



## Hankuk University of Foreign Studies

### 2019 Summer Session

## BIOL 101 Introduction to Biology with Lab

### Course Outline

**Course Code:** BIOL 101

**Instructor:** Young Charles Jang, Ph.D.

**Home Institution:** Georgia Institute of Technology (Georgia Tech)

**Office Hours:** By Appointment

**Email:** [young.jang@gatech.edu](mailto:young.jang@gatech.edu)

**Credit:** 4

**Class Hours:** This course will have 72 class hours, including 40 lecture hours, 10 lecturer office hours, 10-hour TA discussion sessions, 2-hour review sessions, 10 laboratory hours.

#### Course Description

This is an **active-learning** class that introduces students to basic principles of modern biology, including biomacromolecules, bioenergetics, cell structure, genetics, homeostasis, and integrative biology. This course will foster the development of critical scientific skills including hypothesis testing, experimental design, data analysis and interpretation, and scientific communication. Class time will consist of a variety of **team-based activities** designed to discuss, clarify, and apply new ideas by answering questions, drawing diagrams, analyzing primary literature, and explaining medical phenomenon in the context of biological principles. We will spend class time on building your comprehension on the material you find the most difficult, based on pre-class assessment. You will play a prominent role in determining what is the focus of each day's effort.

#### Required Textbook

**BIOL 101** is taught on the flipped classroom model, meaning that you will need to complete your assigned readings before each lecture. **BIOL 101** will be taught without a textbook. All course readings and videos are available on the course website (TBD) or will be handed out before lectures. We will also use an online textbook found at **OpenStax Biology** (open source e-book): <http://openstaxcollege.org/textbooks/biology>



### **Learning Catalytics for Participation and Homework:**

To complete your pre-class incoming knowledge evaluation (IKEs), team in class activities (TICAs), and your homework assignments, students are required to have a **Learning Catalytics** account. Points earned in learning catalytics will contribute to the "participation" portion of your course grade. Learning Catalytics can be purchased directly at:

[https://learningcatalytics.com/users/sign\\_up](https://learningcatalytics.com/users/sign_up)

To participate in class, you will need to bring an internet-ready smartphone, tablet, or laptop to class to earn participation points. Phone and computer use is restricted to class-related material, and off-task use may result in loss of participation points for that day. Your entire Learning Catalytics contribution of IKEs, TICAs, and Homeworks tallies to **10%** of the course grade.

### **Incoming Knowledge Evaluation (IKEs):**

Before each class, we'll expect you to complete the pre-class readings on the website. Once you've reviewed the material, log in to learning catalytics to complete that day's Incoming Knowledge Evaluation (IKE). IKE sessions close at the start of class and will not be reopened for credit, but you can review closed sessions for study purposes. We'll use your responses to guide what we do in class. IKE questions are not often at the same level as you can expect to see on an exam; instead, they ensure that you come to class with effective baseline knowledge to work up to exam level questions in class. We will drop the 5 lowest IKEs from your participation grade.

### **Lectures and Team In-class Activities (TICAs):**

Attendance in lecture correlates strongly with performance in BIOL 101. We will make our lecture materials available and urge you to use in active note-taking during class. Much of the material and application of ideas needed for success in this course will be presented only in lecture and assessed via Learning Catalytics. Questions presented in class are usually at the same level as exam questions. TICA sessions in Learning Catalytics close at the end of class, with a few exceptions, and will not be reopened for credit, but you can review closed sessions for study purposes. We will drop the 5 lowest TICAs from your participation grade.

### **Homework:**

Homework assignments will be made available each week in Learning Catalytics and are always due on Sundays at midnight. Homeworks close on Sunday at midnight, with few exceptions, and will not be reopened for credit, but you can review closed sessions for study purposes. In the week of Midterm and Final Exam, all homeworks for that module will be reopened for practice, not for credit. We will drop the lowest Homework from your participation grade.

### **Group Projects:**

Groups of 4-5 students each will create a short video to explain a fundamental concept related to the course. Each student will be assigned to a group and a topic, and each group will complete only one group project during the semester. Group assignments, details, and deadlines will be provided in class. Video grades have a group and an individual component. The Group Component will be based on instructors' grades and peer evaluations. The same group project grade will be assigned to all members of a group; each group member is fully responsible for all submitted project work. The group video projects consist of 3 deliverables: a story board, a transcript, and a



video posted to *Youtube* or Kakao group chat. The Individual Component includes peer-evaluation of all members of your team and peer-review of a subset of videos from other groups.

**Exams (Mid-term and Final):**

This course has a midterm exam and the cumulative final exam. The midterm exams will be held as “closed-book,” and will be made up of multiple-choice questions based on topics, materials, and discussions presented in class, assigned readings, TICAs, and Homeworks.

**Labs:**

A 100% cotton lab coat, and you must wear closed-toe shoes that cover your entire foot as well as long pants. Laboratory attendance is mandatory and each unexcused absence will lower your final course grade (not just your lab grade) by 5%.

**Honor Code:**

All students are expected to abide by the Academic Honor Code. Plagiarism is the unattributed use of the words or ideas of others; plagiarism on any assignment, including laboratory reports are strictly prohibited. If you have any questions regarding your assignments and plagiarism, we encourage you to come consult with me before you submit the assignment.

**Grading & Evaluation**

Your final grade will depend on the following combination of grades:

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|---|-----|
| 1) Mid-term exam  | 25% |
| 2) Final exam -   | 30% |
| 3) Group project  | 15% |
| 4) Participation (comprised of 5% homeworks, 3% TICAs, and 2% IKEs) | 10% |
| 5) Laboratory   | 20% |

<b>A: 94 – 100</b>	<b>A-: 90 – 93.99</b>	<b>B-: 82 – 84.99</b>
<b>B+: 88 – 89.99</b>	<b>B: 85 – 87.99</b>	<b>B-: 72 – 74.99</b>
<b>C+: 78 – 81.99</b>	<b>C: 75 – 77.99</b>	<b>F: Below 64</b>
<b>D: 67 – 71.99</b>	<b>D-: 64 – 66.99</b>	



**Organization:** The course is organized into five modules, each of which deals with a major area of modern biology.

**Modules**

<b>Major theme</b>	<b>Teaching Goals</b>
<b>1. Introduction</b> (Week 1)	<ul style="list-style-type: none"> <li>• Course intro</li> <li>• Study of life</li> <li>• Scientific method</li> </ul>
<b>LAB 1:</b>	
<b>2. Molecules, Cells, and Metabolism</b> (Week 2)	<ul style="list-style-type: none"> <li>• Overview of biomolecules and cells</li> <li>• Introduction to bioenergetics: respiration and metabolism</li> <li>• Chemiosmosis in respiration and photosynthesis</li> <li>• Diversity of metabolic pathways</li> </ul>
<b>LAB 2:</b>	
<b>MIDTERM EXAM</b>	
<b>3. Genetics</b> (Week 3)	<ul style="list-style-type: none"> <li>• Mendelian genetics</li> <li>• DNA and genomics</li> <li>• Gene regulation in prokaryotes and eukaryotes</li> </ul>
<b>LAB 3:</b>	
<b>4. Integrative Biology</b> (Week 4)	<ul style="list-style-type: none"> <li>• Recombinant DNA technology &amp; bioethics</li> <li>• Genetic diseases as model biological systems</li> <li>• Stem cell biology &amp; medicine</li> <li>• Biology &amp; Biotechnology</li> </ul>
<b>LAB 4:</b>	
<b>5. Evolution</b> (Week 5)	<ul style="list-style-type: none"> <li>• Earth history</li> <li>• History of life on Earth</li> <li>• Mechanism of evolution</li> </ul>
<b>LAB 5:</b>	
<b>6. Group project presentation</b> Week 6)	
<b>FINAL EXAM</b>	