# FLCC Course Syllabus

**Response ID:** 147

## 2. General Information

**Date**
12/04/2016

**Department**
Science & Technology

**Course Prefix:**
BIO

**Course Number:**
125

**Course Title:**
Foundations of Life Science

## 3. Course Information

**Credit Hours**
4

**Lecture Contact Hours**
3

**Laboratory Contact Hours**
2

**Other Contact Hours**

**Catalog Description**
This course is a brief overview to the unifying concepts in biology including, but not limited to molecular, cellular, metabolic, genetic, evolutionary, and whole organismal biology. This course relates the relevant concepts of living organisms to their environment. The laboratory component supports and reinforces lecture content.

**New Analysis Question**

**Prerequisites**
Successful completion of all required remedial courses.

**Co-requisites**

**Grading Scheme**
Letter Grade
## Course Information

This course can be taken more than once for credit

This course is designated as satisfying a requirement in the following SUNY Gen Ed category:

- Natural Sciences

### First Year Experience

### Capstone

### 4. FLCC Values

**College Learning Outcomes Addressed by the Course**

- Inquiry
- Interconnectedness
- Vitality
- Perseverance

### 5. Course Learning Outcomes

**Course Learning Outcomes**

1. Identify fundamental concepts of biology - including basic molecular, cellular, metabolic, genetic, evolutionary, and whole organismal biology.
2. Analyze biological diversity from multiple perspectives (e.g. biochemical, metabolic, ecological, and behavioral).
3. Articulate comprehensive conclusions through use of scientific inquiry.
4. Practice the techniques of writing scientifically.

### 6. Program Affiliation

This course is required as a core program course in the following program(s):

- AAS Horticulture
- Horticulture Certificate
- AAS Natural Resources Conservation
- AAS Natural Resource Conservation: Law Enforcement

### 8. Outline of Topics Covered

**Outline of Topics Covered in Course**

**New Analysis Question**

**Outline of Topics Covered**

- I. Taxonomic System of Classification
  - a. characteristics of each Domain and/or Kingdom from a cellular, metabolic and whole organismal level
  - b. scientific application of taxonomy
  - c. application of these concepts
- II. Molecular Biology
  - a. Carbohydrates
b. Lipids
c. Proteins
d. Nucleic Acids

III. Relationship between Nitrogenous Base sequence in DNA and Nitrogenous Base sequence in RNA and Amino Acid sequence in a polypeptide and the configuration of a protein and genetically based characteristics

IV. Basic Cellular Structure and Function
a. Organelle identification
b. Molecular components of organelle
c. Metabolic function of organelle
i. In relationship to other organelles
ii. In relationship to the whole organism

V. Cellular energy
a. Application of the First Law of Thermal Dynamics
b. Aerobic Respiration
i. Flow of energy
   1. Glycolysis
   2. Krebs Cycle
   3. Electron Transport Chain
c. Anaerobic Respiration
   i. Lactic Acid Fermentation
   ii. Alcohol Fermentation

VI. Photosynthesis
a. Impact of photosynthesis and photosynthesizing organisms on the environment and evolution of Aerobic Respiration
b. Flow of Energy
c. Light Reaction
d. Calvin Cycle

VII. Transportation of water from roots to leaves
a. Osmotic Pressure
b. Capillary Action
c. Transpiration

VIII. Sexual vs. asexual reproduction
a. Genetic differences
b. Population variability as a result of each
c. Evolutionary consequences of each

IX. Cell Division
a. Mitotic Cell Division
   i. Purpose
   ii. Genetic Results of Mitotic Cell Division
   iii. How these results are achieved
b. Meiotic Cell Division
   i. Purpose
   ii. Genetic result of Meiotic Cell Division
   iii. How these results are achieved
      1. Crossing over
      2. Law of Independent Assortment
   iv. Chromosomal Anomalies
   v. Sex Determination

X. Mendelian Genetics
a. Chromosome, Gene, Homologous Pairs of Chromosome, Allele, Genotype vs. Phenotype
b. Punnett's Squares
c. Test Cross

XI. Alternatives to Mendelian Genetics
a. Codominance
b. Incomplete Dominance
c. Multiple alleles
d. Pleiotropy
e. Polygenic Inheritance
f. Effects of environment of expression of genes

XII. Evolution
a. Definition
b. Microevolution
i. Natural Selection
ii. Artificial Selection
iii. Non-selection Influences
1. Genetic Drift
2. Founders Effect
3. Bottle Neck Effect
iv. Sexual Selection

XIII. Macroevolution
a. The Biological Species Concept
b. Mechanisms of Speciation
i. Allopatric
ii. Sympatric

XIV. Extinction
a. Throughout geological time
b. In recent history