Sophie Lampier (lampier9@msu.edu)
Frederick Ezenyilimba (ezenyili@msu.edu)
Huda Warsame (warsameh@msu.edu)
Maggie Leff (leffmagg@msu.edu)

TEXTBOOK (online-only, $26.95 for Luckie's LB144 custom textbook, http://store.trunity.com/)

COURSE PACK (online-only, FREE) Is available on course website as pdf files for viewing/download.


LB-144 = LB-144 (LECTURE) & LB-144L (LAB) OVERVIEW OF CLASSES
There are two overreaching goals in these two connected classes.
1.) To gain a fundamental comprehension of the cellular & organismal processes of life and an appreciation why it is important to understand these processes.
2.) To learn how to think like a scientist and be able to adaptively negotiate a question or problem.

The cell & organismal biology course is an exploration of life at all levels. It examines the interplay of genes, cells, and chemistry allowing organisms to live, survive, and interact with each other and the environment. Specifically, we will study genes (molecular biology), living cells inside organisms (cell biology), organisms and their environments (ecology), genetic variation and inheritance (genetics), and the interactions of the environment and genetics over time (evolution) that led to the diversity of life observed on the planet today.

Our lecture will meet twice a week as two 80-minute class meetings. Once a week on Zoom (live, synchronous) and once on TopHat (recorded, asynchronous). In this class, you will have daily homework and in lecture we will review and discuss, in depth, parts of the readings. We will examine how scientists perform their work to help you master the ability to Think like a serious scientist, not like a pretend one.

WORKLOAD
The first semester of Biology is a 4-credit course (LB144) that consists of two connected classes (lecture 3 credits, laboratory 1 credit) and because it is two classes it requires twice as many hours of work as one class. For any university-level course, for each credit, you are expected to spend 2-3 hours/week outside of class studying and working on homework assignments. There will be a certain amount of preparation that you will need to do before each lab and readings that you will need to complete (with notes taken) before each lecture. Come to lecture and lab well-prepared or mastering the new material may take much longer than necessary.
SCHEDULE
Both the lecture schedule and the lab schedule are found in the syllabi pages. We reserve the right to modify the schedule if necessary. You will be given advance warning if the schedule needs changed.

OFFICE HOURS
Tues. 1-2pm and Thurs. 4-5pm. See Luckie in his Zoom-office, see LAs in the LB144 Zoom-classroom. Note: When there are people in waiting room, Luckie will limit each visit to 10min (yet can rejoin line).

ACADEMIC HONESTY
Turnitin.com will allow you to review assignments prior to submission. If you are caught cheating, you will be assigned a “0” for the assignment or the entire course. The policy for academic honesty at LBC is available online -> https://lbc.msu.edu/advising/academic-policies.html

GRADING
Your grade in this course (LB144) is based on the total number of points earned in the both the lecture portion and the laboratory portion of the course. The course will be graded on a flat scale (see page 16).

4.0= 90-100%  3.5= 85-89.9%  3.0= 80-84.9%  2.5= 75-79.9%  2.0= 70-74.9%  1.5= 65-69.9%  1.0= 60-64.9%  0.0= <60

A “3.0” is considered Excellent. It is impressive work, top of the class, and the work was done extremely well but nothing beyond what was expected. A “3.5” is Most Excellent. Every detail of the work was done extremely well, and they found additional papers and evidence beyond what they were told.
A “4.0” is Outstanding. It has the 3.0, 3.5-level elements + student impresses instructor with how much/well they did the work. They taught Prof something.

Late Policy: Assignments are due in lab/lecture at the beginning of the session indicated (at time of entering room) unless otherwise specified. If an assignment is 1 day late, 1 point will be deducted from the final score. After this 24 hr grace period, the penalty becomes more severe: 20% off for two days late, 30% off for three days and so on. After 5 days, you will receive a “0” for the assignment.

Rejected Manuscripts/Reports: Each time a paper is “rejected”, because it did not follow the Instructions to Authors, 1 point is deducted. This is independent of the Late Policy, both can occur.

Blind grading: Whenever possible we will score assignments "blind" and ask you not indicate your name but list your provided "B-PID". This enables grading to be fairer and not be impacted by subjectivity etc.

*Formal written grade appeal process: If you feel that your assignment was not graded properly, you must submit your concern via appeal in writing via email. You must concisely explain why you object to the assigned grade and what elements of your work in fact demonstrate you mastered the material. Please be advised that if you submit a formal grade appeal about one element of an assignment, we always re-grade your entire exam, paper or quiz and the score may increase, decrease or stay the same. For group assignments, all authors must sign the written request since re-grading may impact all. How well you provide your claim, evidence and reasoning will be assessed, and students who provide good logical arguments supported well by solid relevant evidence will earn approval (you may cite pages of textbooks, or even better, published research papers). Avoid emotional arguments that blame others or arguments based on hearsay, e.g. “I heard from a student” “A TA told me this was correct.” If you neither make logical arguments or provide thoughtful evidence to support them, your appeal will not gain traction or be approved. All discussion concerning score changes must be completed within 7 days from the date the grade was officially posted (on the returned assignment or online). No grade changes will be considered after this time. If illness or other emergency prevents you from completing assignments on time, you must make arrangements with your instructor before the due date (example appeal provided in course pack).
LB144 Biology Learning Goals

1. Practice at doing and communicating science. Speak your thoughts smartly.
   
a) Communicate Scientific Thoughts: Manifest your smart thinking in the best words possible.
   1. Speaking: a high priority of this course is for you to practice public speaking & listening.
   2. Reading: practice careful reading of papers, identification of points, interpretation of figures.

b) Design and Analyze Experiments: Make a hypothesis, design experiments, make predictions. Interpret data collected, look for patterns, ways to best share and represent findings.

2. Study the Biology Idea of "Information". Learn examples and mechanisms to store/transmit information at molecular, cell, organismal, population levels.

   These "content" goals are for you to understand, describe, and give examples of how:

   a) Heritable information (like DNA/genes) provides for continuity of life and non-heritable information (like talking) is also transmitted within and between biological systems.

   b) Imperfect information transfer, like during reproduction of cells, chromosomes, and genes, leads to variation of traits among individuals. (e.g., some beach mice have light colored fur because a mutation in a gene makes it difficult for their hair cells to make dark hair pigment)

   c) Interactions among organisms and the environment determine individual survival and reproduction. (e.g., animals who are in cooperative groups and communicate live longer)

   d) Selection (and other mechanisms) acts on individuals and leads to the evolution of populations. (e.g., beach mice with fur that matches the color of sand live longer than others because?)

   e) Information in DNA => becomes (transcribed) information as RNA => becomes (translated) information as proteins (e.g. How viruses enter our cells, take control, & make viral proteins)

   f) Small simple chemicals can associate to form nucleotides, amino acids, lipids, carbohydrates; which can polymerize, form structures and functions we define as "alive" (life on earth).

3. Practice Transfer of Learning: Work with your group to intentionally transfer knowledge learned in one context (e.g. squirrels) to another new context (e.g. humans).

   a) Reflect: Develop personal learning goals and regularly reflect on your progress during the semester. (e.g. regularly consider "What I am supposed to be learning here? Have I mastered that? What about transfer? Can I link this to life on Mars, or humans, or something different?")

   b) Collaborate: Confidently cooperate in teamwork, and practice team building, communication and leadership. (e.g. "that's a good idea, should we also test if it works in another animal?" "Jon, you haven't spoken much, what do you think?")
**CELL AND ORGANISIMAL BIOLOGY (ONLINE LECTURE), FALL 2020**

**TOP HAT** course: [app.tophat.com/e/028662](http://app.tophat.com/e/028662), **zoom** classroom is: 9424-167-2427 (pass: 144)

**SCHEDULE:** Tuesdays=lecture videos on TopHat & Thursdays=LIVE lectures on Zoom 12:40-2:00pm

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Scale/Level</th>
<th>Readings (emphasis)</th>
<th>Instructors LIVE or TopHat</th>
</tr>
</thead>
<tbody>
<tr>
<td>W1</td>
<td>Th, 3 Sept.</td>
<td>Ecological</td>
<td>Lecture 1, Ch.18 (18.1 crickets call)</td>
<td>LIVE via Zoom (Luckie &amp; LAs)</td>
</tr>
<tr>
<td>W2</td>
<td>T, 8</td>
<td>Ecological</td>
<td>Lecture 2, Ch.18 (18.1 frogs sing)</td>
<td>Online videos (Luckie &amp; LAs)</td>
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<tr>
<td></td>
<td>Th, 10</td>
<td>Ecological</td>
<td>Lecture 3, Ch.18 (18.3 corals settle)</td>
<td>LIVE via Zoom (Luckie &amp; LAs)</td>
</tr>
<tr>
<td>W3</td>
<td>T, 15</td>
<td>Population</td>
<td>Lecture 4, Ch.17 (17.1&amp;2 fireflies)</td>
<td>Online videos (Chris Paradise)</td>
</tr>
<tr>
<td></td>
<td>Th, 17</td>
<td>Population</td>
<td>Lecture 5, Ch.17 (17.2 storm petrel)</td>
<td>LIVE via Zoom (Luckie &amp; LAs)</td>
</tr>
<tr>
<td>W4</td>
<td>T, 22</td>
<td>Population</td>
<td>Lecture 6, Ch.17 (17.3 meerkats)</td>
<td>Online videos (Chris Paradise)</td>
</tr>
<tr>
<td></td>
<td>Th, 24</td>
<td>Population</td>
<td>Lecture 7, Ch.17 (17.3 continued)</td>
<td>LIVE via Zoom (Luckie &amp; LAs)</td>
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<tr>
<td>W5</td>
<td>T, 29</td>
<td>EXAM I</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Th, 1 Oct.</td>
<td>Organismal</td>
<td>Lecture 8, Ch.16 (16.1 rat blood BP)</td>
<td>LIVE via Zoom (Luckie &amp; LAs)</td>
</tr>
<tr>
<td>W6</td>
<td>T, 6</td>
<td>Organismal</td>
<td>Lecture 9, Ch.16 (16.1 sandworts)</td>
<td>Online videos (Chris Paradise)</td>
</tr>
<tr>
<td></td>
<td>Th, 8</td>
<td>Organismal</td>
<td>Lecture 10, Ch.16 (16.3 flu vaccines)</td>
<td>LIVE via Zoom (Luckie &amp; LAs)</td>
</tr>
<tr>
<td>W7</td>
<td>T, 13</td>
<td>Organismal</td>
<td>Lecture 11, Ch.3 (3.1 Mendel)</td>
<td>Online videos (Luckie &amp; LAs)</td>
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<tr>
<td></td>
<td>Th, 15</td>
<td>Organismal</td>
<td>Lecture 12, Ch.3 (3.1 Mendel/SBE)</td>
<td>LIVE via Zoom (Luckie &amp; LAs)</td>
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<tr>
<td>W8</td>
<td>T, 20</td>
<td>Organismal</td>
<td>Lecture 13, Ch.3 (3.3 cell division)</td>
<td>Online videos (Malcolm Campbell)</td>
</tr>
<tr>
<td></td>
<td>Th, 22</td>
<td>Organismal</td>
<td>Lecture 14, Ch.3 (3.4 mitosis)</td>
<td>LIVE via Zoom (Luckie &amp; LAs)</td>
</tr>
<tr>
<td>W9</td>
<td>T, 27</td>
<td>Organismal</td>
<td>Lecture 15, Ch.3 (3.5 mit/meiosis)</td>
<td>Online videos (Malcolm Campbell)</td>
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<tr>
<td></td>
<td>Th, 29</td>
<td>Organismal</td>
<td>Lecture 16, Ch.3 (3.5 meiosis)</td>
<td>LIVE via Zoom (Luckie &amp; LAs)</td>
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<tr>
<td>W10</td>
<td>T, 3 Nov.</td>
<td>EXAM II</td>
<td></td>
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<tr>
<td></td>
<td>Th, 5</td>
<td>Cellular</td>
<td>Lecture 17, Ch.2 (2.1 RNA types)</td>
<td>LIVE via Zoom (Luckie &amp; LAs)</td>
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<tr>
<td>W11</td>
<td>T, 10</td>
<td>Cellular</td>
<td>Lecture 18, Ch.2 (2.3 Translation)</td>
<td>Online videos (Malcolm Campbell)</td>
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<tr>
<td></td>
<td>Th, 12</td>
<td>Cellular</td>
<td>Lecture 19, Ch.2 (2.4 NCBI)</td>
<td>LIVE via Zoom (Luckie &amp; LAs)</td>
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<tr>
<td>W12</td>
<td>T, 17</td>
<td>Molecular</td>
<td>Lecture 20, Ch.1 (1.1, 1.2 Griffith)</td>
<td>Online videos (Luckie &amp; LAs)</td>
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<tr>
<td></td>
<td>Th, 19</td>
<td>Molecular</td>
<td>Lecture 21, Ch.1 (1.4 DNA structure)</td>
<td>LIVE via Zoom (Luckie &amp; LAs)</td>
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<tr>
<td>W13</td>
<td>T, 24</td>
<td>Molecular</td>
<td>Lecture 22, Ch.1 (1.5 epigenetics)</td>
<td>Online videos (Malcolm Campbell)</td>
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<td>Thanksgiving Break, Nov. 26-29</td>
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<tr>
<td>W14</td>
<td>T, 1 Dec.</td>
<td>Molecular</td>
<td>Lecture 23, Ch4 (4.1 Evolution)</td>
<td>Online videos (Malcolm Campbell)</td>
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<tr>
<td></td>
<td>Th, 3</td>
<td>Molecular</td>
<td>Lecture 24, Ch4 (4.2 Miller &amp; life)</td>
<td>LIVE via Zoom (Luckie &amp; LAs)</td>
</tr>
<tr>
<td>W15</td>
<td>T, 8</td>
<td>Molecular</td>
<td>Lecture 25, Ch4 (4.3 competition)</td>
<td>Online videos (Malcolm Campbell)</td>
</tr>
<tr>
<td></td>
<td>Th, 10</td>
<td>Molecular</td>
<td>Lecture 26, Ch4 (4.4 store energy)</td>
<td>LIVE via Zoom (Luckie &amp; LAs)</td>
</tr>
</tbody>
</table>

**FINAL EXAM** Thursday Dec 17, 2020 12:45-2:45pm
THE TEXTBOOK

What is so insanely great about this textbook?

Drs. Malcolm Campbell, Chris Paradise and Laurie Heyer wrote an extraordinary textbook for learning biology. Over the past 50 years, research in biology has become more quantitative and interdisciplinary, relying more heavily on other sciences. To understand large ecosystems, or to make sense of massive data from human and other genomes, today's biologists must be able to use modern math, statistics, computation, and tech tools.

Yet biology instruction and traditional textbooks have also not kept pace with modern biology nor current research into how people learn. Studies on learning reveal that students learn best if they are actively engaged working both individually and in groups together constructing their own knowledge.

The textbook Integrating Concepts in Biology takes advantage of these insights and enables you to better achieve your full learning potential by directly involving you in your own learning\(^1\).

You will be asked to construct your own knowledge by analyzing and interpreting published data. As you gain knowledge, you will find you can learn more and retain new information more easily. Our classroom discussions will help you learn how to read text and scientific figures. You will be able to learn major concepts by reading about several examples in more depth. The textbook readings, online homework and in class discussions will guide you in interpretation, analysis and will help you build your new skills and knowledge.

The textbook does five things that experts\(^2\) have always said “should be done” in biology textbooks:

1. **Biology data**: You are presented both historical and modern published research data used to answer biological questions. You practice interpreting that data, making sense of it, just as scientists do.

2. **Hierarchy/Scale**: BIG biology (organismal) and little biology (molecular/cellular) is addressed together, integrated. The textbook integrates information across the biological size/hierarchy and scale.

3. **Big Ideas**: The text focuses on five big ideas, so that you learn that these big ideas of biology.
   - 1) **INFORMATION**: Living system's mechanisms to store, retrieve, and transmit information.
   - 2) **EVOLUTION**: The diversity and unity of life can be explained by the process of evolution.
   - 3) **CELLS**: Cells are a fundamental structural and functional unit of life.
   - 4) **EMERGENT PROPERTIES**: Interdependent relationships give rise to emergent properties.
   - 5) **HOMESTASIS**: Biological systems maintain energy and matter homeostasis.

4. **Math**: Mathematics is used as an important tool. Self-contained Bio-Math Explorations (BMEs) help you understand how math is applied to answer biological questions.

5. **HPS ethics**: Finally, the text raises your awareness about ELSI (ethical, legal, and social implications) and you engage with case studies of real-world implications of what you are learning.

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Integrating Concepts in Biology
By A. Malcolm Campbell, Laurie J. Heyer, and Christopher J. Paradise

Table of Contents
In the entire textbook, each of the five units focuses on one of the Big Ideas of biology. Each chapter in a unit focuses on a particular level of the biological hierarchy. We will focus on two Big Ideas (two units).

Big Idea 1: Information
Living systems have multiple mechanisms to store, retrieve, and transmit information. Main ideas include:
1. Heritable information provides for continuity of life.
2. Imperfect information transfer produces variation.

Big Idea 2: Evolution
The diversity and unity of life can be explained by the process of evolution. Main ideas include:
1. The origin of living systems occurred by natural processes, and life continues to evolve.
2. Natural selection is a mechanism of evolution that accounts for adaptation.

Chapter 18: Discusses commonalities in communication within and between species, how information is used by organisms to find and exploit other species. Case studies include: (i) mole crickets versus parasites, (ii) frog choruses and predators (opossums and bats), and (iii) where corals decide to grow.

Chapter 17: Discusses language and information transfer between organisms. How animals communicate and find each other through signals, using light or sound. Case study stories include: (i) fireflies, with light signals, (ii) a story about bird vocalizations, (iii) meerkats vs. mongooses (iv) how do plants communicate?

Chapter 16 & 3: In these chapters, you will learn how to predict patterns of inheritance and how organisms passed their genetic information to future generations. How prokaryotes (E. coli) reproduce, how eukaryotes use mitosis and meiosis. The laws discovered by Gregor Mendel and viral mechanisms.

Chapter 2: In this chapter, you will follow the path of researchers who made many ground-breaking discoveries about how cells produce proteins, processes that were nicknamed "central dogma" (transcription and translation) that answer "how does DNA communicate information to the cell?"

Chapter 1: You will explore and interpret the original data from experiments that led to our current understanding of DNA as heritable information. Case studies presented are: (i) Griffith and Pseudomonas bacteria story, then (ii) Oswald Avery's data and story, (iii) the Watson, Crick story with Franklin and Wilkins; and a discussion of how methylation of DNA sequences reduces expression.

Chapter 4: You will analyze data that illuminate the origin of eukaryotic cells from prokaryotic ancestors, the mechanisms of evolution (natural selection, mutation, gene flow, genetic drift), as well as the evidence that explains how life on earth evolved (NASA, Stanley Miller experiment, RNA World hypothesis).
Researchers have found increased structure and active learning increase everyone's ability to learn in introductory biology courses. In addition, every student in our course really does want to slowly carefully read the textbook, learn new information and enjoy mastering topics in biology. Given we believe the textbook we are using is outstanding, we are structuring short readings, with integrating questions in the course, so you more carefully read each section and reflect upon it. A quiz or exercise based on the reading may be given each lecture. These quizzes/exercises are designed to help you assess your own learning before and between exams. They provide you with regular feedback as to how well you are mastering each topic.

**ATTENDANCE AND PARTICIPATION:** It is essential that you not only come to class but also actively participate in order to construct your own knowledge. While attendance is being "present", participation includes reading and preparing well for class, answering questions verbally, and via clicker questions. Active participation includes, the following behaviors:

1. Bringing forth new ideas, information, or perspectives to academic conversations
2. Discussing your readings and reflections with instructors and peers
3. Meeting with the instructors to discuss your interests, assignments, or project
4. Participating in small group discussions and activities
5. Assuming responsibility for personal behavior and learning

While working on group projects, students should be mindful, all participants should exercise:

- Respect for themselves, each other
- Openness and a positive attitude toward new ideas and other's ideas
- Flexibility and tolerance of ambiguity
- Good communications amongst themselves.

**EXAMS:** There will be two midterm exams and a final exam, each may be comprehensive of all prior material. Midterm exams may be traditional multiple-choice format, or may be essay-style. Answers to open-book & take-home exams must also be submitted online to [http://turnitin.com/](http://turnitin.com/).

**Assignments (pts):**

<table>
<thead>
<tr>
<th>Week</th>
<th>Assignment</th>
<th>@Lecture</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>(all)</td>
<td>Attendance, Participation, Homework, Quizzes</td>
<td>X</td>
<td>50</td>
</tr>
<tr>
<td>5</td>
<td>Exam I</td>
<td>X</td>
<td>75</td>
</tr>
<tr>
<td>10</td>
<td>Exam II</td>
<td>X</td>
<td>75</td>
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<tr>
<td>15</td>
<td>Final Exam</td>
<td>X</td>
<td>100</td>
</tr>
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</table>

Total 300 pts

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144 Contract (sign & return)

A syllabus is a form of contract between the instructor and the students. If you, the student, complete tasks with a specific score a predefined grade is awarded. Read the announcements below and the syllabus in full before signing and submitting this page.

1. WORKLOAD As Undersigned student, I am aware the lecture & lab course is worth 4 credits and will require me to work outside of class 8-12 hours each week. Some weeks will require less, and some weeks will require more effort. If I prepare poorly for class, learning will take longer.

2. TOURISM I am aware that I will work with a group of students that learn together in lecture, work together as a research team in lab, meet and study together outside of class at night and on weekends. This course is designed for full-time LBC students and if I need to travel off-grid frequently, my group members may become very unhappy, and I should discuss this.

3. MANY READINGS As the Undersigned student, I am aware that I will have many required reading assignments each week, and unless I read the assigned pages, answer questions, take notes and study them prior to class, it’s likely I will become lost in lecture.

4. QUIZZES As the Undersigned student, I am aware that I will have quizzes or graded exercises each week, and unless I read the assigned pages in the reading, take notes and study them prior to the quiz, it’s likely I will get a low score on said quiz or exercise.

5. EXAMS As the Undersigned student, I am aware midterm exams may be purely essay style and provided in advance, and in this case I should work with my group studying the questions and developing excellent answers in the time prior to the test. If I just “cram” my studies and work into 48 hours prior to the exam, it’s likely I will get a low score on said midterm.

6. UNIVERSITY GRADING SCALE I am aware this course uses a university scale with higher expectations than high school, excellent work is a 3.0, much more is necessary for a 4.0.

7. GROUP GRADES I am aware that I, with the help of other students in my research group, will be authoring one research paper (with a number of drafts) and my grade will include both the score of my sections as well as the score for the work as a whole. I realize I will be expected to review the entire project before submission. If this doesn’t work well for me, I should discuss it with my group or the prof immediately.

8. HONOR CODE In the authoring of assignments, I accept that any piece of work may be submitted to http://turnitin.com for screening. I am aware that if the work authored by me is found to be plagiarized, I will be given a zero for the assignment & perhaps for LB144 course grade.

I have read the above announcements and syllabus. I understand the expectations are high but I’m up to the challenge. I agree to the tenets of this contract.

Printed Name __________________________ Signature __________________________ Date __________________________
TOP HAT  course: app.tophat.com/e/028662. zoom classroom is: 9424-167-2427 (pass: 144)

LB-144L: CELL & ORGANISMAL BIOLOGY I (DISTANCE LAB), FALL 2020
Lab is held Tuesdays (LIVE on Zoom 3-6pm) & Thursdays (recorded on TopHat)

LECTURER
Douglas B. Luckie, Ph.D., Associate Professor, Lyman Briggs College & Dept. Physiology

COURSE PACKET
"LB-144 Course Pack," Fall 2020 (Dr. Luckie) available online, on the course website.

COURSE WEBSITE  msu.edu/course/lb/144

UNDERGRADUATE LEARNING ASSISTANTS:
Sophie Lampier (lampier9@msu.edu)
Frederick Ezenyilimba (ezenyili@msu.edu)
Huda Warsame (warsameh@msu.edu)
Maggie Leff (leffmagg@msu.edu)

RESEARCH TEAM RATIONALE
Student groups are intended to be research & learning teams. Work with other students to study and discuss biology topics in lecture, as well as share your ideas and research predictions in lab. Teams are better learning environments but also, they are REAL LIFE. While scientists do some things on their own, they more often work in groups to solve problems because a well-functioning team is the most efficient way to work. Working in the same group in both laboratory and lecture will allow you to become more familiar with each other so you will feel comfortable enough to discuss your biology questions. Although it is easier for an instructor to run a class or lab without group work, numerous research studies have shown that working in groups and discussing science with your peers can increase your learning considerably (although you have to strive to be a “cooperative” group). By pooling your knowledge, members of your group will get “stuck” less often be able to progress far beyond what any individual in the group could do alone.

<table>
<thead>
<tr>
<th>Week</th>
<th>Before Lab Meeting</th>
<th>During Laboratory Meeting Activities &amp; Assignments DUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>View &quot;Talking&quot; Film</td>
<td>Film Quiz, CoV-Figure, Journal Club: &quot;HoneyGuide&quot;, CoursePack</td>
</tr>
<tr>
<td>2</td>
<td>View &quot;IDEO&quot; Film</td>
<td>Film Quiz &amp; Debrief, Writing INTROS, Form Groups</td>
</tr>
<tr>
<td>3</td>
<td>View &quot;Islands&quot; Film</td>
<td>Film Quiz, 4-slide Proposal movie, Grading TITLES</td>
</tr>
<tr>
<td>4</td>
<td>Group Contract</td>
<td>2¶-Draft due, Preparing for LA and Prof Thesis Interviews: Q&amp;A</td>
</tr>
<tr>
<td>5</td>
<td>GEA1 on Catme.org</td>
<td>LA Interviews begin (during &amp; outside lab time, groups of 4, 60m)</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td>LA Interviews (cont.) Writing RESULTS &amp; FIGURES</td>
</tr>
<tr>
<td>7</td>
<td></td>
<td>Half-Draft due (2¶+ Results/Figs paper), Grading FIGURES</td>
</tr>
<tr>
<td>8</td>
<td>GEA2 on Catme.org</td>
<td>PCR &amp; Prof Interviews begin (during lab, in groups of 2, 60min)</td>
</tr>
<tr>
<td>9-12</td>
<td></td>
<td>Gene research (PCR, gels, Primers, BLAST =Molecular Teams)</td>
</tr>
<tr>
<td>13</td>
<td></td>
<td>Final film and/or Final paper (DRAFT1) due</td>
</tr>
<tr>
<td>14-15</td>
<td>GEA3 on Catme.org</td>
<td>Prof Interviews completed (during lab, in groups of 2, 60min)</td>
</tr>
</tbody>
</table>
THE LABORATORY

You will need the Laboratory Guide resources provided in the Course Pack. Review the lab guide materials required for each week during the semester. This semester, you will design and pursue one experiment all semester long. You will find an interesting animal behavior related to communication that has been studied and published in the literature (like a mating display) and attempt to document it when observing animals on locally (like squirrels & humans). 4.0-seeking students will also connect the behavior to a gene. Your group will capture your observations with still photographs and digital video from your smartphones. Ultimately, you’ll generate a short 5minute documentary film showing the results of your research and write a formal research manuscript. Each week, you will examine and practice the methods of a scientist in performing your research. This approach is aimed at mentoring you, so you master the ability to think and work like a serious scientist.

While working on group projects, you should be mindful of other students in your group; therefore, it is important for all participants to exercise:
• Respect for themselves, each other
• Openness and a positive attitude toward new ideas and other’s ideas
• Flexibility and tolerance of ambiguity
• Good communications amongst themselves

ASSIGNMENT SCHEDULE

<table>
<thead>
<tr>
<th>Speaking (points)</th>
<th>Writing (points)</th>
<th>Discussing/Demonstrating</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Film option)</td>
<td>Half-Draft Paper= 36</td>
<td>Prof Thesis interview= 50</td>
</tr>
<tr>
<td></td>
<td>Final Paper/Film=60</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Week</th>
<th>Assignment(s) Due</th>
<th>Value (pts)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Proposal movie</td>
<td>13</td>
</tr>
<tr>
<td>4</td>
<td>Proposal 2¶-Paper</td>
<td>11</td>
</tr>
<tr>
<td>5</td>
<td>LA Thesis Interview (individual score, groups format)</td>
<td>30</td>
</tr>
<tr>
<td>7</td>
<td>Half-Draft Paper</td>
<td>36 (rubric x2)</td>
</tr>
<tr>
<td>7-15</td>
<td>Prof Thesis Interview (individual score, pairs format)</td>
<td>50</td>
</tr>
<tr>
<td>13</td>
<td>Final Paper -or- (Film option)</td>
<td>60 (rubric x2)</td>
</tr>
</tbody>
</table>

Total 200 pts

The "Honors Option" (optional)

*Note: The Honors Option for LB144 this semester is presenting your group’s research findings as a talk at the UURAF during the Spring Semester. This is required to be an individual assignment (not done as a group) and a talk (not a poster) if you seek individual credit for an Honors Option. Be aware the UURAF application deadline is often in January.
Face Coverings:
Face coverings must be worn by everyone (including all faculty, staff, students, vendors, and visitors) indoors and outdoors while on property owned or governed by MSU and while participating in MSU-related or MSU-sponsored activities. If you have a medical condition that may prevent you from safely wearing a face covering, you should contact MSU’s Resource Center for Persons with Disabilities to begin the accommodation process.

Face coverings should (a) be non-medical grade to maintain supplies for health care use, (b) fit snugly against the side of your face, (c) cover your nose and mouth, (d) be secured with ties or ear loops, and (e) allow for breathing without restriction. Cloth face coverings should only be worn for one day at a time, and they must be properly hand washed or laundered before subsequent use. Face coverings may vary (for example, disposable non-medical face coverings or neck gaiters are acceptable).

Failure to wear a face covering for those without an accommodation will result in the following: (1) A reminder of the requirement, the reason for it (to minimize spread), and a request to comply. (2) A request to leave the classroom if no compliance. (3) If no face covering compliance and the student refuses to leave the classroom, class will be dismissed. (4) Should an emergency develop that cannot be resolved by classroom dismissal, the instructor may consider calling 911 for assistance.

Absence due to illness: Students who need to quarantine themselves, have been sick with COVID-19 symptoms, tested positive for COVID-19, or have been potentially exposed to someone with COVID-19 must follow CDC guidance to self-isolate or stay home. Illness or self-isolation will not harm performance or put one at a disadvantage in the class.

Technical Assistance
If you need technical assistance at any time during the course or to report a problem you can:

- Visit the Distance Learning Services Support Site
- Visit the Desire2Learn Help Site [http://help.d2l.msu.edu/]
- Or call Distance Learning Services: (800) 500-1554, or (517) 355-2345
Mental Health Resources
College students often experience issues that may interfere with academic success such as academic stress, sleep problems, juggling responsibilities, life events, relationship concerns, or feelings of anxiety, hopelessness, or depression. If you or a friend is struggling, we strongly encourage you to seek support. Helpful, effective resources are available on campus, and most are free of charge.

- Drop by Counseling & Psychiatric Services (CAPS) main location (3rd floor of Olin Health Center) for a same-day mental health screening.
- Visit https://caps.msu.edu for online health assessments, hours, and additional CAPS services.
- Call CAPS at (517) 355-8270 any time, day or night.
- 24-Hour MSU Sexual Assault Crisis Line (517) 372-6666 or visit https://centerforsurvivors.msu.edu/

Resource Persons with Disabilities (RCPD)

- To make an appointment with a specialist, contact: (517) 353-9642
  Or TTY:  (517) 355-1293
- Web site for RCPD: http://MYProfile.rcpd.msu.edu

LBC Student Success and Advising Team
LBC advisors work to educate, coach, and support students in our College. For more information about the Student Success and Advising team visit: https://lbc.msu.edu/advising/index1.html
To make a zoom or phone appointment with an advisor visit: https://lbc.msu.edu/advising/advising-appointments.html
To review LBC Academic Policies, including LBC’s Academic Grievance Policy, visit:
  https://lbc.msu.edu/advising/academic-policies.html

Library Information
Chana Kraus-Friedberg is the Lyman Briggs College and Public Health Librarian at MSU’s library. Feel free to contact Chana Kraus-Friedberg for any research or resource support for your LBC classes. Phone: 517-884-8462; Email: kraisfri@msu.edu; MSU Library: www.lib.msu.edu

MSU Writing Center
You can read about the goals and mission of MSU’s Writing Center here: https://writing.msu.edu/language-statement/ To schedule an appointment at the writing center to review an outline and/or drafts, visit:
  https://msuwriting.mywconline.com/

Course Recordings: Meetings of this course may be recorded. The recordings may be available to students registered for this class. This is intended to supplement the classroom experience. Students are expected to follow appropriate University policies and maintain the security of passwords used to access recorded lectures. MSU requires recordings may not be reproduced, shared with those not in the class, or uploaded to other online environments. Due to FERPA laws, MSU states doing so may result in disciplinary action. If the instructor or another University office plan other uses for the recordings beyond this class, students identifiable in the recordings will be notified to request consent prior to such use.

Related Policies:
Institutional Data Policy:
  https://tech.msu.edu/about/guidelines-policies/msu-institutional-data-policy/
Commitment to Integrity: Academic Honesty

Article 2.3.3 of the Academic Freedom Report states that "The student shares with the faculty the responsibility for maintaining the integrity of scholarship, grades, and professional standards." In addition, the (insert name of unit offering course) adheres to the policies on academic honesty as specified in General Student Regulations 1.0, Protection of Scholarship and Grades; the all-University Policy on Integrity of Scholarship and Grades; and Ordinance 17.00, Examinations. (See Spartan Life: Student Handbook and Resource Guide and/or the MSU Web site: www.msu.edu.)

Therefore, unless authorized by your instructor, you are expected to complete all course assignments, including homework, lab work, quizzes, tests and exams, without assistance from any source. You are expected to develop original work for this course; therefore, you may not submit course work you completed for another course to satisfy the requirements for this course. Also, you are not authorized to use the www.allmsu.com Web site to complete any course work in this course. Students who violate MSU academic integrity rules may receive a penalty grade, including a failing grade on the assignment or in the course. Contact your instructor if you are unsure about the appropriateness of your course work. (See also the Academic Integrity webpage.)

Inform Your Instructor of Any Accommodations Needed

From the Resource Center for Persons with Disabilities (RCPD): Michigan State University is committed to providing equal opportunity for participation in all programs, services and activities. Requests for accommodations by persons with disabilities may be made by contacting the Resource Center for Persons with Disabilities at 517-884-RCPD or on the web at rcpd.msu.edu. Once your eligibility for an accommodation has been determined, you will be issued a Verified Individual Services Accommodation ("VISA") form. Please present this form to me at the start of the term and/or two weeks prior to the accommodation date (test, project, etc.). Requests received after this date may not be honored.

LINKS TO UNIVERSITY POLICIES

- Spartan Code of Honor
- Academic Integrity
- RVSM Limits to Confidentiality
- RCPD Disability Accommodations Statement
- Mental Health
- Tolerance and civility
- Religious Observance Policy
- Student Athletes
- Pronouns
- MSU Final Exam Policy
Owner's Manual
(with lots of ideas and text stolen from great authors, Drs. Alice Dreger and Tanya Noel)

Why is this an "owner's manual" instead of a syllabus?

Most syllabi contain only class schedule information. By contrast, this is more like an "owner's manual" like the sort that comes with a new car. If you read and use this manual, you will understand how this course works, and you will be able to keep the course running smoothly, and do the regular maintenance required to avoid breakdowns. Of course, this course isn’t a car. It’s more like a bus tour. I believe that a university course is in its essence not a number, and not a topic, but a group of people who share a common goal of learning about some particular thing. In this sense, a course is like a bus tour, a tour to a place which is unfamiliar to most of us. As the teacher, I am the bus driver and chief tour guide. Each member of the course starts off at “home” intellectually and emotionally and comes to the bus station which is the classroom. We agree to "take the tour" together, to get on the bus and travel together for the length of the course even though many of us may never have met before. Together we visit a number of different "places."

So why is this "owner's manual" so long?

I've discovered that the more information I give students, the more comfortable and in control they feel, and the better they learn. This packet contains lots of information. Besides telling you about the mechanics of the course, this packet tells you a lot about my teaching style. I used to provide my students with a separate "statement of teaching philosophy." It now occurs to me it is weird to separate that teaching philosophy from my teaching materials. So now my philosophy is embedded throughout this packet. My teaching style, methods, and philosophy change over time, thanks to students who tell me what works and what doesn’t work. I'm counting on you to give me lots of feedback about what is working for you and what is not, and most importantly why. It is very important to me to do a good job for you. In addition to the course learning objectives provided earlier, be aware this course aligns with the following MSU Undergraduate Learning Goals:

Analytical Thinking
A successful student uses ways of knowing from mathematics, natural sciences, social sciences, humanities, and arts to access information and critically analyzes complex material in order to evaluate evidence, construct reasoned arguments, and communicate inferences and conclusions.

- Acquires, analyzes, and evaluates information from multiple sources.
- Synthesizes and applies the information within and across disciplines.
- Identifies and applies, as appropriate, quantitative methods for defining and responding to problems.
- Identifies the credibility, use and misuse of scientific, humanistic and artistic methods.

Effective Communication
A successful student uses a variety of media to communicate effectively with diverse audiences.

- Identifies how contexts affect communication strategies and practices.
- Engages in effective communication practices in a variety of situations and with a variety of media.

Integrated Reasoning
A successful student integrates discipline-based knowledge to make informed decisions that reflect humane social, ethical, and aesthetic values.

- Critically applies liberal arts knowledge in disciplinary contexts and disciplinary knowledge in liberal arts contexts.
- Uses a variety of inquiry strategies incorporating multiple views to make value judgments, solve problems, answer questions, and generate new understandings.

How does this course work in terms of the day-to-day?

We will meet two times a week for the lecture class and our meetings will consist of discussions of the readings and activities related to the topics we are investigating. Do the readings assigned for the day before you come to class and spend enough time thinking about the readings before class. You should come to class ready to summarize the readings and to ask and answer questions about them. Homework and quizzes will often be given on the readings.

Always give yourself plenty of time to do your work, and feel free to contact me whenever you need help or clarification. I like teaching and not only do I feel good when you learn, often when you
learn something new, I learn, too.

Generally we will stick very closely to the attached schedule, however, the point of this class is for you to learn, so if we need to change our scheduled plans to achieve that goal, we will do so. If you feel that you need things to be done somewhat differently in class in order for you to learn better, please let me know and I will work to adjust our schedule or classroom dynamics so that we can maximize learning.

So what’s my feeling about teaching?

I love it! And I think it shows – my students have voted me “honorary member of the graduating class of Lyman Briggs” (“teacher of the year”) about five times in the last fifteen years, I was given the Teacher-Scholar Award of MSU, and most recently the 2015 MSU Alumni Club of Mid-Michigan Quality in Undergraduate Teaching Award (nominated by MSU faculty and alumni for teaching) and the 2017 Outstanding Faculty Award by the ASMSU Senior Class Council (nominated by MSU graduating seniors for teaching). If you hear that I am tough, I am, but that’s because I care about your learning. If I didn’t care about your learning, I would have stayed at Stanford University.

I am delighted to have recruited amazing LAs to help you do well in the course. You will find that our LAs share my love of teaching, of biology and dedication to helping you learn. But they are tough too because they want you to learn, lots. They are trained to answer your questions with responses in the form of guiding questions. Why? because it helps you learn and remember, and they know your next class (and career) will be far more difficult and demanding than this course, you know this too.

What else besides being in class will be required of you?

Note that this course uses a wider range of assignments than just several exams. This spreads out risk and stress so it's lower level, day to day, and allows you to assess your own learning with lower-stake quizzes to avoid any surprises when facing the bigger exams. All points are weighted equally and in that sense, grades are pretty simple – and you can always check your total on the online D2L gradebook – but be sure to keep your own spreadsheet and alert me if my grade data has an error.

• Quizzes on readings: I will frequently give short quizzes on a day’s assigned reading at the beginning of the class meeting. These quizzes accomplish two things: (1) reward you for keeping up-to-date on the readings; (2) reward you for spending enough time on the readings to really understand them. If you read carefully, you should have little problem with the quizzes. If you have a lot of trouble with short, fast quizzes, remember there are lots of bonus options in this class you can use as substitutions. If you miss a quiz because you are late or absent, you will receive a "0". These cannot be made up.

A note on grades & FERPA:

To support blind-grading we will often request that you not list your actual name but just provide your PID. Privacy, as required by MSU FERPA regulation, will be maintained by utilizing a code that is NOT your real A-PID, so we'll call it your B-PID. Your B-PID will be listed on D2L in your personal gradebook.

Backstory: In recent years universities have become very afraid of getting in trouble for breaking the law called FERPA (Family Educational Rights and Privacy Act). The law was created back in 1974 to protect the privacy of students and their grades. In response to it all universities created student ID numbers so instead of placing a grade next to a person's name, instructors could place it next to a student number to maintain privacy. Many universities chose to use a student's social security number to also be their student number. When identity theft became a big problem, universities then changed all their
student ID numbers from social security to become some number randomly generated in house. In recent years now the student ID number itself has become protected. In fact, while other people are permitted to know your name, and even say it aloud and post it publicly, the student ID number is super protected. Thus instead of using your officially MSU-issued A-PID, in this course MSU requires that we issue a new temporary student ID. We will call these the B-PID, since they are for "who you be" and it’s for blind grading.

Professors can use grades in two ways: they can use grades to "sort" students into "A" students, "B" students, etc.; or they can use grades as learning incentives and rewards. Unfortunately the sorting system generally sorts according to "talents" students either have or don't have before they ever reach a particular classroom, e.g., the talent of being able to memorize and recall a lot of things. I would rather use grades to encourage students to develop their skills, to expand their minds and interests. While students are often only familiar with positive curving (sometime called a mother's curve) a number of university classes use an actual curve that raises or lowers the grading scale with the goals to only permits a few students (like just 10 in a class of 100) to earn a 4.0 and then only a few (perhaps 20) are permitted to have a 3.5 etc. Even if everyone in the class got above a 90% on an exam the grade scale would shift up until only the prescribed number of students got a 4.0 grade. This is a real "curve" and, I will never grade on a curve like this. Our grading scale with stay exactly as stated in the syllabus and each student will get whatever grade she or he has earned by the end of the semester. Nothing would make me happier than if everyone worked hard and learned a lot and got 4.0's. I would feel that we had achieved something great if everyone got a 4.0.

Table 1- University-level grading system: The table below describes the relationships between grades, percent, and performance in the University-level grading system used in our lab and lecture courses. The first column describes the letter/number grade. The second column describes the percentage associated with that grade. The third column describes the performance-level required. Remember, if at any point you feel confused or distressed about your grades, carefully review the syllabus and talk to me.

<table>
<thead>
<tr>
<th>Letter Grade</th>
<th>Percentage</th>
<th>Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>A (4.0)</td>
<td>90 to 100%</td>
<td>Outstanding Work- A “4.0” is Outstanding. It literally stands out. It has the characteristics described for 3.0 and 3.5-level elements but in addition, the work by itself impressed with how much &amp; well it was done. The student taught Prof something original.</td>
</tr>
<tr>
<td>B+ (3.5)</td>
<td>85 to 89.9%</td>
<td>Most Excellent Work - A “3.5” is Most Excellent. Every detail of the work was done extremely well and they found additional papers and evidence beyond what they were told.</td>
</tr>
<tr>
<td>B (3.0)</td>
<td>80 to 84.9%</td>
<td>Excellent Work - A “3.0” score is considered Excellent. It is impressive work, top of the class, and the work was done extremely well but nothing beyond what was expected.</td>
</tr>
<tr>
<td>C+ (2.5)</td>
<td>75 to 79.9%</td>
<td>Pretty Good Work- A “2.5” is Pretty Good, the student did the minimum work required and did a pretty good job, this is expected at the university level and near average for the class.</td>
</tr>
<tr>
<td>C (2.0)</td>
<td>70 to 74.9%</td>
<td>Average Work - A “2.0” is average, the student did the minimum work required.</td>
</tr>
<tr>
<td>D+ (1.5)</td>
<td>65 to 69.9%</td>
<td>Below Average Work - the student did less than minimum work required.</td>
</tr>
<tr>
<td>D (1.0)</td>
<td>60 to 64.9%</td>
<td>Poor Work- the student did less than minimum work required and of poor quality.</td>
</tr>
<tr>
<td>F (0.0)</td>
<td>0 to 59.9%</td>
<td>Failing Work- the student did far less than minimum work required and very poor quality.</td>
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</tbody>
</table>
Course Structure
This course will use a public website and online tools like Turnitin, CATME, Desire2Learn, and Top Hat. The course website may include online lessons, course materials, and additional resources. Activities may consist of readings, discussion forums, email, journaling, wikis, and other online activities. You will need your MSU NetID to login to the course to access the grades on D2L (http://d2l.msu.edu).

Definitions, terms, transparency
Admission: I believe caffeine and sugar increase attention and learning but have no empirical data to support this, except for eating donuts, that is documented to work, but just for 15 minutes post-eating. I like the drink called the Cortado (it’s coffee, like a tiny latte) but particularly enjoy the moment I pour cane sugar out of the brown paper packet on top of the frothed milk and watch it sink into the drink. When you come to office hours, unless there’s a rush, I’ll likely offer you an espresso (LIVE or virtually).

Attendance: Student learning is impacted by many things, yet education research has robustly shown it is significantly impacted by these three things: class size, teacher quality and attendance. You are, of course, permitted to skip any class meeting you wish but often a single clicker point is made available to you, to encourage attendance since it correlates with learning. Attendance at the meeting of a class will be defined as being physically present in the room for the full time period of the class meeting. Thus be present, in your seat with you notebook open and pen in hand, at the very beginning when the clock in room strikes the hour and class begins, still there during/throughout the entire duration of the class, as well as at the very end of the official time period (feel free to come and go to visit the restroom, just not off vacationing elsewhere). It’s only fair to treat students who arrive late exactly the same as those who depart early. We will often reward students for attendance by using technology to record your presence. If you fail at using your device to click-in for attendance at the beginning middle or end of class, due to whatever reason, be aware we do not micromanage the attendance data (no appeals). Making the choice to schedule another course that has a start or finish time that is proximal or even overlaps with this class is, of course, your choice and entirely acceptable. Yet this will not change the definition of attendance or waive it. University students are adults and literally everything in a course is optional, yet if you want points, in this case for attendance (and more importantly to learn) you have to be there.

Belong: Lyman Briggs College is dedicated to promoting inclusion and fostering diversity. Let’s make our classroom comfortable and welcoming for everybody. Let’s strive to treat everyone with respect, civility, and empathy and rather than avoid new things to learn from others about different beliefs, practices, and lives. You are all super wonderful smart people and all belong here.

Blind grading: When a computer scores a scantron bubble sheet from a multiple choice exam, it is objective, it doesn’t have a pre-conception as to which students are smart, or are nice to it, so it treats everyone the same and just rewards correct answers. Unfortunately, human graders are less objective. LAs, GTAs, and Profs, are all unable to be perfectly objective when they have already had interactions with the person whose work they are grading. While they try hard to be so, education research shows that even knowing what the person’s name is will impact the grader and grade (even if they never met the person). Thus imagine if they know the person reasonably well. If they have read prior papers, knew the person’s prior grades, or had a number of positive (or negative) conversations with them. Wow, that will cause major problems when trying to be objective while grading, even for the best teacher ever, unless the grader is blind to the identity of the author. Professional journals and grant review panels use single blind or double blind systems to avoid subjective evaluation. We will use this in our class too.
Participation: It turns out participation is different than attendance. It refers to a student who is actively working to learn the materials discussed in the course. Students who are active participants do not merely talk during class but also prepare in advance for class. This means carefully completing the readings, taking notes on them (best for learning, do this by handwritten notes on paper) and preparing for the upcoming class meeting by reviewing notes and highlighting any questions you thought of while preparing for class. To reward this behavior, which enhances learning, often there will be a pop quiz or problem or writing exercise during class which is scored. Also there are clicker questions during lecture and you earn a point each time you chose a correct answer. You only need to get half of all clicker points to earn a perfect 100% score for participation. And, if you go above that level, all those extra clicker points become extra credit for you to use to help fill in for any points you lost on other assignment in the course. If you prepare for class you’ll get lots of points and if you don’t you get less. This helps increase the number of people that ultimately decide they need to study the material prior to class and as a result also learn more when discussing the material again in class. If you prepare, class is fun and interesting. If you don’t it becomes confusing and frustrating, as it feels like everyone else seems to know all the answers while you don’t even understand the questions.

Random calling in lecture: How often have you been in a big lecture class that has maybe 8 students who are the only people who ever are called upon to answer the professor’s questions in lecture? The other 100+ students throughout the entire semester will generally never speak aloud during lecture. After a while you get used to it. Everyone knows that “those students” answer the questions, so we don’t have to, cool. Yet, deep down you also know, while it’s comfortable to never have to answer a question, it likely reduces your learning, heck some folks fall asleep. My wife tells a story about a small class where the Professor always asked these incredibly difficult questions that nobody ever even understood. Then one day, near the end of the semester, she did the reading prior to class and during class realized that ever single question the instructor asked was directly out of the reading. She was embarrassed because she realized they must know nobody does the reading, given no student ever understood the questions he asked even though they were right out of the first pages of each reading. Because our goal in this class is learning we will use random calling in lecture to help *everyone* increase their learning and gain skills at communication/public speaking.

---"Tips from Tanya": Some points for students about technology in the classroom ---

Author: Dr. Tanya Noel

Almost everyone has a smartphone, laptop, tablet, or combination of these devices with them during their waking hours (and beyond, in some cases). There is huge potential for distraction using these devices – which is fine if you’re waiting in a long, boring line or on the bus, but can be problematic in the classroom. Be aware of:

- There have been studies that have shown **multi-tasking in class is detrimental to learning**. (Actually, the evidence overwhelmingly suggests humans can’t really multi-task … or, at least, can’t multi-task well!) If you’re trying to go back and forth between course-related stuff and other websites (or assignments for other courses, etc.), this will affect how well you’re learning/working.

- **Notifications (e.g., beeps/vibrations for new emails, text messages, etc.) are highly distracting**, and feed into “reward systems” in the brain that can reinforce behaviors like frequently checking your phone, Facebook, etc. (You know that uncomfortable feeling that makes you check your phone/email? Your brain gets a dopamine hit when you give into that urge … and makes it more likely to continue the behavior leading to the reward.) **Consider turning off these notifications**, at
least during class and other times when you want to be able to focus uninterrupted. (Some people
have found turning off notifications altogether has helped them not only focus, but reduced their
stress levels!)

- **Note-taking on computers (vs. by hand) is associated with lower-quality learning/test scores.**
  Results from some recent studies support the idea that writing notes by hand on paper is superior to
taking notes on the computer. There are a number of hypotheses about this, but many experts agree
that taking notes by hand involves more thinking about what’s important and worth writing down
(as you can’t transcribe every word spoken by the professor). On the computer, it is tempting to try
to record everything verbatim, with the brain not processing much of the information.

**References:**

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