SOUTHEAST COMMUNITY COLLEGE
DIVISION OF ARTS AND SCIENCES
Sciences
Revision Date: 07-01-19

I. CATALOG DESCRIPTION

Course Number:	BIOS1400
Course Title:	Biology I
Prerequisite(s):	None
Catalog Description:	This course investigates life and living systems at the cellular level. Discussion topics include all aspects of cell structure and function, including cell metabolism, the cell cycle, cell membrane transport, photosynthesis, cellular respiration, protein synthesis, gametogenesis, genetic expression and patterns of inheritance. This course in series with BIOS1410 is designed to provide students with a foundation for upper level courses in the biological and life sciences. A laboratory course (BIOS1400L) must be taken concurrently.
Credit Hours:	4.0
Class Hours:	45
Lab Hours:	30
Total Contact Hours:	75

II. COURSE OBJECTIVES: *Course will:*

A. Recognize science and scientific inquiry as a vital and relevant component of human society
B. Explain how science and scientific theory provide logical explanations for natural phenomena based on the acquisition and analysis of evidence.
C. Recognize that cell structure and function provide evidence supporting the origins and diversity of all life on earth.
D. Provide a foundation for understanding the molecular basis for life.
E. Present a comprehensive investigation of life at the cellular level.

III. STUDENT LEARNING OUTCOMES AND GENERAL EDUCATION LEARNING OUTCOMES:

A. Student Learning Outcomes: *Student will be able to:*

1. Understand the atomic and molecular structure and function of living systems
2. Define and understand the components of the Cell Theory
3. Identify similarities and differences between prokaryotic and eukaryotic cells
4. Understand the functions of all cell organelles
5. Understand the structure and function of the cell membrane
6. Compare and contrast different methods of membrane transport
7. Describe and understand cellular metabolic and energy transfer activities including photosynthesis, aerobic cellular respiration, anaerobic cellular respiration, fermentation, and protein synthesis
8. Understand DNA, the key stages of the cell cycle and gametogenesis, including the similarities and differences between them
9. Understand the molecular basis of genetic material and the expression of genetic traits
10. Understand the inheritance of traits
11. Describe the process of genetic mutation and how mutations are the foundation for evolution and the diversity of life
12. Explain the role cells play in the homeostasis of organisms at all biological levels
13. Understand the process of gathering data, data analysis, and data presentation via statistical analysis, graphing, and the preparation of detailed laboratory reports summarizing experimental methods and results

14. Understand the connection between cellular, organismal, and ecosystem function

B. General Education Learning Outcomes

1. GELO #3: Critical Thinking & Problem Solving
- Outcome: Collect, identify, interpret and analyze data.
- Outcome: Synthesize information to arrive at reasoned solutions to problems.
- Outcome: Evaluate ideas presented in writing, media, speech, or artistic presentations.
- Outcome: Evaluate the validity of arguments, alternatives, data, outcomes, and/or impacts of actions.
- Outcome: Acquire and integrate knowledge and construct relationships across disciplines.

2. GELO #5: Analytical, Quantitative, and Scientific Reasoning
- Outcome: Apply mathematical and scientific methods to solve problems from an array of contexts and everyday situations.
- Outcome: Understand and create logical arguments supported by quantitative and scientific evidence and communicate those arguments in a variety of formats.
- Outcome: Effectively develop strategies, algorithms, or experiments (or performing experiments) to better describe the systems or to solve the problems.
- Outcome: Manipulate formulas, data sets, graphs, tables, etc. in a way to produce a meaningful outcome.

3. GELO #6: Career and Life Skills
- Outcome: Use digital technology effectively to access, manage, integrate, evaluate, and present information.

IV. CONTENT/TOPICAL OUTLINE (*course outline may provide more detailed information)*

A. Evolution, Foundations of Biology, and Scientific Method
B. The Chemistry of Life
C. Cell Structure and Function
D. Cell Membrane Transport and Cell Signaling
E. Cellular Metabolism and Energy Transfer Reactions
F. Aerobic Respiration, Anaerobic Respiration, and Fermentation
G. Photosynthesis
H. The Cell Cycle and Mitosis
I. Meiosis/Gametogenesis
J. Mendelian Genetics
K. Chromosomes and Genetic Inheritance
L. DNA Structure and Replication
M. Protein Synthesis and Gene Expression
N. Regulation of Gene Expression
O. Cell Differentiation, Stem Cells and Cancer
P. Viruses
Q. Genomes

V. INSTRUCTIONAL MATERIALS

A. Required Text(s):

1. Urry, Lisa A., Cain, Michael L., Wasserman, Steven A., Minorsky, Peter V., Jackson, Robert B. and Reece, Jane B. *Campbell Biology in Focus Plus MasteringBiology*, 2nd Edition, Pearson, 2016, ISBN 13: 9780321962584.

B. Other Resources:

1. *Mastering Biology* Online Study Program, Pearson Publishing
2. Laboratory Exercise Handouts
3. Laboratory Notebook

VI. METHODS OF PRESENTATION/INSTRUCTION

A. Methods of presentation typically include a combination of the following:

1. Lecture: PowerPoint lectures, discussions, and short supporting videos

2. Laboratory: Experiments, hands-on data collection and evaluation, demonstrations, occasional videos

VII. METHODS OF EVALUATION

A. Methods of evaluation typically include a combination of the following:

1. Exams

2. Quizzes – via Mastering Biology as well as regular laboratory quizzes

3. Homework assignments via Mastering Biology

4. Laboratory reports

B. SCC STANDARD GRADING SCALE POLICY:

A+	95-100	C+	75-79	F	59 or less
A	90-94	C	70-74		
B+	85-89	D+	65-69		
B	80-84	D	60-64		

VIII. SPECIFIC COURSE REQUIREMENTS:

A. None