# BIOLOGY 110 – GENERAL BIOLOGY COURSE SYLLABUS AND OUTLINE

**January 8, 2018**

**PROFESSOR**: Dr. Howard Duncan, Professor of Biology, Room 201 Woods Science Bldg., Phone: 823-8940, [hbduncan@nsu.edu](mailto:hbduncan@nsu.edu)

# OFFICE HOURS:

Monday 11:00 AM to 1:00 PM

Tuesday: 11:30 PM to 1:30 PM

Wednesday: 11:00 AM to 1:00 PM

Thursday: 1:30 PM to 3:00 PM

Friday: 11:00 AM to 12:00 PM

**CLASS MEETINGS**: 9:00 AM to 9:50 AM, MWF, Room 104 Wood Science Bldg.

# REQUIRED TEXTS:

1. *BIOLOGY The Unity and Diversity of Life,* 14th Ed., Cecie Starr and Ralph Taggart. Wadsworth Publishing Co., Belmont, CA.
2. *Student Interactive Workbook to Accompany BIOLOGY The Unity and Diversity of Life*

**COURSE DESCRIPTION:** This course is a survey of basic concepts and principles; with emphasis at the molecular and cellular levels of biological systems. It is a coverage of contemporary genetics, metabolism, and organ systems of representative plants and animals.

**COURSE RATIONAL:** Biology 110 provides biological principles that will serve as a primer for future biology curriculum courses. It also provides an overview of biology for biology and other science majors.

# PREREQUISITES, CO-REQUISITES, OR SUPPLEMENTAL READING:

Students **must take** Biology 110 Laboratory with this course as a co-requisite.

**COURSE OBJECTIVES**: Biology 110 is an introductory biology course for all science majors. The course is designed as a study of all major living organism topics and will provide science students with; 1) the biological prerequisites for more advanced science courses 2) an understanding of the relationship of biology to the physical sciences 3) an understanding of the relationship of biological phenomena to current and daily scientific events 4) an appreciation of the diversity of biological topics as individual sciences themselves 5) a working knowledge of classic principles of biology as well as an overview of how they relate to modern biological advancements.

**CREDITS** – Three (3) semester hours

# EVALUATION/ASSESSMENT METHODS:

* Four Lecture Examinations: **Jan 29, Feb 19, Mar 19, Apr 9,**

-Announced Quizzes: Quiz average counts as **one** lecture examination grade.

* Final Examination: **May 2 ,** counts as **two** lecture exams.

(**Make-Up Policy**: Only students with **valid excuses** will be allowed to make up exams.)

**GRADING STANDARDS/EVALUATION CRITERIA –**  Final grades will be curved with 100-86 A and then dropped in 3 point increments (100-86 A, 85-82 A-, 81-78 B+, etc.)

**QUALATIVE REASONING EXAMINATION:** Currently administered non-credit at the end of the semester

# ACADEMIC INTEGRITY STANDARDS:

As stated in the NSU Catalogue, academic misconduct includes "unauthorized collaboration or use of external information during examinations" and “engaging in any conduct which is intended or reasonably likely to confer upon one's self or another an unfair benefit respecting an academic matter.”

As stated in the NSU Handbook, "Cases of dishonesty in academic work are considered to be serious violations; therefore, the student risks incurring the penalty of failure of the course."

**ATTENDANCE:** will be taken daily. Students are expected to attend class unless they have an official excuse. Students that have not attended class by the 3rd week of the semester will be dropped from the class roster.

-Not more than 20% of class meetings may be missed by a student during a given semester.

# CELL PHONES

-Students who use their cell phones or have their phones ring during class will be asked to leave.

# METHODS AND RESOURCES OF INSTRUCTION:

* 1. Lectures supplemented by slide presentations and examination study guides
  2. Question and discussion sessions

Students will find adequate resources for this course in their class notes, textbooks, website, and the computer software accompanying the textbook.

# COMPUTER TECHNOLOGY REQUIREMENTS:

Although use of a computer is not required for this course, basic computer literacy is necessary to log on to “Black Board”.

# BLACK BOARD LOGIN INSTRUCTIONS

NSU HomepageE-Learning Login (upper left corner) Login (again) (upper left corner) Type in User Name ****first initial(period)second initial(period)last name****Type in Password ****S + 7-didgit student number + $****BIO 110-01

Choose from: Announcements

Course Information Course Documents Staff Information Communication

# AMERICANS WITH DISABILITIES ACT (ADA) STATEMENT

In accordance with Section 504 of the 1973 Rehabilitation Act and the Americans with Disabilities Act (ADA) of 1990, if you have a disability or think you have a disability, we ask that you please contact the Disability Service office.

**Location:** Student Services Building Suite 110, Room 110D

**Contact Person:** Mrs. Audrey Wells, Coordinator DS

**Telephone:** 757-823-8325

**Email:** [amwells@nsu.edu](mailto:amwells@nsu.edu)

# COURSE OUTLINE/CALENDAR BIOLOGY 110

1. **Life’s Chemical Basis, P. 22**
   1. Starts with Atoms
   2. Why Atoms Interact
   3. Acids, Bases, (and Salts)
   4. Water‘s Life-Giving Processes

# Molecules of Life, p. 35

* 1. Organic Molecules - Role of Carbon in Cell Structure and Function
  2. Carbohydrates
  3. Lipids
  4. Proteins
  5. Nucleotides and Nucleic Acids

# Cell Structure and Function, p. 52

* 1. Generalized Picture of a Cell – The Cell Theory
  2. Prokaryotic Cells - The Bacteria p. 60
  3. Eukaryotic Cells. P. 62
  4. The Nucleus
  5. The Endomembrane System
  6. Mitochondria
  7. Specialized Plant Organelles
  8. Cell Surface Specialization
  9. The Cytoskeleton

# Organization of Cell Membranes, p. 88

* 1. Lipid Bilayer/Fluid Membranes
  2. Membrane Proteins
  3. Diffusion
  4. Osmosis
  5. Passive/Active Transport. Endo/Exocytosis
  6. Tonicity – Which Way Will Water Move

# Ground Rules of Metabolism, p. 96

* 1. The Nature of Energy and the World of Life
  2. Energy and the Molecules of Life
  3. How Enzymes Make Substances React
  4. Metabolic Control (p. 101)
  5. Cofactors
  6. ATP: The Main Energy Carrier
  7. Electron Transport Systems

# Photosynthesis, p. 100

* 1. Overview of Photosynthesis
  2. Light Dependent Reactions (Cyclic & Non-cyclic Photophosphorylation)
  3. Light Independent Reactions (The Calvin Cycle)

# How Cells Release Chemical Energy, p. 116

* 1. Anaerobic Metabolism – Glycolysis and Fermentation
  2. Aerobic Metabolism - Oxidation of Pyruvic Acid to Acetyl CoA
  3. Kreb's Cycle

1. Electron Transfer Phosphorylation
2. Respiration of Fats and Proteins (p. 135)
3. Mitochondria As Organelles of Cellular Respiration
4. Body Temperature and Metabolic Rate (Duncan)

# How Cells Reproduce, p. 176

* 1. Overview of Division Mechanisms
  2. Mitotic Cell Division and the Cell Cycle. p. 178
  3. Stages of Mitosis
  4. Cytokinesis: Dividing Up the Cytoplasm

# Meiosis and Sexual Reproduction, p. 188

* 1. Sexual Reproduction
  2. Overview of Meiosis
  3. Stages of Meiosis
  4. Meiosis and the Life Cycle

# Observing Patterns in Inherited Traits, p. 201

* 1. Mendel’s Insights Into the Patterns of Inheritance
  2. Variations On Mendel's Themes
  3. Sex Determination p. 192

# Chromosomes and Human Inheritance p. 218

* 1. Human Genetic Analysis p. 220
  2. Autosomal Recessive Inheritance p. 223
  3. Autosomal Dominant Inheritance p. 222
  4. Heritable Change in Chromosome Number, Non-disjunction p. 228
  5. Change in Sex Chromosome Number p. 228

# COURSE GOALS AND MEASURABLE INTENDED STUDENT LEARING OUTCOMES:

**Upon completion of this course, students should be able to understand the:**

**Chapter I.**

-Organization of matter at the molecular, elemental, atomic, and subatomic level

-Chemical nature of ionic, covalent, and hydrogen bonds

-Role acids, bases, and salts in cellular reactions

-Structural and chemical properties of water

# Chapter II

-Role of carbon in cell structure and function

-Role of the five classes of organic molecules in biological systems

# Chapter III

-Structure and function of pro-and eukaryotic cells and their organelles

Chapter IV

-Function of cell membranes and the roles of diffusion, osmosis, and solute transport

# Chapter V

-Nature of energy and its role in metabolic reactions

-Structure and function of enzymes, cofactors, ATP, and electron transport systems

# Chapter VI

-Principles of cyclic-, non-cyclic photophosphorylation, and the Calvin cycle as components of photosynthesis

# Chapter VII

-Mechanisms of cellular anaerobic and anaerobic energy releasing pathways

-Function and structure of mitochondria as organelles of cellular respiration

# Chapter VIII

-Prokaryotic and eukaryotic cell cycle events and their metabolic and genetic importance

-Stages of mitosis

# Chapter IX

-Stages of meiosis

-Essential differences between mitosis and meiosis and their role in organism physiology and metabolism

# Chapter X

-Impact of Gregor Mendel's gardening observations

-Concepts of mono-, dihybrid, test, intermediate, and multiple allele inheritance patterns.

# Chapter XI

-Construction of a pedigree chart

-Difference between autosomal recessive and dominant inheritance

-Disorders resulting non-disjunction I and II

**STUDY RESOURCES FOR BIOLOGY 110:**

**TEXTBOOK: *BIOLOGY – UNITY AND DIVERSITY OF LIFE, 14th ed.***

# STUDENT INTERACTIVE WORKBOOK TEXTBOOK

**STUDY QUESTIONS, VOCABULARY, AND EXERCISES AT THE END OF TEXTBOOK CHAPTERS**

**CLASS NOTES**

**INCLASS QUESTIONS TO PROFESSOR CONFERENCES WITH PROFESSOR EXAMINATION STUDY GUIDES**

**BLACKBOARD FIGURES AND ILLUSTRATIONS**

***MINE TAP* THROUGH BLACKBOARD**

**CLASSMATE STUDY GROUPS**

**CLASSMATE COMMUNICATION THROUGH BLACKBOARD**

**TUTORIAL HELP – STUDENT SUPPORT SERVICES**