



**Beijing Jiaotong University**

**2019 Summer Session**

**BIOL 101 Introduction to Biology with Lab**

**Course Outline**

**Term: July 08-August 09,2019**

**Class Hours: 14:00-16:00 (Monday through Friday)**

**Course Code: BIOL 101**

**Instructor: Dr. Aleksandar Jeremic**

**Home Institution: The George Washington University**

**Office Hours: TBA**

**Email: jerema@gwu.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**

Introduction to Biology will provide students with an overview of the current trends and body of knowledge in Biology, including basics of the scientific method and of the analysis of scientific data.

### **Course Objectives**

The main course goal is to allow students to reach a comprehensive understanding of the issues and method in Biology, in order to decide whether to pursue studies in the field. In the process of reaching this goal, our objectives are that each student will:

- Become familiar with current scientific theories and research in the major topic areas of Biology.
- Discover the personal relevance of course material in their everyday and professional lives, in order to make fully informed decisions.



- Develop the skills necessary to evaluate and think critically about information concerning biological phenomena obtained from research, the general public, and the media.
- Be well prepared for advanced courses in Biology.

### **Required Textbooks**

-*Concepts of Biology*, by Fowler, Roush and Wise.

Download for free at: <https://openstax.org/details/books/concepts-biology>.

Publisher: OpenStax

Publish Date: May 18, 2016

Print: ISBN-10: 1938168119 ISBN-13: 978-1-938168-11-6

Digital: ISBN-10: 1-947172-03-4 ISBN-13: 978-1-947172-03-6

Several readings will be required throughout the course, either to prepare for class or to complete an assignment. All materials will be posted online to provide a free and easy access to everyone.

### **Grading & Evaluation**

Lab (20%) – Midterm exam (40%) – Final exam (40%)

90-100% (A), 80-89% (B), 70-79% (C), 60-69% (D), ≤ 60% (F)

Intermediary assignments will be posted throughout the course, to help students assess their needs and to ensure that all the important topics are well understood. Assignments and labs are also an opportunity for students to ask questions concerning unclear notions, as the main objective are not to grade but to help everyone reach an optimal level of comprehension. Midterm and final exams will target all topics previously covered in class. Lecture notes, labs and assignments are important to succeed in the midterm and final exams, yet some questions will be specifically intended to stimulate students' critical thinking.

Attendance is extremely important for success in this class. It is expected that each student will commit fully to the assignments and readings required. Exams will cover the required texts as well as material presented or discussed in class.



## Course Schedule

### **Week 1:**

Lecture 1: Course Introduction –Biological Molecules and Chemistry of Life

Lecture 2: Principles of cellular organization in Animals and Plants

Lecture 3: The Cellular Energetics: Cellular Respiration

Lecture 4: The Cellular Energetics: Photosynthesis

*LAB 1: Principles of Microscopy; Microscopic analysis of a cell*

### **Week 2:**

Lecture 5: Structure/Function of DNA and DNA replication

Lecture 6: Gene expression and control: Transcription

Lecture 7: Gene expression and control: Translation

Lecture 8: The Cell cycle

*LAB 2: Overview of molecular biology methods: PCR, RT-QPCR, primers design*

### **Week 3:**

Lecture 9: Practice problems / Review session 1

Lecture 10: **MIDTERM EXAM**

Lecture 11: The Cellular Basis of Inheritance: Sexual reproduction and Meiosis

Lecture 12: Mandel's experiments and Laws of inheritance

*LAB 3: Overview of biochemical methods and tools in biological research*

### **Week 4:**

Lecture 13: Theory of Evolution and Diversity of Life

Lecture 14: Development and Organogenesis

Lecture 15: Systems biology: The Nervous system and diseases

Lecture 16: Systems biology: The Endocrine system and diseases

*LAB 4: Biotechnology in Action: overview of gene cloning strategies, vector design and synthesis, transfection approaches.*

### **Week 5:**

Lecture 17: Systems biology: The Immune system and diseases

Lecture 18: Practice problems

Lecture 19: General Review

Lecture 20: **FINAL EXAM**

*LAB 5: Data Analysis*