

BSC-120 – Principles of Biology – Fall 2015

** By remaining enrolled in this course, you accept the contents of this syllabus; therefore, you must ensure that you understand the contents **

~CONTACT INFO ~

Dr. EMILY GILLESPIE gillespieE@marshall.edu website: <http://gillespielab.weebly.com/>

- Use this email only, not the messaging system within MUOnline/Blackboard.
- Email is not texting; do not expect a response immediately. I may not respond to emails during non-business hours, but I will respond as quickly as possible. If you don't hear from me within two business days, please stop by office hours.
- I expect students to write professional emails, which means writing clearly and concisely, and addressing your instructors appropriately. Do not write in text-ese.
- Identify your course in the subject line (BSC-120) since I teach multiple courses.

Office: Science 364 Phone (304) 696-6467. I strongly prefer email over phone so that I can write you a thoughtful, clear response without being pressed for time.

OFFICE HOURS: **10:30am-11:30am Monday, Wednesday and Friday** and **11:00-11:30 Tuesday and Thursday**. These hours are firm unless you are in a scheduled class during all of these times—in which case, email me to set up an alternative time. If these hours prove inadequate for us, I will add more.

LECTURE MEETINGS: Science 374 Lecture Time: M, W, F 1:00 p.m. – 1:50 p.m.

LAB MEETINGS: Science 210 Section 112: 8:00 a.m. - 9:50 a.m. Tuesday
Section 113: 12:00 p.m. - 1:50 p.m. Tuesday
Section 203: 10:00 a.m. – 11:50 a.m. Wednesday

Two of my former BSC-120 students, **Shad Mitchell** and **Andrew Hart**, will be offering regular review/study sessions as a volunteer. These sessions will be held from 4 p.m. – 5 p.m. on Tuesdays (location TBD). Both students know the material well and can help you adapt to the demands of this course if you attend regularly. They are likely to cover material differently than I do, so you may find both approaches together very helpful.

~COURSE INFO~

COURSE DESCRIPTION: 4 credit hrs. This survey course introduces students to the biological principles common to all organisms, including the chemistry of life, cell biology, metabolism, heredity, and evolution through classroom lecture and laboratory activities.

Course Prerequisite: Minimum of 21 or better on Math ACT, *or* \geq C in MTH 121 or a higher math course. **The course is intended for biology majors and pre-professional students, and will be taught at a level appropriate for these goals, meaning that it is heavily conceptual but reliant on underlying detail.**

Course Outcomes	Opportunities to Practice Course Outcome	Course Outcome Assessment(s)
Articulate and describe the basic biological principles common to all organisms	In-class discussions and laboratory exercises	Examinations and quizzes
Discuss and use the scientific approach to solve problems within the field of biology	In-class discussions and laboratory experiments	Examinations, quizzes and laboratory reports
Read and analyze charts, graphs, and tables conveying scientific information	In-class discussions and laboratory exercises and experiments	Examinations, quizzes and laboratory reports
Collect, interpret, present and discuss scientific data	Laboratory experiments	Formal written laboratory report

REQUIRED COURSE MATERIALS:

1. A comfortable way to take notes (see my Electronics Policy, below).
2. Text: Biology, 3rd edition by Brooker et al., 2013. (for home)
3. Software: McGraw-Hill 'Connect' access (for home) Navigate to:
<http://connect.mheducation.com/class/e-gillespie-all-sections-1>
4. BSC-120 Laboratory Manual by Weinstein (for lab)
5. Short Guide to Writing in Biology by Pechenik (2013) or another edition (for lab)
6. Safety goggles (for lab)

7. Access to the course management site through www.marshall.edu/muonline (also called Blackboard), where you will find various updates, announcements and materials throughout the semester. Your gradebook will be available here as well. If you cannot access the course, email me right away, because ***you are responsible for any material or announcements posted there, as well as regularly making sure that your gradebook reflects your grades as you understand them.***

~EXPECTATIONS~

University education is a 'two-way street.' In other words, you (the student) and I (the lecturer) must work together in order for your experience to be successful. Your commitment to getting the most out of the course is critical. You will find that college courses are qualitatively different (not just more work or harder work) than high school. It is important that you embrace this difference. I can help with that.

My responsibility to you is to come to class prepared each and every day, and to think critically about what you need to learn in this class in order to be successful biology majors. Another part of my commitment is to be available to you for help during office hours for help with material and troubleshooting your study habits, and to give you feedback about your progress in a timely manner. If you require more extensive help with maximizing your study habits, I will help you access more resources.

Your responsibility to me is to come to class prepared to participate each and every day, to study actively, to be responsible for your own learning process, and to address problems in a timely manner. It is extremely difficult to pass this course if you are disengaged, attend poorly, or fail to address what you need help with on a continuing basis.

Electronics policy. Laptops are permitted for note-taking *if and only if you agree to the following conditions:* 1) No charging is possible in the lecture hall due to insufficient outlets and tripping risk, 2) Your computer must be quiet, 3) You must arrive early enough to boot up and get settled before class starts, and 4) You are responsible for keeping your attention on lecture and not on other activities that may distract classmates around you. *If you cannot agree to these conditions, particularly #4, please refrain from using a laptop during class.* The same policy applies to tablets or other devices.

In general, no phones should be active during class and they should not be allowed to ring during class. If you have a situation where you might need to take an important phone call, please set your phone to 'vibrate', sit nearest the exit and leave without

disturbance to attend to your issue.

I do not consent to any audio- or video-recording of my lectures for any reason.

General conduct. I expect everyone to handle themselves in a professional manner in class, and I will ask that students who cannot do this leave for the day. I expect you to be professional and courteous in your email, during lecture/lab and during one-on-one contact with myself and your lab instructor. If you blatantly and/or frequently mistreat any person in the lecture hall or lab, you will be asked to leave immediately and disciplinary action will be sought before you are permitted to return.

My lectures are informal and I encourage you to ask questions and offer comments, including without waiting to be called on. I encourage students to attempt to answer classmates' questions respectfully. I welcome questions that are slightly off-topic, as they often lead to meaningful connections to lecture material. In short, do not be intimidated by our large lecture class. I want you to be professional and considerate, but informal and interactive.

Good Habits:

- § Read ahead AND frequently review what we've already covered. *Evidence suggests that cramming is virtually always unsuccessful.*
- § Take advantage of the resources provided to you: Lecture time, office hours, on- campus tutors (Our course volunteers Shad and Andrew, tutors in Laidley Hall and grad students in the Science Building), and online tools associated with your textbook.
- § Ask questions in class! Students who participate actively tend to do better than those who don't. *There are no silly questions!* Your questions tell me what you need clarified right away, and often lead to interesting discussions.
- § Develop a strategy that works for you: Avoid 'going through the motions'; Set aside proper study time and use it well; Set up a study group that is reliable and effective; Set aside time to attend tutoring hours or office hours.
- § Be watchful of potential bad weather, etc... that might keep you at home (particularly if you are a commuter). Plan ahead to have materials with you so that you can study in the event of a major disruption to our schedule.
- § If you feel overwhelmed, come see me right away. I can't help you if I don't know that you need help. Seek help long before your exam, so that you can make necessary changes to your study habits.
- § Be considerate of your classmates, your lecturer, and your lab instructor. Be on time so that we can leave on time. Respect your classmates' questions. Respect their need for relative quiet during class. Respect my time and effort. Stay engaged until we dismiss each day.

- § Pay attention to your health and take care of yourself! Manage your physical and mental stress. Seek help before you get completely overwhelmed. I can point you toward resources on campus.
- § In short, be actively involved in your education! We're here to help, but the person who is impacted most by your progress, and is most responsible for your progress is.....YOU. Don't waste your chance.

~GRADING INFO~

GRADING: A=100 -90; B=89-80; C=79 -70; D=69-60; F ≤59. 'Incomplete' grades will be given only if a student has completed 75% of the anticipated coursework and in extraordinary circumstances, as determined in consultation with the Department Chair and/or Dean of Students. Incompletes will not be permitted in the case of 'getting behind', missing an important grade, or having typical absences. Appeals for Incomplete grades will require substantial documentation before approval. Incomplete grades must be resolved as prescribed by the University.

A **cumulative final exam** constituting **15%** of your course grade will be given on **Friday, December 11 at 12:45 p.m.** There is no makeup exam available for the final exam since grades are due the following Monday. If you miss the final for any reason, your only options will be to take a zero or appeal to the Dean of Student Affairs for an Incomplete grade (see above).

Four lecture exams together constitute **40%** of total course grade. You will be tested on lecture notes, videos, activities, readings from the text and any other materials covered or assigned. Please note your exam dates right away and plan accordingly (see Tentative Schedule, below), as you will receive a zero for any exam you miss for any reason. No makeup exams will be permitted, but your lowest lecture exam will be dropped. If you miss an exam, you should plan to drop that zero exam score. If you miss a second exam, your cumulative final exam will count in place of that missed exam.

Connect Assignments. One for each chapter we cover) will constitute an additional **20%** of your course grade. These are important 'low-risk/low-impact' assignments that guide your studying and allow you to test and improve your mastery well in advance of exams. These will become available as we cover the material in class, and every assignment will be available until 12 p.m. (noon) on Thursday, Dec. 10, at which time no more quiz grades will be recorded. This is to encourage you to review regularly, and it will also give you unlimited opportunities to earn an excellent score. Do not wait to start the Connect assignments until late in the semester.

These assignments are intended to be done on your own, without the help of any

human (except Dr. Gillespie). You can use your book and notes. If you seek other students' help, 1) you are guilty of academic dishonesty and are at risk for disciplinary action, and 2) you will have a misleading perception of how well-prepared you are for your exams.

Lab. The remaining **25%** of your course grade will come from your laboratory performance. You will receive a separate syllabus from your lab instructor. You are expected to read and completely understand that syllabus. Your individual scores from lab will not be posted in your MUOnline/Blackboard gradebook. Your total lab grade on Blackboard will be updated only twice: at midterm and at the end of the term.

Please be aware that I do not offer bonus work, extra credit or curves to improve your grade. Your only route to a good grade is mastery of the material. Do not ask for an exception to this policy.

ATTENDANCE: Attendance and participation in all lectures is expected. You are expected to be present for the entirety of lecture. If you feel that you cannot stay for the entire lecture, I request that you arrive early enough to find a seat nearest the door and that you leave quietly. Any material covered in your absence is your responsibility, and you should identify a student you trust who might share their notes with you in case you need to be absent. Do not email me to ask what you missed. In the case of an absence on exam day, you should plan to count that as your single dropped exam score.

'Triggers', controversial topics and sensitive subjects: Biology is an evidence-based, relatively dispassionate subject. We follow the evidence where it takes us and we pursue an understanding of how the natural world operates with as little influence as possible from human biases and emotions. As a discipline, we do not turn away from explanations that challenge our positions; rather, we use evidence to explore and challenge our opinions and positions.

That said, if you feel that you may not be able to handle our discussion of any topic, you are not required to remain in class. I request that you anticipate, by reading ahead, sit near the door and leave without disturbance. You are, however, completely responsible for the information covered and you should identify a classmate who is willing to provide notes to you. You will not be exempted from being examined on any factual information for any reason.

ACADEMIC ACCOMMODATION: Marshall University is committed to equal opportunity in education for all students, including those with physical, learning and psychological disabilities. University policy states that it is the responsibility of students with disabilities to contact the Office of Disabled Student Services (DSS) in Prichard Hall 117, phone 304-696-2271 to provide documentation of their disability. The DSS

Coordinator will then send a letter to each of the student's instructors outlining the academic accommodation he/she will need to ensure equality in classroom experiences, outside assignment, testing and grading. The instructor and student will meet to discuss how the accommodation(s) requested will be provided. For more information, please visit <http://www.marshall.edu/disabled>. I strongly encourage you to seek assistance from these resources if you have any qualifying challenge. Be aware that you must be evaluated by a qualified professional on- or off-campus prior to receiving these services, and modifications are not retroactive. I cannot make these modifications outside the direction of the Office of Disabled Student Services.

WITHDRAWAL: If you feel that you cannot complete the course, keep the Withdrawal deadline, **OCT. 30**, clearly in mind. You must administratively withdraw. Do not simply stop attending (you will receive an F!)

ACADEMIC DISHONESTY—Academic dishonesty will not be tolerated, and cheating will be pursued vigorously. This includes, but is not limited to, exams, quizzes, lab papers, etc... If work is intended to be done with a group, you will receive explicit instructions indicating that you have permission to exchange work with other students. Any appearance of cheating (looking around at other people's answer sheets during exams, being caught with an electronic device on during a quiz or exam, etc...) will result in a zero on that assignment without discussion. More blatant forms of cheating will be referred for disciplinary action. If you have any questions, please ask, rather than take a chance.

UNIVERSITY POLICIES AND PROCEDURES: By enrolling in this course, you agree to the University Policies listed below. Please read the full text of each policy by going to www.marshall.edu/academic-affairs and clicking on "Marshall University Policies." Or, you can access the policies directly by going to http://www.marshall.edu/academic-affairs/?page_id=802

COURSE SCHEDULE. Below is our tentative lecture schedule for Fall 2015.

This table includes the dates, topics and chapters. In the 'Background' column, you will find topics that you should bring with you from high school courses (or from intro chemistry if you are currently enrolled) or from earlier in this course; these topics will not be covered in detail during class, so if you are not comfortable with them, you should review prior to that lecture. During class, I may assign specific, limited topics for you to cover on your own, outside of class (e.g., a specific, additional example).

We will make every effort to stay on this schedule, but you will hear *in class* if changes will be made to the schedule. Exam dates will never change, unless classes are officially cancelled on an exam day. In case this rare event occurs, the exam will be taken on the first day back after a University cancellation. In extraordinary circumstances, I will revise the course plan significantly (i.e. significant disruption to the University schedule).

TENTATIVE LECTURE SCHEDULE for FALL 2015

WEEK #	WEEK OF	DAY	TOPIC	CHAPTER	FOCUS	CRITICAL BACKGROUND	UNIT
1	Aug 24	M	Syllabus/welcome		Syllabus will be posted on Blackboard.		
		W	Pre-test		Bring a lead pencil (no pens!). No calculator necessary.		
		F	Survival Skills & Getting to Know You Brief overview of course topics	1	Bring your weekly calendar with you; the template is posted on Blackboard. Fill in <i>classes and firm commitments</i> in pencil.		
2	Aug 31	M	Earth History	22	Major events/ trends/ shifts. Tree of Life.	Major geologic eras and approximate dates	EVOLUTION
		W	Earth History	22			
		F	Evolution	23	Evolutionary mechanisms, evidence for evolution.	Darwin's history and formation of fossils.	
3	Sept 7	M	Labor Day – No class				
		W	Evolution	23			
		F	Atoms, Molecules & H ₂ O	2	Water, hierarchy of atoms → molecules, bonds.	Basic atomic structure	
4	Sept 14	M	Macromolecules	3	Major classes, basic structure, & basic functions	Molecules and bonds	

TENTATIVE LECTURE SCHEDULE for FALL 2015

WEEK #	WEEK OF	DAY	TOPIC	CHAPTER	FOCUS	CRITICAL BACKGROUND	UNIT
		W	Overview of cell structure	4	Interactions among organelles, evolutionary history. <u>De-emphasize</u> microscopy concepts—major points only.	Major organelles & their functions. Eukaryotic v. prokaryotic cells. Plant cells v. animal cells., geologic time.	CELL STRUCTURE
		F	Membrane structure & synthesis	5	Get structures quickly, then focus on synthesis & transport most.	Major organelles & their functions	
5	Sept 21	M	Membrane structure & transport	5			
		W	<u>Exam 1</u> (covering chapters 22, 23, 2, 3, 4 and 5)				
		F	Overview of energy, enzymes and metabolism	6	ADP/ATP transition, enzyme structure & function, brief overview of general metabolism.	States of energy, Laws of Thermodynamics, & equilibrium states, proteins	CELL METABOLISM & COMMUNICATION
6	Sept 28	M	Cellular Respiration: Overview	7	The ‘five Ws’ of respiration, basic steps, orientation	Mitochondria, enzyme function, energy, ADP/ATP, geologic time.	
		W	Cellular Respiration: Details and alternative pathways	7	Transitional steps, connections between organelles/ compartments, fermentation & anaerobic respiration.		
		F	Photosynthesis: Overview	8	The ‘five Ws’ of photosynthesis, basic steps, orientation.	Mitochondria, chloroplasts,	

TENTATIVE LECTURE SCHEDULE for FALL 2015

WEEK #	WEEK OF	DAY	TOPIC	CHAPTER	FOCUS	CRITICAL BACKGROUND	UNIT
7	Oct 5	M	Photosynthesis: Details and alternative pathways	8	Transitional steps, connections between organelles/ compartments, C4 & CAM processes.	enzyme function, energy, ADP/ATP, geologic time.	
		W	Cell signaling: Overview	9	Kinds of signals, basic parts of cell signaling systems	Energetics, ADP/ATP,	
		F	Cell signaling: Details & specific pathways	9	How signaling components interact, specific examples.	enzyme structure & function	
8	Oct 12	M	Multicellularity	10	<u>Comparative</u> evolutionary aspects.	Basic layout of cells, organelles, macromolecules	
		W	DNA Structure & overview of Replication	11	Hierarchy: atoms → chromosomes, the basic challenge of DNA replication	Nucleic acids, enzymes, bonds, organelles	MOLECULAR BIOLOGY OF CELLS
		F	DNA Replication, genomes and chromosomes	11	Details of replication, impacts on genomes, chromosome structure.		
9	Oct 19	M	Exam 2 (covering chapters 6, 7, 8, 9, 10 and 11)				
		W	Gene expression: Transcription	12	Each process will be covered as an overview and then in detail.	DNA structure, proteins (incl. enzymes), cell structure	
		F	Gene expression: Translation	12	Emphasize the interaction between them and with the cell.		
10	Oct 26	M	Gene regulation	13	<i>lac</i> and <i>trp</i> operons in bacteria	Gene expression,	

TENTATIVE LECTURE SCHEDULE for FALL 2015

WEEK #	WEEK OF	DAY	TOPIC	CHAPTER	FOCUS	CRITICAL BACKGROUND	UNIT
		W	Gene regulation	13	Comparative complexity of regulation in eukaryotes.	prokaryotic v. eukaryotic cells.	
		F	Mutation, DNA repair & cancer	14	Types of mutations & options for repair. Molecular and physiological consequences of unrepaired mutations.	DNA structure & replication, macromolecules, gene expression.	
11	Nov 2	M	Cell division: mitosis	15	Control of cell division (incl. gamete production), consequences of errors in health and evolution.	Cell structure, chromosome structure, <i>basic</i> steps of both cell divisions	
		W	Gamete production: meiosis	15			
		F	Exam 3 (covering chapters 11, 12, 13, 14 and 15)				
12	Nov 9	M	Simple inheritance	16	Mendelian inheritance patterns as a simple model.	Mendel's Laws, Punnett squares, basic probability, chromosomes, meiosis	GENETICS & GENOMICS
		W	Complex inheritance	17	Epistasis, continuous variation & linkage	Mendelian inheritance, chromosomes, meiosis	
		F	Complex inheritance	17	Extra-nuclear inheritance, X-inactivation & genomic imprinting.		
13	Nov 16	M	Developmental genetics	19	Pattern formation in animals & plants. Evolutionary aspects of	Cell divisions, chromosomes,	

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WEEK #	WEEK OF	DAY	TOPIC	CHAPTER	FOCUS	CRITICAL BACKGROUND	UNIT	
		W	Developmental genetics	19	development in plants & animals ('evo-devo').	gene expression, gene regulation, complex inheritance		
		F	Bacterial genetics, technology & careers	20, 18	Basics of bacterial genetics. How we co-opt bacterial genetics to do science. Careers in the molecular/ genetics / cell sub-disciplines.	Tree of Life, gene expression & regulation.		
14	Nov 23	M	Fall break – No class					
		W	Fall break – No class					
		F	Fall break – No class					
15	Nov 30	M	Viral genetics, genomes & proteomes	20, 21	Basics of viral genetics. Viruses and society. Variations in genome structure and comparative genomics.	Tree of Life, DNA & chromosome structure, gene expression & regulation		
		W	Exam 4 (covering chapters 16, 17, 18, 19, 20 and 21)					
		F	Review for Final Exam & Wrap-up					
	Dec 11	F	Final Exam: 12:45 – 2:45 p.m.	all				