

## **Fundamentals of Biology**

**A freshman-level course intended for majors.**

**This is a *proposed* course template that individual institutions of higher education may choose to use, so that their own majors course is automatically accepted at other institutions, state-wide. A committee of faculty from across the state will review submissions.**

### **Course description**

Fundamentals of Biology is four-credit lecture and laboratory course forms the foundation for subsequent coursework in the major. This course focuses on the nature of Science, biological macromolecules, energy concepts within biological systems, molecular and cellular biology, patterns of inheritance and genetics, biotechnology, and mechanisms of evolution.

### **Learning outcomes**

These are the **essential outcomes** that ***must*** be covered in this course. Additional material may vary among institutions and instructors.

1. Inter-relate common themes throughout life systems.
2. Apply the concept of the Scientific method, including correctly identifying controls and variables.
3. Use basic chemical knowledge to make appropriate extensions in biological systems.
4. Describe structure and function of the biological macromolecules.
5. Use the structure/function of biological macromolecules to explain basic processes like DNA replication, transcription, and translation.
6. Describe/compare/contrast cell structure/function in prokaryotic and eukaryotic cells.
7. Chart basic cellular processes through the appropriate cell structures.
8. Relate the structure/function of the cell membrane to various cellular processes such as transport and respiration.
9. Align the basic concepts of metabolism with cellular respiration, fermentation, and photosynthesis.
10. Discuss cellular communication methods.
11. Inter-relate the cell cycle and the stages of mitosis in asexual cellular reproduction.
12. Apply the stages of meiosis to explain the positive and negative aspects of sexual reproduction.
13. Utilize Mendelian genetics principles to explain inheritance of traits.
14. Outline the steps of DNA replication.
15. Chart the processes that result in protein production from a specific gene.
16. Relate control of gene expression to the functional needs of a cell.
17. Describe basic evolutionary concepts.

## Template for Course Inventory

Please fill out the following table and submit attachment(s). Approved courses must be resubmitted every 5 years.

Please attach the following materials:

- Current working syllabus and lab syllabus that contains instructional goals and/or objectives
- Comprehensive final; in the absence of a comprehensive final no more than 5 sample assessments (student exercises, quizzes, exams, or other assessments).

<b>Course #</b>			
<b>Course Title</b>			
<b>Beginning Term</b> (when is/was it first offered?)	If more than five years, check box <input type="checkbox"/>		
	If less than five years, enter date:		
<b>Credit Hours</b> (including the entire course, lecture/lab)	Lecture:		
	Lab (leave blank if no lab):		
<b>Co-/Pre-requisite</b> (test scores for placement)		Test	Score
	Pre-req:		
	Co-req:		
<b>Successor Course:</b>			
<b>Catalog Description</b>			
<b>All Textbook(s)/Lab Manual</b>	ISBN:	ISBN:	
	Title:	Title:	
	Publisher:	Publisher:	
	Author:	Author:	
	Edition:	Edition:	
	Copyright Year:	Copyright Year:	

Indicate the typical percentage of time spent on each learning outcome/topic	Learning Objective	% Time
	1. Inter-relate common themes throughout life systems.	
	2. Apply the concept of the Scientific method, including correctly identifying controls and variables.	
	3. Use basic chemical knowledge to make appropriate extensions in biological systems.	
	4. Describe structure and function of the biological macromolecules	
	5. Use the structure/function of biological macromolecules to explain basic processes like DNA replication, transcription, and translation.	
	6. Describe/compare/contrast cell structure/function in prokaryotic and eukaryotic cells.	
	7. Chart basic cellular processes through the appropriate cell structures.	
	8. Relate the structure/function of the cell membrane to various cellular processes such as transport and respiration.	
	9. Align the basic concepts of metabolism with cellular respiration, fermentation, and photosynthesis.	
	10. Discuss cellular communication methods.	
	11. Inter-relate the cell cycle and the stages of mitosis in asexual cellular reproduction.	
	12. Apply the stages of meiosis to explain the positive and negative aspects of sexual reproduction.	
	13. Utilize Mendelian genetics principles to explain inheritance of traits.	
	14. Outline the steps of DNA replication.	
	15. Chart the processes that result in protein production from a specific gene.	
	16. Relate control of gene expression to the functional needs of a cell.	
	17. Describe basic evolutionary concepts.	
<b>Additional Comments:</b>		

Name of individual submitting: \_\_\_\_\_

Email address: \_\_\_\_\_

Please contact Beez Schell, beez.schell@wvhepc.edu, Academic Affairs with questions