

# Cellular & Molecular Biology

## BIOL 300; Spring 2017

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**Office Hours:** [removed] or by appointment

**Section:**

**33048: BIOL300-001**            **MWF 11:00-11:50 am**    **Harris Hall 101**

**Course Description:** A study of the molecular biology of the cell; including cell structure, cell signaling, cell metabolism, gene expression, and the growth and differentiation of cells.

**Course Objective:** Whether you are an aspiring researcher, doctor, nurse, environmental scientist, teacher, or ecologist, your knowledge will be founded on the basic structure and function of life; The Cell.

Knowing the components of cells and how cells function is fundamental to all biological sciences. In order to prepare you all to delve deeply into your chosen field of biology, I hope to provide you with a solid groundwork concerning cell structure, gene expression, signal transduction, and communication between cells and their environment. I will strive to provide relevant examples from recent research. I hope to help you gain a critical opinion of current topics and how they can be applied. To accomplish these goals you will use the book as your primary source of information, however I may also share recent events from scientific journals to complement and expand on the information given in class.

**Prerequisites:** BIOL 151 and 152, and BIOZ 151 and 152, with minimum grades of C. Pre- or co-requisites: CHEM 102 and CHEZ 102.

**Textbook:** Essential Cell Biology, 4th Edition. Alberts et. al. Garland Science. ISBN: 978-0815344544

This textbook has an associated website <http://www.garlandscience.com> which contains many components to help you study, including practice quizzes, videos, and other materials.

## Grading

The final grade in this course is out of 500 points:

4 Exams	80 % (100 points each)
4 Online Quizzes	20 % (25 points each)

## Final Grade Scale

89.50-100% =A      79.50-89.49% =B      69.50-79.49% =C      59.50-69.49% =D  
Below 59.50% =F

**I DO NOT BEND ON THESE GRADE BARRIERS.** Sorry, the line has to be somewhere. Letter grades will be assigned at the end of the course. Please be aware that I do not curve any exams or final grades. Also I do not “round” grades or drop grades. Only changes due to mathematical error will be granted.

Grades will be posted in Blackboard and you have one week to check them and get back to me with any question or concerns about them. **No grades will be changed after the one-week period.**

A grade of Incomplete (I) will be given only if an excused absence is granted for the final exam.

The grading in this class is very simple; you can calculate your grade at any time. I will not calculate your grade for you; you need to do this math yourself!

The course is out of 500 points:

4 x 25 for quizzes  
4 x 100 for exams.

Your final percentage will be determined by adding up all your points, then adding your extra credit to the top and dividing by 500.

Eg:

Quiz 1 = 22, Quiz 2 = 24, quiz 3 = 25, quiz 4 = 25  
Exam 1 = 65, Exam 2 = 75, Exam 3 = 85, exam 4 = 95  
Total = 416 + extra credit 12 = 428  
 $428/500 = 85\%$  final score B

As a guide:

450 points is 90%  
400 points is 80%  
350 points is 70%  
300 points is 60%

Your job is to get these points. I do not determine your grade; you do!

**Blackboard** – <http://blackboard.vcu.edu>

Information for our course will be posted on blackboard. I will administer quizzes and post announcements, the syllabus, handouts, grades, etc. You will need your VCU e-mail address and password to log in. Blackboard will give you instructions if this is your first time using it.

**VCU Email Policy**

Email is considered an official method for communication at VCU because it delivers information in a convenient, timely, cost-effective, and environmentally aware manner. Students are expected to check their official VCU email on a frequent and consistent basis in order to remain informed of university-related communications. The university recommends checking email daily. Students are responsible for the consequences of not reading, in a timely fashion, university-related communications sent to their official VCU student email account. This policy ensures that all students have access to this important form of communication. It ensures students can be reached through a standardized channel by faculty and other staff of the university as needed. Mail sent to the VCU email address may include notification of university-related actions, including disciplinary action. Please read the policy in its entirety: <http://www.ts.vcu.edu/kb/3407.html>.

I will use your vcu.edu account to send out class announcements. I will not answer emails that do not come from your vcu.edu account. In the email include your class in the subject area, please no ‘text messaging’ style messages, use the ‘reply with history’ option and also be courteous and concise. I will also post announcements to the class on the Blackboard page. **Do NOT reply to announcements sent out from Blackboard, your email will get lost and I will not respond.**

Please remember that this is a large class. If the preceptors can answer your questions about class content, please contact them first.

**Examinations**

Due to the size of the class, all exams will be multiple choice. You will have four examinations given during scheduled class periods. The final exam will **NOT** be cumulative (however cell biology is a cumulative subject by nature).

During exams you will be seated in allocated seats, your bags will be placed at the front of the room, no hats will be allowed to be worn, no phones will be allowed on your person. You will be required to show your ID when you turn in your answers and you will need your V number. **If a phone or other electronic device is found on your person during an exam, you will automatically receive a zero on that exam! That is our class policy! Make sure to leave your cell phones at the front of the room!**

**Please make sure that you know exactly when the tests are, I will not give any test, including the Final, early or late under any circumstance. Also I will not give a test if you are 15 minutes late or a student has already finished and turned the exam.**

**Absences from an exam:** Due to the size of the class I **DO NOT** offer make-up exams. If you have a valid reason to miss an exam you must contact me within 24 hours of the exam (**preferably before**). Valid reasons include: funerals (must provide obituary), hospitalization (must provide hospital documentation), Serve illness (must provide an official doctors note stating specifically that you are too sick to take the exam – please note VCU health services notes rarely state this); other reasons will be considered but official documentation must be provided. **If no proof is provided you will receive a 0.**

In the event that I approve an absence I will discuss an appropriate alternative assessment based on the circumstances this could include a mix of multiple choice, short answer and *oral* responses. All students must take the final exam during the final exam period – no make-ups will be allowed.

### **Quizzes**

I will post 4 quizzes to Blackboard in-between each exam. These will be done at home in your own time by a defined deadline (4 days after posting). You will have 2 attempts at each quiz. The quizzes are based on a pool of questions so the second attempt will have some different questions from the first attempt. Your highest score will count. The dates for these quizzes are in the class schedule. Quizzes are intended to make you aware of what you do not know so that you can better prepare for the tests. Quiz 1 will cover material from your prerequisites and also reading from chapters 1 and 2 that you will do on your own, please be prepared. **No make-up quizzes will be given; you have several days to complete the assignment. In order for you to have a make-up quiz, you will need documentation that excuses you from class during the entire period that the quiz is open.**

Quizzes may not be started once the due date has passed. If the quiz is accessed after the due date on Blackboard, there will be a 5 point deduction for every 30 minutes passed the due date. There may be more points deducted if more than 5 questions were answered per 30 minute period. You may be given a zero. It is better to stop a quiz on time and get an appropriate score, than to continue the quiz past the due date.

### **Attendance**

Attendance is key to success in this course and is highly encouraged! As you are an adult learner, I will not enforce attendance and all lecture slides will be posted to blackboard. However, Please be aware that any information delivered orally in lecture will be included in examinations. Lecture slides will not contain all the information delivered orally in class. Please attend class to ensure that you have maximum exposure to the materials.

Students may only attend those classes for which they have registered. Therefore, if students are attending a class for which they have not registered, they must stop attending.

### **Review sessions**

A significant amount of review sessions will be held throughout the week by my preceptors. To encourage participation in these sessions I will monitor attendance. 1 extra

point will be given for attendance at each review session. You may earn a maximum of 5 points (5 sessions) before exam 2 and 5 points (5 sessions) after exam two, to a maximum of 5 points (10 review sessions). These will be added to the final points total for class before the final grade is calculated. You are welcome to attend as many sessions as you would like, there is no limit on attendance. Our best students go to sessions weekly or more to improve their performance.

Class total points = 500 (4 x 100, 4 x 25)

Student total points = 480

Student total points + extra credit = 490

Final grade:  $(490/500) \times 100 = 98\%$

### **Supplemental Instruction**

Supplemental Instruction (SI) sessions are available for free, courtesy of VCU. SI sessions are hosted by free tutors, paid by VCU, who will provide additional review and study sessions for this course. If you are struggling in this class, having attended class and review sessions, I highly encourage you to make use of this free resource. The schedule and more information can be found at: <http://uc.vcu.edu/learning-support/campus-learning-center/supplemental-instruction/>

### **Letters of Recommendation**

Due to the high level of demand for letters of recommendation, this is my policy:

You must provide at least two weeks notice, preferably more, before your letter is due. I will not consider writing a letter that is due in less than two weeks!

**Letter of recommendation to professional school (medical, dental, vet, nursing, pharmacy, etc.) and to the VCU Pre-Health Track Committees (or any other pre-professional school committee):** I only write these letters for students who have served as my preceptors, completed two courses with me or that I have worked with closely in some other manner. A successful letter of recommendation to a professional school must have detailed information about a student's personality, work ethic, scholastic performance, reliability, interpersonal relationships, etc. I can only get to know a student well enough to write this letter by working with them personally, as I do my preceptors. To become a preceptor, you must have an A in that course with me, and you must be able to attend lecture during that semester.

**Letter of recommendation to undergraduate programs (travel abroad, summer research, etc.):** You must complete a course with me with an A. Furthermore, you must be someone I am familiar with and meet on a regular basis (office hours, before/after class, etc.)

If I agree to write a letter for you, you must let me know at least two weeks, preferably more, before the letter is due. Please email me a CV or resume with a picture on it, and all the necessary paperwork to accompany the letter. Provide a list of all the classes you have taken with me, including the semester. Make sure to tell me when the letter is due,

where to send the letter, and tell me about the program you are applying for and why you want to be in it. Also make sure you have filled out your section of the form and signed where needed. Please make sure that the document file format is a type that I can edit.

Lastly, please be advised that the better I know you, the better (and longer) your letter will be. If I have agreed to write a letter for you, but have not spent a lot of time with you, the letter will be short. If this letter of recommendation is for something very competitive or important to you, your application may suffer considerably from a short letter. You may want to ask someone who knows you better and can write more confidently about you.

Lastly, please note that letter of recommendation writing is completely voluntary; I am free to deny a letter to anyone for any reason.

### **VCU Honor System: Upholding Academic Integrity**

**Due to the size of this class seating in the exam is close. Please think about your body language. Keep your eyes down on your paper and your body within your space. I will be watching closely for wandering eyes.** Looking at the exam of another student will be considered cheating and will be reported.

**No electronics may be on your person during an exam.** All backpacks, purses, and electronics must be stored at the front of the room during the exam. Possession of electronics during an exam will be reported to the honor council. Electronics include, but are not limited to, cell phones, beepers, graphing calculators, portable music players, etc. No earphones may be used, included noise-canceling earphones. Anyone found with electronics on their person will receive a zero on the exam. Anyone looking at the exam of another student will be reported to the VCU Honor Council.

The VCU Honor System policy describes the responsibilities of students, faculty and administration in upholding academic integrity, while at the same time respecting the rights of individuals to the due process offered by administrative hearings and appeals. According to this policy, "Members of the academic community are required to conduct themselves in accordance with the highest standards of academic honesty and integrity." In addition, "All members of the VCU community are presumed to have an understanding of the VCU Honor System and are required to:

- Agree to be bound by the Honor System policy and its procedures;
- Report suspicion or knowledge of possible violations of the Honor System;
- Support an environment that reflects a commitment to academic integrity;
- Answer truthfully when called upon to do so regarding Honor System cases;
- Maintain confidentiality regarding specific information in Honor System cases."

More information can be found at in the VCU policy library at <http://www.assurance.vcu.edu/Policy%20Library/Honor%20System.pdf>.

### **Student Conduct in the Classroom**

According to the Faculty Guide to Student Conduct in Instructional Settings (<http://www.assurance.vcu.edu/Policy%20Library/Faculty%20Guide%20to%20Student%20Conduct%20in%20Instructional%20Settings.pdf>), "The University is a community of learners. Students, as well as faculty, have a responsibility for creating and maintaining an environment that supports effective instruction. In order for faculty members (including graduate teaching assistants) to provide and students to receive effective instruction in classrooms, laboratories, studios, online courses, and other learning areas, the university expects students to conduct themselves in an orderly and cooperative manner." Among other things, cell phones and beepers should be turned off while in the classroom. The Student Code of Conduct also prohibits the possession of or carrying of any weapon. For more information see <http://register.dls.virginia.gov/details.aspx?id=3436>.

### **Students with Disabilities**

Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1990, as amended, require that VCU provide "academic adjustments" or "reasonable accommodations" to any student who has a physical or mental impairment that substantially limits a major life activity. To receive accommodations, students must request them by contacting the Disability Support Services Office on the Monroe Park Campus (828-2253) or the Division for Academic Success on the MCV campus (828-9782). Please also visit the Disability Support Services website at [www.students.vcu.edu/dss](http://www.students.vcu.edu/dss) and/or the Division for Academic Success website at [healthsciences.vcu.edu/DAS/](http://healthsciences.vcu.edu/DAS/) for additional information.

Any student who has a disability that requires an accommodation should schedule a meeting with the instructor at the student's earliest convenience. Additionally, if coursework requires the student to work in a lab environment, the student should advise the instructor or a department chairperson of any concerns that the student may have regarding safety issues related to a disability. Students should follow this procedure for all courses in the academic semester.

### **Statement on Military Short-Term Training or Deployment**

If military students receive orders for short-term training or for deployment/mobilization, they should inform and present their orders to Military Student Services and to their professor(s). For further information on policies and procedures contact Military Services at 828-5993 or access the corresponding policies.

### **Excused Absences for Students Representing the University**

Students who represent the university (athletes and others) do not choose their schedules. Student athletes are required to attend games and/or meets. All student athletes should provide their schedules to their instructors at the beginning of the semester. The Intercollegiate Athletic Council strongly encourages faculty to treat missed classes or exams (because of a scheduling conflict) as excused absences and urges faculty to work with the students to make up the work or exam.

## **Campus Emergency Information**

What to Know and Do to Be Prepared for Emergencies at VCU:

- Sign up to receive VCU text messaging alerts. Keep your information up-to-date. Within the classroom, the professor will keep his or her phone on to receive any emergency transmissions.
- Know the safe evacuation route from each of your classrooms. Emergency evacuation routes are posted in on-campus classrooms.
- Listen for and follow instructions from VCU or other designated authorities. Within the classroom, follow your professor's instructions.
- Know where to go for additional emergency information.
- Know the emergency phone number for the VCU Police (828-1234).
- Report suspicious activities and objects.
- Keep your permanent address and emergency contact information current in eServices.

## **Important Dates**

You can view important dates for the Fall 2014 semester in the university calendar

([http://academiccalendars.vcu.edu/ac\\_fullViewAll.asp?term=Fall+2014](http://academiccalendars.vcu.edu/ac_fullViewAll.asp?term=Fall+2014)).

## **VCU Mobile**

The VCU Mobile application is a valuable tool to get the latest VCU information on the go. The application contains helpful information including the VCU directory, events, course schedules, campus maps, athletics and general VCU news, emergency information, library resources, Blackboard and more. To download the application on your smart phone or for more information, please visit <http://m.vcu.edu>.

## **Class Registration Required for Attendance**

Students may attend only those classes for which they have registered. Faculty may not add students to class rosters or Blackboard. Therefore, if students are attending a class for which they have not registered, they must stop attending.

## **Withdrawal from Classes**

Before withdrawing from classes, students should consult their instructor as well as other appropriate university offices. Withdrawing from classes may negatively impact a student's financial aid award and his or her semester charges. To discuss financial aid and the student bill, visit the Student Services Center at 1015 Floyd Avenue (Harris Hall) and/or contact your financial aid counselor regarding the impact on your financial aid. Contact information for the University Financial Aid Office is available at <http://www.enrollment.vcu.edu/finaid/contact-us/>.

**Student Financial Responsibility**

Students assume the responsibility of full payment of tuition and fees generated from their registration and all charges for housing and dining services, and other applicable miscellaneous charges. Students are ultimately responsible for any unpaid balance on their account as a result of the University Financial Aid Office or their third party sponsor canceling or reducing their award(s).

## SCHEDULE

The Add/Drop deadline is **Monday Jan. 23rd, 2017**

Please note that **Friday, March 24th, 2017** is the last day to withdraw for a course with a mark of "W" **As this is a required course for many I urge you to meet with me if you are considered withdrawal so that we can see if there is any way to improve your performance in class.**

**Friday Jan. 27th 2017** is the last day to provide a written notification to me that you are planning to observe a religious holiday. Students athletes, please provide your schedule to me at this time if your schedule will conflict with any assignments

Please inform me as soon as possible of any scheduled absences for athletic or academic reasons.

\* Disclaimer: The schedule, the dates and content of tests and other aspects of this syllabus could change as a result of unplanned closings, inclement weather, and other uncontrollable factors. Therefore the dates in this syllabus are tentative. Material for quizzes and exams will be announced in class and will be posted in Blackboard.

### Tentative Schedule of Lectures

Date	Topic	Chapters
<b>Week 1</b>		
Jan 18	Welcome to Class! ☺	
Jan 20	Introduction to the Cell	1
<b>Week 2</b>		
Jan 23	Introduction to the Cell	1
Jan 25	Chemistry and Energetics	2,3
Jan 27	Lecture Catch-Up	
<b>Week 3</b>		
Jan 30	Cells & Energy	13, 14
Feb 1	Protein Structure and Function	4
Feb 3	Lecture Catch-Up	
<b>Week 4</b>		
Feb 6	Cell Communication	4 & 16
Feb 8	Lecture Catch-Up	
Feb 10	<b>Review; Online Quiz 1 Due Feb. 10th at 7:00 pm</b>	<b>1,2,3,13,14,4 &amp; 16</b>

<b>Week 5</b>		
Feb 13	<b>Exam 1 is on Feb 13th</b>	<b>1,2,3,13,14,4 &amp; 16</b>
Feb 15	DNA and Chromosomes	5
Feb 17	DNA replication and repair; Backing up the data	6
<b>Week 6</b>		
Feb 20	DNA to Protein - Translating the data	7
Feb 22	Research, Study Abroad & Advising	
Feb 24	Lecture Catch-Up	
<b>Week 7</b>		
Feb 27	Control of Gene Expression	8
March 1	Lecture Catch-Up	
March 3	Lecture Catch-Up	
<b>Week 8</b>		
March 6	Spring Break! 😊	
March 8	Spring Break! 😊	
March 10	Spring Break! 😊	
<b>Week 9</b>		
March 13	Cell Cycle	18, part I
March 15	Cancer; When Regulation Goes Wrong	20, part I
March 17	Lecture Catch-Up	
	<b>Online Quiz 2 due March 17th at 7:00 pm</b>	<b>5,6,7,8,18,20</b>
<b>Week 10</b>		
March 20	Review	
March 22	<b>Exam 2 is March 22<sup>nd</sup></b>	<b>5,6,7,8,18,20</b>
March 24	Membrane structure	11
<b>Week 11</b>		
March 27	Membrane transport, Pt. I	12
March 29	Membrane transport, Pt. II	12
March 31	Lecture Catch-Up	

<b>Week 12</b>		
April 3	Intracellular functions – organizing the insides	15
April 5	Cytoskeleton	17
April 7	<b>Lecture Catch-Up; Online Quiz 3 due April 7th at 7:00 pm</b>	<b>11,12,15,17</b>
<b>Week 13</b>		
April 10	<b>Exam 3 is April 10<sup>th</sup></b>	<b>11,12,15,17</b>
April 12	Cell Communication	16
April 14	Lecture Catch-Up	
<b>Week 14</b>		
April 17	Cell Division	18
April 19	Tissues, Stem Cells	20 (II)
April 21	Lecture Catch-Up	
<b>Week 15</b>		
April 24	Cancer	20 (III)
April 26	Lecture Catch-Up	
April 28	How Do I Get Where I Want to Go? Lecture	
<b>Week 16</b>		
May 1	<b>Lecture Catch-Up; Online Quiz 4 due May 1st at 7:00 pm</b>	<b>16,18,20</b>
May 3	No Class	
May 5	No Class	
May 8 <sup>th</sup>	<b>Exam 4 on May 8<sup>th</sup> at 8:00 am during FINAL EXAM SLOT</b>	<b>16,18,20</b>

# TIPS & TRICKS: HOW TO DO WELL IN YOUR CLASSES!

## ALWAYS COME TO CLASS AND COME ON TIME! ☺

- I love giving out hints about what's on the exam! Sometimes I will flat out tell everyone an exam question! You don't want to miss that!
- The most important announcements are made in the first 5 mins of class. "I was late that day" will never be an excuse for missing an assignment, quiz, points, etc.
- Going to class saves you time! If you miss a one hour class, it will take you at least three hours to teach that material to yourself.
- Class is expensive! You've paid ~\$100 per lecture.
- Higher attendance = Higher exam grades. Every time we've kept track, missing more than a class or two costs a letter grade!
- Higher attention span = higher grade. Attention spans are a learned skill and grow longer as we age. Students who can focus for an hour get As. This takes practice.**

## NO ELECTRONICS DURING LECTURE! Take notes by hand!

- Research has shown that taking notes by hand activates extra brain areas and helps you retain the material. Since you can't copy directly (as by typing), your brain must shuffle and condense the information. Also, the motor areas of your brain are activated as you move your hands, improving material retention.
  - The easiest way to take notes in this class is to print out the slides ahead of time in the PowerPoint '3 slides' format with 'notes' on the side. That way you can directly take notes on the slides themselves during class.
  - Go over your notes directly after class to make sure that they can be understood later.

"Each time we shift attention, there is a metabolic cost we pay in glucose. We don't actually do two, or three, or 10 things at once, we just switch from one to another. Some brain activities are more expensive than others, and switching attention is among the most expensive" -neuroscientist Daniel Levitin

- This applies to electronics in lecture as well as multi-tasking while studying.

Shop around the preceptor sessions to find a good 'match'. All students and preceptors are different. Find a preceptor that appeals to your particular learning style.

You get out of review sessions what you put into it! You are an adult learner. Do not go to the review sessions with the hope that you will be 'spoon fed' the material. Step up and teach yourself by asking questions and by teaching your friends. The more you participate, the more you will learn. Remember, you are part of the equation when it comes to review session.

Keep your own records of the review session you attend! (Date, time, leader!)

Do NOT miss review sessions or class due to your work schedule. Schedule your work around review sessions. If you receive \$10 an hour, missing 10 review sessions will give you \$100. Failing this class or receiving a low grade will cost you over \$1000.

Do NOT make this course part of an 'overloaded' semester. This course requires a large time commitment. If you are taking significantly more than 15 credits, you may not have the time you need to dedicate to this course. 'Overloaded' students usually do not do well in this class.

What has worked for you in earlier courses may not work here. Be prepared to modify your study habits. If you are spending a lot of time doing it one way and it's not working, try something else. Try 'lecturing' in front of your computer. Draw the material. Color code the material. Watch videos repeatedly. Make flash cards. TALK WITH YOUR FRIENDS. Even try interpretive dance! ☺

Use your textbook! Many students do not read the entire chapter in one sitting, but instead, reference it as they study. When you are looking at each figure on the slide and comparing it to the notes you took in class, it really helps to go read the figure legend for that figure, and read the text which directly covers what we have lectured on. Also, don't forget the quizzes and videos on the textbook website! They are so useful!

**DO NOT MISS A QUIZ!** Note when the quizzes are due, and put several reminders in place for yourself. If you miss a quiz, I will not re-open it, you will get a zero and this will have a large impact on your grade.

EAT before the exam. Your brain needs the glucose!

SLEEP before the exam.

DO NOT reply to class announcements for Blackboard! Start your own email chain or I will not respond!

**Do not over-think an exam!** Read the question carefully and thoroughly, and then go with your first instinct. Do not change an answer unless you have an epiphany! I always hear "I went back and changed some answers, and I changed them all to wrong". I almost never hear about it the other way around, "I went back and caught a bunch of mistakes'. Trust your gut, and stick with your first choice.

**Deal with test anxiety.** Take practice tests. Write test questions to 'get into the mind' of a question writer. Take your time, read carefully and do not second guess yourself! #1 phrase heard in my office: 'I just made a lot of stupid mistakes'

If you have a disability that affects how you test, Disability Support Services is an option. Disability Support Services is in Student Commons, Room 102. You may take the test there. It is your responsibility to set work with them ahead of the exam, schedule your

own exam, and send me a reminder to deliver the exam. This is required for each exam.  
<http://www.students.vcu.edu/dss/>

No practice tests, 'crib sheets', study guides, etc. will be provided. Please make them yourself; they will help you out.

**All emails you send to any professor should be professional.** Do not use 'text chat' abbreviations. "R u available" is neither profession nor polite. Also, avoid any 'rant' emails; these will not achieve the effect you desire.

Go over the slides once before class. If you having trouble keeping up in class due to the pace, this will make a world of difference.

**You can either pay attention to lecture or you can pay attention to your cell phone. Scientific studies have shown that you cannot do both.**

Studies have also shown that people believe they can do both, when they really cannot.

**Watch out for 'crab bucket!'** What is crab bucket, you ask? A large number of crabs can be kept in a shallow bucket, because as soon as one tries to escape, all the other crabs grab onto it and pull it back into the bucket. Think about the different groups of friends that you are in a bucket with; which of the following statements are you most likely to hear from those groups? 'Ugh. Drug Biology has so much material, I am so stressed out! Even if I study all night I still won't get an A, so let's relax at the coffee shop for a while and then binge watch some Netflix' OR 'Ugh. Drug Biology has so much material, I am so stressed out! Let's grab one of those sugary coffee drinks with the whip cream and a cookie at the coffee shop before we hit up the review session. And then we'll binge watch some Netflix.'? Science has strongly shown that your peer group has major impacts on where you are going in life and even your health and body weight. Which group of friends is going to be where they want to be in 10 years? Choose wisely and 'get ideas above your station'. Break out of the crab bucket! (I totally ripped this analogy off my favorite author, Terry Pratchett).

Lastly, **your most powerful study tool is each other.** Endeavor to make as many 'study buddies' as possible, especially during extra credit opportunities. Meet friends at review sessions or seminars. Invite classmates to the coffee shop or library to study. And then talk about this course. Talking about the materials with friends is the most effective way to retain material. Gossip about this class! Teach each other! ☺

WHAT WE REMEMBER!:

