



## TENTATIVE—SUBJECT TO CHANGE

### BIOL 1111: Biology I COURSE SYLLABUS Lecture Monday, Tuesday Fall Semester 2018

#### COURSE INFORMATION

Credit Hours/Minutes: 3/2250

Class Location: RMTC 729

Class Meets: MT 11:00am – 12:15pm

CRN: 20023

#### INSTRUCTOR CONTACT INFORMATION

Instructor Name: Dr. Erica M. Harrison

Office Location: HSA 901 (Vidalia), 8145 (Swainsboro)

Office Hours: M-R 800-1030 (Vidalia)

Email Address: [eharrison@southeasterntech.edu](mailto:eharrison@southeasterntech.edu)

Phone: 912-538-3188

Fax Number: 912-538-3156

Tutoring Hours: By appointment only

#### REQUIRED TEXT

1. Biology, Mader & Windelspecht, 12th edition, McGraw Hill
2. Laboratory Manual to accompany Biology, Mader, 12th edition, McGraw Hill

#### REQUIRED SUPPLIES & SOFTWARE

Ink pens, highlighters, and any other supplies deemed necessary by the instructor

#### COURSE DESCRIPTION

Provides an introduction to basic biological concepts with a focus on living cells. Topics include chemical principles related to cells, cell structure and function, energy and metabolism, cell division, protein synthesis, genetics, and biotechnology.

#### MAJOR COURSE COMPETENCIES

1. Organization and Chemical Basis of Life
2. Cell Structure and Function
3. Metabolism
4. Cell Division
5. Protein Synthesis
6. Central Dogma of Biology
7. Genetics
8. Biotechnology
9. Evolutionary concepts

## PREREQUISITE(S)

Regular Admission

Co-requisites: All Required

BIOL 1111L

## COURSE OUTLINE

### CHAPTER 1:

1. List the characteristics of life.
3. Distinguish between prokaryotic and eukaryotic cells.
4. List the six kingdoms of life and distinguish among them.
5. Outline the scientific method.

### CHAPTER 2:

1. Define element.
2. State four elements essential to life that make up 96% of living matter.
3. Describe the structure of an atom.
4. Define and distinguish among atomic number, mass number, atomic weight, and valence.
5. Given the atomic number and mass number of an atom, determine the number of neutrons.
6. Define electronegativity and explain how it influences the formation of chemical bonds.
7. Distinguish among nonpolar covalent, polar covalent and ionic bonds.
8. Describe the formation of a hydrogen bond and explain how it differs from a covalent or ionic bond.
9. Explain why weak bonds are important to living organisms.
10. Explain the relationship between the polar nature of water and its ability to form hydrogen bonds.
11. Describe the biological significance of the cohesiveness of water.
12. Explain the basis for the pH scale.
13. Explain how acids and bases directly or indirectly affect the hydrogen ion concentration of a solution.

### CHAPTER 3:

1. Recognize the major functional groups, and describe the chemical properties of organic molecules in which they occur.
1. List the four major classes of biomolecules.
2. Describe how covalent linkages are formed and broken in organic polymers.
3. Describe the unique properties, building block molecules and biological importance of the three important lipids: fats, phospholipids and steroids.
4. Distinguish between a saturated and unsaturated fat, and list some unique emergent properties that are a consequence of these structural differences.
5. Describe the characteristics that distinguish proteins from the other major classes of macromolecules, and explain the biologically important functions of this group.
6. Identify a peptide bond and explain how it is formed.
7. Explain what determines protein conformation and why it is important.
8. Define denaturation and explain how proteins may be denatured.
9. Summarize the functions of nucleic acids.
10. List the major components of a nucleotide, and describe how these monomers are linked together to form a nucleic acid.
11. Briefly describe the three-dimensional structure of DNA.

### CHAPTER 4:

1. Describe the anatomy of Prokaryotes.
2. Describe the structure and function of the Eukaryotic nucleus, and briefly explain how the nucleus

controls protein synthesis in the cytoplasm.

3. Describe the structure and function of a eukaryotic ribosome.
4. List the components of the *endomembrane system*, describe their structures and functions and summarize the relationships among them.
5. Explain how impaired lysosomal function causes the symptoms of storage diseases.
6. Describe the types of vacuoles and explain how their functions differ.
7. Describe the structure of a *mitochondrion* and explain the importance of compartmentalization in mitochondrial function.

#### CHAPTER 5:

1. Describe the function of the plasma membrane.
2. Describe the fluid properties of the cell membrane and explain how membrane fluidity is influenced by membrane composition.
3. Explain how hydrophobic interactions determine membrane structure and function.
4. Define diffusion; explain what causes it and why it is a spontaneous process.
5. Define osmosis and predict the direction of water movement based upon differences in solute concentration.
6. Explain how active transport differs from diffusion.

#### CHAPTER 6:

1. Distinguish between exergonic and endergonic reactions.
2. Describe the function of ATP in the cell.
3. Explain how ATP performs cellular work.
4. Describe the function of enzymes in biological systems.
5. Explain the relationship between enzyme structure and enzyme specificity.
6. Explain the *induced fit* model of enzyme function and describe the catalytic cycle of an enzyme.
7. Explain how substrate concentration affects rate of an enzyme-controlled reaction.
8. Explain how enzyme activity can be regulated or controlled by environmental conditions, cofactors, enzyme inhibitors and allosteric regulators

#### CHAPTER 7:

1. Distinguish between photosynthetic autotrophs and chemosynthetic autotrophs.
2. Describe the location and structure of the chloroplast.
3. Write a summary equation for photosynthesis.
4. Explain what happens when chlorophyll or accessory pigments absorb photons.
5. List the components of a photosystem and explain their function.
6. Trace electron flow through photosystems II and I
7. Compare cyclic and noncyclic electron flow and explain the relationship between these components of the light reactions.
8. Describe the role of ATP and NADPH in the Calvin cycle.

#### CHAPTER 8:

1. Describe the overall summary equation for cellular respiration.
2. Distinguish between substrate-level phosphorylation and oxidative phosphorylation.
3. Define oxidation and reduction.
4. Describe the structure of coenzymes and explain how they function in redox reactions.
5. Describe the role of ATP in coupled reactions.
6. Write a summary equation for glycolysis and describe where it occurs in the cell.
7. Describe where pyruvate is oxidized to acetyl CoA, what molecules are produced and how it links glycolysis to the Krebs cycle.
8. Describe the location, molecules in and molecules out for the Krebs cycle.
9. Describe the process of chemiosmosis.
10. Explain how membrane structure is related to membrane function in chemiosmosis.

11. Describe the fate of pyruvate in the absence of oxygen.
12. Explain why fermentation is necessary.
13. Distinguish between aerobic and anaerobic metabolism.
14. Explain how ATP production is controlled by the cell and what role the allosteric enzyme, phosphofructokinase, plays in this process.

#### CHAPTER 9:

1. Describe the structural organization of the genome.
2. Overview the major events of cell division that enable the genome of one cell to be passed on to two daughter cells.
3. List the phases of the cell cycle and describe the sequence of events that occurs during each phase.
4. List the phases of mitosis and describe the events characteristic of each phase.
5. Recognize the phases of mitosis from diagrams or micrographs.
6. Compare cytokinesis in animals and plants.
7. Describe the roles of checkpoints, cyclin, Cdk, and MPF, in the cell-cycle control system.
8. Describe the internal and external factors which influence the cell-cycle control system.
9. Explain how abnormal cell division of cancerous cells differs from normal cell division.

#### CHAPTER 10:

1. Distinguish between asexual and sexual reproduction.
2. Diagram the human life cycle and indicate where in the human body that mitosis and meiosis occur; which cells are the result of meiosis and mitosis; and which cells are haploid.
3. List the phases of meiosis I and meiosis II and describe the events characteristic of each phase.
4. Recognize the phases of meiosis from diagrams or micrographs.
5. Describe the process of synapsis during prophase I, and explain how genetic recombination occurs.
6. Describe key differences between mitosis and meiosis; explain how the result of meiosis differs from that of mitosis.
7. List the sources of genetic variation.

#### CHAPTER 11:

1. List several features of Mendel's methods that contributed to his success.
2. State, in their own words, Mendel's law of segregation.
3. Use a Punnett square to predict the results of a monohybrid cross and state the phenotypic and genotypic ratios of the F<sub>2</sub> generation.
4. Distinguish between genotype and phenotype; heterozygous and homozygous; dominant and recessive.
5. Explain how a testcross can be used to determine if a dominant phenotype is homozygous or heterozygous.
6. Use a Punnett square to predict the results of a dihybrid cross and state the phenotypic and genotypic ratios of the F<sub>2</sub> generation.
7. Explain how the phenotypic expression of the heterozygote is affected by complete dominance, incomplete dominance and codominance.
8. Describe the inheritance of the ABO blood system and explain why the I<sup>A</sup> and I<sup>B</sup> alleles are said to be *codominant*.
9. Define and give examples of pleiotropy.
10. Give a simple family pedigree, deduce the genotypes for some of the family members.
11. Describe the inheritance and expression of cystic fibrosis, Tay-Sachs disease, and sickle-cell disease.
12. Explain how a lethal recessive gene can be maintained in a population.

#### CHAPTER 12:

1. List the three components of a nucleotide.
2. Distinguish between deoxyribose and ribose.
3. List the nitrogen bases found in DNA and distinguish between pyrimidine and purine.

4. Explain the "base-pairing rule" and describe its significance.
5. Describe the structure of DNA and explain what kind of chemical bond connects the nucleotides of each strand and what type of bond holds the two strands together.
6. Explain, in their own words, semiconservative replication and describe the Meselson-Stahl experiment.
7. Describe the process of DNA replication and explain the role of helicase, single strand binding protein, DNA polymerase, ligase and primase.
8. Explain the Central Dogma (transcription, translation, protein modification)

#### CHAPTER 13:

1. Explain Prokaryotic gene regulation and use the example of the *Lac* operon
2. List the four ways Eukaryotic gene regulation occurs
3. Explain how a gene mutation occurs

#### CHAPTER: 14

1. Explain the two methods of DNA cloning
2. List the benefits of biotechnology
3. Explain gene therapy and genomics

#### CHAPTER 15-18:

1. Write the general Hardy-Weinberg equation and use it to calculate allele and genotype frequencies
2. List the conditions a population must meet in order to maintain Hardy-Weinberg equilibrium
3. Explain how genetic drift, mutation, nonrandom mating and natural selection can cause micro evolution
4. Distinguish between the bottleneck effect and the founder effect
5. Distinguish between prezygotic and postzygotic isolating mechanisms
6. Explain how an atheistic world view can impact how data can be interpreted.
7. Define sympatric speciation and explain how polyploidy can cause reproductive isolation
9. Explain the difference between microevolution and macroevolution
10. Compare and contrast various models of creation
11. Explain the importance of the fossil record to the study of evolution

#### GENERAL EDUCATION CORE COMPETENCIES

STC has identified the following general education core competencies that graduates will attain:

1. The ability to utilize standard written English.
2. The ability to solve practical mathematical problems.
3. The ability to read, analyze, and interpret information.

#### STUDENT REQUIREMENTS

In order to be successful in this class, students should study a minimum of 2 hours per credit hour each week (minimum of 8 hours). Before arriving for class, students should read assigned chapters taking special note of bold-faced vocabulary terms and any study questions within the chapter. Failure to comply with these suggestion will make it impossible to understand and follow the lecture material and will result in a student being unsuccessful in this course.

Students are responsible for the policies and procedures in the STC Student Handbook. Additionally, during exams, students are to place all notebooks, bags, and other belongings on the floor or on the counters located in the back and sides of the classroom. Also during examinations students are to be seated with one empty chair between each student. No talking is permitted once the exams are handed out. **Students found with their cellphone or any other personal communication device (including smart watches) will be considered cheating and given a zero for the exam. This includes taking out a phone or similar device after the student**

## **has completed the exam but while others in the classroom are still testing.**

Students are expected to exhibit professional behavior at all times. Each student is to show respect and concern for fellow students and for the instructor. Insubordination will not be tolerated, and disciplinary measures will be enacted.

Per STC policy no cell phones are allowed in hallways or in classrooms. If your phone must be with you it must be turned off and in a bag. In cases of emergency when a student needs his or her phone, he or she is expected to 1) notify the instructor before class begins and 2) leave the phone on silent (NO VIBRATE) while they are in the class (this excludes examination guidelines for phones). No personal calls are to be taken during class, regardless of the situation. This should be handled before or after class.

No eating or drinking is permitted in the lab or lecture classroom. Water is allowed if it is in a spill-proof container and must be kept under the desk or on the sides of the classroom.

## **ATTENDANCE GUIDELINES**

Class attendance is a very important aspect of a student's success. Being absent from class prevents students from receiving the full benefit of a course and also interrupts the learning process. Southeastern Technical College considers both tardiness and leaving early as types of absenteeism (three (3) tardies or early departures equals one (1) absences from the course). Responsibility for class attendance rests with the student. Regular and punctual attendance at all scheduled classes is required for student success. Students will be expected to complete all work required by the instructor as described in the individual course syllabus.

Instructors have the right to give unannounced quizzes/assignments. Students who miss an unannounced quiz or assignment will receive a grade of 0. Students who stop attending class, but do not formally withdraw, may receive a grade of F and face financial aid repercussions in upcoming semesters.

Instructors are responsible for determining whether missed work may be made up and the content and dates for makeup work is at the discretion of the instructor (see evaluation procedures and course lesson plan below).

## **SPECIAL NEEDS**

Students with disabilities who believe that they may need accommodations in this class based on the impact of a disability are encouraged to contact Helen Thomas, 912-538-3126, [hthomas@southeasterntech.edu](mailto:hthomas@southeasterntech.edu), to coordinate reasonable accommodations.

## **SPECIFIC ABSENCES**

Provisions for Instructional Time missed because of documented absences due to jury duty, military duty, court duty, or required job training will be made at the discretion of the instructor.

## **PREGNANCY**

Southeastern Technical College does not discriminate on the basis of pregnancy. However, we can offer accommodations to students who are pregnant that need special consideration to successfully complete the course. If you think you will need accommodations due to pregnancy, please advise me and make appropriate arrangements with Helen Thomas, 912-538-3126, [hthomas@southeasterntech.edu](mailto:hthomas@southeasterntech.edu).

## **WITHDRAWAL PROCEDURE**

Students wishing to officially withdraw from a course(s) or all courses after the drop/add period and prior to

the 65% point of the term in which student is enrolled (date will be posted on the school calendar) must speak with a Career Counselor in Student Affairs and complete a Student Withdrawal Form. A grade of “W” is assigned for the course(s) when the student completes the withdrawal form.

Students who are dropped from courses due to attendance after drop/add until the 65% point of the semester will receive a “W” for the course.

Important – Student-initiated withdrawals are not allowed after the 65% point. Only instructors can drop students after the 65% point for violating the attendance procedure of the course. Students who are dropped from courses due to attendance after the 65% point will receive either a “WP” or “WF” for the semester.

Informing your instructor that you will not return to his/her course, does not satisfy the approved withdrawal procedure outlined above.

There is no refund for partial reduction of hours. Withdrawals may affect students’ eligibility for financial aid for the current semester and in the future, so a student must also speak with a representative of the Financial Aid Office to determine any financial penalties that may be assessed due to the withdrawal. A grade of ‘W’ will count in attempted hour calculations for the purpose of Financial Aid.

**Remember** - Informing your instructor that you will not return to his/her course does not satisfy the approved withdrawal procedure outlined above.

## MAKEUP GUIDELINES

Lecture examinations: Students will be allowed to make up one lecture examination (excluding the final exam), due to a documented, excused absence approved by the instructor. Any subsequently missed lecture exam will result in an automatic zero.

Lab exams: There is no make-up opportunity for lab exams.

Lecture assignments: Late assignments will be accepted but not for full credit. Assignments submitted after the due date will incur a 10% deduction per day late.

Lab assignments: Late assignments will be accepted but not for full credit. Assignments submitted after the due date will incur a 10% deduction per day late.

Laboratory activities and experiments: There will be no make-up opportunity for missed lab activities, in-class assignments, experiments or dissections.

## ASSIGNMENTS

Students will be asked to bring a three prong notebook for the submission of learning outcomes and lab assignments. This notebook will stay in the classroom and new material will be added each week including: in-class assignments, completed pre-lab and lab activities, signed policies and procedures and other signature sheets, group project information, and learning objectives for lecture. Students are required to read each chapter and complete learning outcomes for each section in each chapter. Learning outcomes can be found at the beginning of each section in the students’ textbooks. All completed learning objectives should be hand written in blue ink and submitted EACH WEEK in the student’s lab notebook.

**OPTIONAL:** While not required, it is tremendously beneficial for students to also answer the “Check your progress” questions at the end of every chapter as well as participate in the chapter quizzes at the end of every chapter. This extra practice is vital to the success in this course. Additionally, there is a *BIOLOGY* companion website that students may visit for pre and post-tests, flash cards, chapter outlines, and other valuable study aids.

## GROUP PROJECT PRESENTATION

Students will work in small groups and give an educational presentation on a topic related to the chapters covered in this course. A list of topics, guidelines for arrangement, content, requirements, and a rubric can be found on the M-Drive. Presentations should be 15-20 minutes long. Points will be deducted for going under or over the time limits. Students are required some type of visual aid. Informative videos or other media may be used if it will enhance the presentation. These video clips or other media are not to exceed 7 minutes of the presentation.

Group members should have equal participation in the completion of this project. A team rating scale will be provided for students to "grade" each other on the work they have done concerning their project. Additionally, students are encouraged to report team member failure to comply with scheduled meetings, discussions, emails, group texts, etc. Failure to correspond and communicate with group members will result in very different project grades.

The week of the presentations (see course schedule), all presentations are to be submitted to the instructor, saved on the classroom computer's desktop from a jump drive, or downloaded from the web prior to the day of the presentations. Thus, no procrastination will be accepted.

## ACADEMIC DISHONESTY POLICY

The STC Academic Dishonesty Policy states All forms of academic dishonesty, including but not limited to cheating on tests, plagiarism, collusion, and falsification of information, will call for discipline. The policy can also be found in the STC Catalog and Student Handbook.

## PROCEDURE FOR ACADEMIC MISCONDUCT

The procedure for dealing with academic misconduct and dishonesty is as follows:

### 1. First Offense

Student will be assigned a grade of "0" for the test or assignment. Instructor keeps a record in course/program files and notes as first offense. The instructor will notify the student's program advisor, academic dean, and the Registrar at the student's home campus. The Registrar will input the incident into Banner for tracking purposes.

### 2. Second Offense

Student is given a grade of "WF" for the course in which offense occurs. The instructor will notify the student's program advisor, academic dean, and the Registrar at the student's home campus indicating a "WF" has been issued as a result of second offense. The Registrar will input the incident into Banner for tracking purposes.

### 3. Third Offense

Student is given a grade of "WF" for the course in which the offense occurs. The instructor will notify the student's program advisor, academic dean, and the Registrar at the student's home campus indicating a "WF" has been issued as a result of second offense. The Vice President for Student Affairs, or designee, will notify the student of suspension from college for a specified period of time. The Registrar will input the incident into Banner for tracking purposes.

## STATEMENT OF NON-DISCRIMINATION

The Technical College System of Georgia and its constituent Technical Colleges do not discriminate on the basis of race, color, creed, national or ethnic origin, sex, religion, disability, age, political affiliation or belief, genetic information, disabled veteran, veteran of the Vietnam Era, spouse of military member or citizenship status (except in those special circumstances permitted or mandated by law). This school is in compliance with Title VI of the Civil Rights Act of 1964, which prohibits discrimination on the basis of race, color, or national



origin; with the provisions of Title IX of the Educational Amendments of 1972, which prohibits discrimination on the basis of gender; with the provisions of Section 504 of the Rehabilitation Act of 1973, which prohibits discrimination on the basis of handicap; and with the American with Disabilities Act (ADA).

The following individuals have been designated to handle inquiries regarding the nondiscrimination policies:

<b>ADA/Section 504 - Equity- Title IX (Students) - OCR Compliance Officer</b>	<b>Title VI - Title IX (Employees) - EEOC Officer</b>
Helen Thomas, Special Needs Specialist Vidalia Campus 3001 East 1 <sup>st</sup> Street, Vidalia Office 108 Phone: 912-538-3126 <a href="mailto:hthomas@southeasterntech.edu">hthomas@southeasterntech.edu</a>	Blythe Wilcox, Director of Human Resources Vidalia Campus 3001 East 1 <sup>st</sup> Street, Vidalia Office 138B Phone: 912-538-3147 <a href="mailto:bwilcox@southeasterntech.edu">bwilcox@southeasterntech.edu</a>

## **GRIEVANCE PROCEDURES**

Grievance procedures can be found in the Catalog and Handbook located on STC's website.

## **ACCESS TO TECHNOLOGY**

Students can now access Blackboard, Remote Lab Access, Student Email, Library Databases (Galileo), and BannerWeb via the mySTC portal or by clicking the Current Students link on the [STC website](#).

## **TCSG GUARANTEE/WARRANTY STATEMENT**

*The Technical College System of Georgia guarantees employers that graduates of State Technical Colleges shall possess skills and knowledge as prescribed by State Curriculum Standards. Should any graduate employee within two years of graduation be deemed lacking in said skills, that student shall be retrained in any State Technical College at no charge for instructional costs to either the student or the employer.*

## **GRADING POLICY**

<b>Assessment/Assignment</b>	<b>Percentage</b>
Lecture Exams	50%
Learning Outcomes	10%
Group Presentation	10%
Comprehensive Final	30%

## **GRADING SCALE**

<b>Letter Grade</b>	<b>Range</b>
A	90-100
B	80-89
C	70-79
D	60-69
F	0-59

## **DISCLAIMER STATEMENT**

Instructor reserves the right to change the syllabus and/or lesson plan as necessary. The official copy of the syllabus is located on the STC M Drive and will be discussed on the first day of class. The syllabus displayed in advance of the semester in any location is for planning purposes only.

# BIOL 1111: Biology I

## Fall Semester 2018 Lesson Plan

Subject to change at instructor's discretion

Date/Week	Chapter/Lesson	Assignments & Tests Due Dates	Competency Area
08/13	Intro to Course, Syllabus, Outline, Regulation, etc.	<b>Students must read chapters and complete chapter assignments before coming to lecture</b>	C: 1-9 G: a-c
08/14	1: A View of Life 2: Basic Chemistry		C: 1 G: a-c
08/20	3: The Chemistry of Organic Molecules	Lecture Exam 1: Chapters 1-2	C: 1 G: a-c
08/21	3: The Chemistry of Organic Molecules		C: 1 G: a-c
08/27	4: Cell Structure and Function		C: 1-2 G: a-c
08/28	5: Membrane Structure and Function	Lecture Exam 2: Chapters 3-4	C: 1-2 G: a-c
9/3	Labor Day Holiday	No class	
9/4	5: Membrane Structure and Function 6: Energy and Enzymes		C: 1-3 G: a-c
9/10	6: Energy and Enzymes		C: 1-3 G: a-c
9/11	8: Cellular Respiration	Lecture Exam 3: Chapters 5-6	C: 1-2 G: a-c
9/17	8: Cellular Respiration 7: Photosynthesis		C: 1-3 G: a-c
9/18	7: Photosynthesis		C: 1-3 G: a-c
9/24	9: The Cell Cycle and Cellular Reproduction	Lecture Exam 4: Chapters 7-8	C: 1-3 G: a-c
9/25	9: The Cell Cycle and Cellular Reproduction		C: 1-3 G: a-c
10/1	10: Meiosis and Sexual Reproduction		C: 1-3, 7 G: a-c
10/2	10: Meiosis and Sexual Reproduction		C: 7 G: a-c
10/8		Lecture Exam 5: Chapters 9-10	
10/9	11: Mendelian Patterns of Inheritance		C: 6-7 G: a-c
10/15	12: Molecular Biology of the Gene		C: 7 G: a-c
10/16	13: Regulation of Gene Expression	Lecture Exam 6: Chapters 11-12	C: 5-7 G: a-c
10/22	14: Biotechnology and Genomics		C: 6-7 G: a-c

Date/Week	Chapter/Lesson	Assignments & Tests Due Dates	Competency Area
10/23	"The Ethics of Biotechnology"		C: 7-8 G: a-c
10/29	15: Darwin and Evolution	Lecture Exam 7: Chapters 13-14	C: 9 G: a, c
10/30	16: How Populations Evolve		C: 9 G: a-c
11/5	17: Speciation and Macroevolution 18: Origin and the History of Life		C: 9 G: a-c
11/6	Alternatives to the Theory of Evolution	Lecture Exam 8: Chapters 15-18	C: 9 G: a-c
11/12	Presentations		C: 1-9 G: a-c
11/13	Presentations		C: 1-9 G: a-c
11/19-11/22	Thanksgiving Holiday	No class	
11/26		Lecture Assignments due – all learning outcomes, all chapters must be checked off TODAY.	C: 1-9 G: a-c
11/27	Final Exam Review	Lecture and Lab – Comprehensive Final 11/29	C: 1-9 G: a-c

### Competency Areas (C)

1. Organization and Chemical Basis of Life
2. Cell Structure and Function
3. Metabolism
4. Cell Division
5. Protein Synthesis
6. Central Dogma of Biology
7. Genetics
8. Biotechnology
9. Evolutionary concepts

### General Core Educational Competencies (G)

- a) The ability to utilize standard written English.
- b) The ability to solve practical mathematical problems.
- c) The ability to read, analyze, and interpret information.