



## **NORTH LAKE COLLEGE**

**5001 N. MacArthur Blvd.**

**Irving, Texas 75038-3899**

**DALLAS COUNTY COMMUNITY COLLEGE DISTRICT**

### **COURSE SYLLABUS**

**Biology BIOL-1406-73250 (1202889)**

## **Biology for Science Major I Spring 2019**

### **Instructor Information:**

**Asghar Hajibeigi, PhD**

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### **Course Information**

**Biology for Science Majors I**

**BIOL-1406-73250 (1202889)**

**Section number: 73250**

**Credit hours: 4**

### **Class meeting time: Saturdays**

**Lecture: 8:30 – 11:40 (C224)**

**Lab: 12:00 – 3:10pm (C322)**

**Course description:** An introductory survey of contemporary biology for students majoring in the sciences. Topics emphasized will include the chemical basis of life, structure and function of cells, energy transformations, and molecular biology and genetics. (3 Lecture, 3 Lab.). **Coordinating Board Academic Approval Number 2601015103**

**Course prerequisites:** One of the following must be met: (1) Developmental Reading 0093 AND Developmental Writing 0093; (2) English as a Second Language (ESOL) 0044 AND 0054; or (3) have met Texas Success Initiative (TSI) Reading and Writing standards AND DCCCD Writing score prerequisite requirement.

### **Required or Recommended Textbooks and Materials**

**Campbell Biology Volume 1, Second Custom Edition for North Lake College,**

**Benjamin Cummings, 9th ed., 2011. ISBN: 10: 1-256-30716-5**

**Biology 1406 Laboratory Manual, 2<sup>nd</sup> Edition**

**Northlake College ISBN-13: 978-1-68135-558-0 @2017 by bluedoor,LLC**

## Course Objectives

1. Recognize the characteristics that distinguish living things from nonliving.
2. Identify the tools used in biological studies such as the microscope, experimental design, scientific problem solving and interrelations between science, technology and society.
3. Define the basic characteristics of matter, the atom, atomic theory and chemical bonding as it relates to the formation of the molecules of life.
4. Describe the unique characteristics of water that make it essential to life on earth.
5. Recognize the properties of carbon that make it central to the molecules of life and the role of functional groups in the characteristics of carbon compounds.
6. Identify the four major groups of biomolecules, their chemical characteristics, the roles they play in life and their basic structural characteristics.
7. Recognize the cell as the structural and functional unit of life while reviewing the cell theory, cellular structure and function, Prokaryotic vs. Eukaryotic cells and the endosymbiotic theory.
8. Describe the fluid mosaic model of membrane structure.
9. Explain the concept of diffusion, its relationship to cellular transport and various methods of membrane transport.
10. Define energy, its role in chemical reaction and reaction mechanisms and the role of enzymes in biological reactions.
11. Review the process of cellular respiration and alternative respiratory pathways recognizing the essential nature of respiration in cellular processes.
12. Recognize the essential nature of photosynthesis to life on earth, identifying the major steps in the process and environmental factors that impact photosynthetic efficiency.
13. Explain the concept of cellular communications at the molecular level focusing on the transduction pathway.
14. Review the role of mitosis and meiosis in the lifecycles of eukaryotes, recognizing the basic steps in each process and identifying how they differ.
15. Identify the basic mechanisms of classical genetics and how they relate to the continuity of life.
16. Explain how DNA was determined to be the genetic material, its molecular structure and how the structure of DNA relates to its role in genetic continuity and expression.
17. Identify the process of protein synthesis and its role in the expression of the genetic code.

## Specific Course Learning Outcomes

Students will master the concept of the cell as the structural and functional unit of life.

Students will master basic concepts of chemistry and atomic theory.

Students will understand the role of biological molecules in the chemistry of life.

Students will master basic concepts of cellular physiology such as cellular respiration and photosynthesis.

Students will understand basic principles of heredity.

Students will master basic concepts of molecular genetics including the structure and functions of DNA and RNA in relation to the production of proteins.

## Course Outline – Corresponds to chapters in text

1. Introduction to Biology
2. Basic Chemistry
3. Chemistry of Water
4. Chemistry of Carbon
5. Biomolecules
6. The Cell
7. Membrane Structure and Function
8. Introduction to Metabolism
9. Cellular Respiration
10. Photosynthesis
11. Cell Communication
12. Cell Cycle- Cell Division-Mitosis
13. Meiosis
14. Mendelian Genetics
15. Human Genetics
16. DNA structure and function
17. DNA to Protein Synthesis

## Means of Assessment of Course Learning Outcomes

Learning outcomes will be assessed by examinations in both lecture and laboratory. Additionally each of the twelve units completed in lab will be assessed by either lab report, quiz or other activities determined to be appropriate by the instructor.

## Attendance Policy:

Lecture and laboratory attendance is required. All responsibility for make-up work is that of the student. Attendance will be taken at the beginning of both lecture and lab classes. No absence is permitted from lab without penalty except in extreme circumstances. Your laboratory instructor will review lab attendance and the makeup policy at your first lab. Laboratory units cannot be completed without laboratory attendance.

## Evaluation Procedures

**Lecture:** Your lecture is based on a combination of 6 lecture exams and 10 to 15 pre-quizzes. Quizzes may or may not be assigned and will be given at the beginning of class. If you are not there on time you cannot take the quiz. There is no makeup for missed quizzes. The lowest score for lecture exams 1-5 will be dropped from the point total for final grade determination. Each exam is valued at 100 points and each quiz at 10 points. Your lecture grade is based on a percentile of the exams and quizzes with 90-100 for an A, 80 to 89.99 for a B 70 to 79.99 for a C, 60 to 69.99 for a D and below 60 an F. Additional graded projects may be assigned during the semester, but the grade is still a percentile grade of the total possible accumulated points. Your lecture average is 70% of your total grade in Biology 1406. **If a lecture exam is missed, make up must be completed within three class days after the exam. The makeup exam may be an essay or objective exam. The only excused absence from a lecture exam is either severe illness, bereavement or other extreme situations as determined by the instructor, but not just because you are not ready for the exam. A second lecture exam cannot be made up except when due to extreme circumstances as approved by the instructor.**

**Laboratory:** Your lab grade is based on four lab exams and a combination of lab reports, pre quizzes and post quizzes to be given during the semester. Each lecture exam and lab exam is valued at 100 points. Daily work may be a combination of a formal lab report, a pre-quiz and a post-quiz. Pre-quizzes are valued at 5 points, post-quizzes at 10 points and formal lab reports at 20 points. Additional graded activities may be assigned during the semester. Your grade in lab is based on a percentile of all graded exams, quizzes, reports and other projects as may be assigned during the semester. The grade scale will be 90-100 for an A, 80 to 89.99 for a B 70 to 79.99 for a C, 60 to 69.99 for a D and below 60 an F. Your lab grade is 30% of your total grade in Biology 1406. **There is not makeup for lab exams, pre-quizzes or post quizzes.**

### Grading Scale

Your final grade will be a combination of both lecture and lab, with lecture representing 70% and lab 30% of the final grade.

### Discipline/ Course/ Department/Policies

Students are expected to be on time for all class and to fully participate in class activities. When you come to class, plan on staying until the class is dismissed. Take care of any out of class needs prior to entering the class.

Cell phones should be turned to silent and be put away during class activities. No texting or other inappropriate use of electronic devices as determined by the instructor.

Laptops, notepads, etc. can be used in class, but only for class purposes.

All electronic devices are to be turned off and put away during exams.

All students are expected to abide by the college Student Code of Conduct.

**The instructor reserves the right to make changes to any part of this document as deemed necessary by the instructor for overall class success, evaluation, class policies and completion of the class.**

## INSTITUTIONAL POLICIES

[Link to Institutional Policies](#)

The above link will provide information about institutional policies regarding the following:

- Student Success
  - Academic Advising and Degree Planning
  - Tutoring
  - Students With Disabilities
  - Cheating, Plagiarism and Collusion
  - Student Survey of Instruction
  - Religious and Ethnic Holiday Observance
  - Harassment, Discrimination and Sexual Misconduct
- Students Receiving Financial Aid
  - Attendance and Participation
  - Withdrawing From Classes
- Class Drop and Repeat Options
  - Withdrawal Policy
  - Six Drop Rule
  - Repeating a Course and Third Drop Rule
- In Case of a Campus Emergency
- Concealed Carry
  - Weapons

- Syllabus Change Disclaimer
- Other College-Specific Information

### **Exemplary Educational Objectives**

This course satisfies all of the Exemplary Educational Objectives for the natural sciences. They are:

1. To understand and apply method and appropriate technology to the study of natural sciences.
2. To recognize scientific and quantitative methods and the differences between these approaches and other methods of inquiry and to communicate findings, analyses and interpretation both orally and in writing.
3. To identify and recognize the differences among competing scientific theories.
4. To demonstrate knowledge of the major issues and problems facing modern science, including issues that touch upon ethics, values, and public policies.
5. To demonstrate knowledge of the interdependence of science and technology and their influence on, and contribution to, modern culture

## **Learning Activities, Outcomes, and Assessment**

### **Learning Activities, Outcomes, and Assessment**

<b><u>Learning Activity</u></b>	<b><u>Learning Outcomes</u></b>	<b><u>Assessment</u></b>	<b><u>EEO's &amp; CCIC's</u></b>
<b>Provide a brief description of the learning activity.</b>	<b>Briefly list the specific learning outcomes/ objectives for the activity.</b>	<b>How will the activity be assessed?</b>	<b>Which EEO's and CCIC's are addressed by the learning activity?</b>
1. Demonstrate the knowledge of diffusion of water and other molecules through a semipermeable membrane by performing different experiments in laboratory.	Practical application of the concept of diffusion of water and other molecules through semipermeable membrane.	Timed quiz through eCampus over the concept and its application on 70% of measured items. Evaluation based on a rubric.	EEO 1, 2 and CCIC 1, 2, 4
2. Describe the unique characteristics of water that make it essential to life on earth.	Assigned readings, lecture and discussion in class, related laboratory activities.	Ten question quiz to be administered after the completion of the topic. The class goal is 70% correct response.	EEO 1, 2, and CCIC 1, 2, 4
3. Demonstrate an understanding of the significance of cellular respiration and an understanding of the major energy transforming events of the process.	Assigned readings, lecture and discussion in class, play out the major steps of the aerobic respiratory pathway and related laboratory activities.	Ten question quiz to be administered after the completion of the topic. The class goal is 70% correct response.	EEO 1, 2, 3 and CCIC 1, 2, 4

### **PROGRAM –LEVEL OBJECTIVES FOR BIOL1406**

BIOL1406 develops the following objectives from the Texas Higher Education Coordinating Board:

- Communications: Written, oral
- Communications: Visual
- Critical Thinking
- Empirical & Quantitative Skills

The program level outcomes are assessed by a questionnaire about the laboratory activities performed by students in a group setting.