A Course Syllabi

This appendix contains recent syllabi for science, mathematics, and computer science courses. Note some syllabi were slightly altered in AY 2020-2021 due to restrictions from the global pandemic.

Science Courses

Mathematics Courses

Computer Science Courses

1. Course number and name
   BIO 101, General Biology I

2. Credits and contact hours
   3

3. Instructor's or course coordinator's name
   Coordinator: Prof. Nancy Burns

4. Text book, title, author, and year

   a. Other supplemental materials

5. Specific course information

   a. Catalog description of the content of the course
      This course considers the basic concepts of life science with emphasis on the methods of science and the role of science in society, the chemistry of life, and molecular and cellular evolution. Selected topics include cellular biochemistry, the central dogma of biology, regulation of gene expression, cell structure and function, respiration and photosynthesis, and cell cycles. This course is primarily for students in health science programs or in the School of Engineering. First semester of a full-year course; must be taken in sequence.

   b. prerequisites or co-requisites
      Corequisites: BIO101L

   c. indicate whether a required, elective, or selected elective
      Selected elective

6. Specific goals for the course

   (a) specific outcomes of instruction
      Learning Objectives (the student will be able to):

      - **TBD**

   (b) explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course.
      None

7. Brief list of topics to be covered
   Lecture Topics

   - **TBD**

Prepared by: Christian Duncan
Creation date: 06/26/2021
Revised:

1. Course number and name
   BIO 101L, General Biology I Lab

2. Credits and contact hours
   1

3. Instructor's or course coordinator's name
   Coordinator: Prof. Nancy Burns

4. Text book, title, author, and year

   a. Other supplemental materials

5. Specific course information

   a. Catalog description of the content of the course
      Lab to accompany BIO 101. Selected projects develop skills in experimental design, data analysis and scientific writing. (2 lab hrs.)

   b. prerequisites or co-requisites
      Corequisites: BIO101

   c. indicate whether a required, elective, or selected elective
      Selected elective

6. Specific goals for the course

   (a) specific outcomes of instruction
      Learning Objectives (the student will be able to):

      - **TBD**

   (b) explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course.
      None

7. Brief list of topics to be covered
   Lecture Topics

   - **TBD**

Prepared by: Christian Duncan
Creation date: 06/26/2021
Revised:

1. Course number and name
   BIO 102, General Biology II

2. Credits and contact hours
   3

3. Instructor's or course coordinator's name
   Coordinator: Prof. Nancy Burns

4. Text book, title, author, and year

   a. Other supplemental materials

5. Specific course information

   a. Catalog description of the content of the course
      This course covers the basic concepts of life science with an emphasis on animal anatomy and physiology, animal reproduction and development, the nervous system, evolutionary mechanisms and ecological principles. Selected topics include microevolution, speciation, macroevolution, animal behavior and application of comparative anatomy and physiology to illuminate evolutionary relationships and their ecological context. This course is primarily for students in health science programs or in the School of Engineering. Second semester of a full-year course; must be taken in sequence.

   b. prerequisites or co-requisites
      Prerequisites: BIO101, BIO101L (Minimum Grade C-)
      Corequisites: BIO102L

   c. indicate whether a required, elective, or selected elective
      Selected elective

6. Specific goals for the course

   (a) specific outcomes of instruction
      Learning Objectives (the student will be able to):

      - **TBD**

   (b) explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course.
      None

7. Brief list of topics to be covered
   Lecture Topics

   - **TBD**

Prepared by: Christian Duncan
Creation date: 06/26/2021
Revised:

1. Course number and name
   BIO 102L, General Biology II Lab

2. Credits and contact hours
   1

3. Instructor's or course coordinator's name
   Coordinator: Prof. Nancy Burns

4. Text book, title, author, and year

   a. Other supplemental materials

5. Specific course information

   a. Catalog description of the content of the course
      Lab to accompany BIO 102. Selected projects develop skills in experimental design, data analysis and scientific writing. (2 lab hrs.)

   b. prerequisites or co-requisites
      Prerequisites: BIO101, BIO101L (Minimum Grade C-)
      Corequisites: BIO102

   c. indicate whether a required, elective, or selected elective
      Selected elective

6. Specific goals for the course

   (a) specific outcomes of instruction
      Learning Objectives (the student will be able to):
      - **TBD**

   (b) explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course.
      None

7. Brief list of topics to be covered
   Lecture Topics
   - **TBD**

Prepared by: Christian Duncan
Creation date: 06/26/2021
Revised:

1. Course number and name
   BIO150, General Biology for Majors

2. Credits and contact hours
   4

3. Instructor's or course coordinator's name
   Coordinator: Prof. Nancy Burns

4. Text book, title, author, and year

   - ***A Student Handbook for Writing in Biology, 5th Edition*, Knisely, Karin, 2017.**
   - ***Mastering Biology Online Study System, 12th Edition* (ISBN 9780135855836), Urry, L. A., Cain, M. L., Wasserman, S. A., Minorsky, P. V., Orr, R. B., Campbell, N.A, 2020.**

   a. Other supplemental materials
      None.

5. Specific course information

   a. Catalog description of the content of the course
      Students develop sound learning strategies and introductory knowledge within five core concepts in biology: science as a way of knowing, chemistry of life, structure and function relationships; major pathways and transformations of energy and matter, as well as living systems as interactive and interconnected. This is the first course of a three-course sequence for biology and related majors.

   b. prerequisites or co-requisites
      Corequisites: BIO150L

   c. indicate whether a required, elective, or selected elective
      Selected elective

6. Specific goals for the course

   (a) specific outcomes of instruction
      Outcomes are given as a list of topics (see below).

   (b) explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course.
      None

7. Brief list of topics to be covered
   Lecture Topics

   - **Science as a Way of Knowing: To help students to understand major epistemological considerations, e.g., How is science different from other kinds of inquiry, e.g., like faith or other philosophical disciplines? What is the Criterion of Demarcation? What is a hypothesis? What distinguishes treatments and controls? What does the asymmetry of proof and disproof refer to and why is this issue important to understanding what scientific theories are. What are the three hallmarks of a scientific investigation?**
   - **Atoms, Bonds and Molecules: Why do atoms interact and form bonds? What kinds of bonds are common in biological systems and what characteristics do they have?**

- **Macromolecules: their Chemistry and Biology: What are the four major kinds of organic molecules, their structural features, and functional roles in biological systems? What kinds of bonds are critical to the functioning of each kind of macromolecule? What are the structural features of nucleic acids and proteins that enable reproduction, information storage, mutation, and catalysis?**
- **Energy, Enzymes and Catalysis: What is catalysis and how is it regulated in biological systems? What are the structural features of biological catalysts that enable them to work with lock-and-key specificity? What are the typical energetics of a catalyzed reaction? What ultimately determines the timing and structure of the various catalysts?**
- **Prokaryotes and Eukaryotes: What are the structural and functional differences between prokaryotes and eukaryotes?**
- **Cell Communication: How do membranes work? How is transport across membranes regulated? What are the components of the endomembrane system and how do they interact? How did the double membranes of the nucleus, mitochondria, and chloroplasts originate - what are the contending hypotheses and evidence?**
- **Respiration and Photosynthesis: How is energy captured and converted to various chemical forms in photosynthesis and respiration? How do photosynthesis and respiration work as biochemical systems, including major inputs and outputs? What is chemiosmosis and how does it function, in both photosynthesis and respiration, and how are membranes and their proteins involved in this work?**
- **Anatomy and Physiology: How are vertebrate systems organized? What are the major organs in a vertebrate system? How do these major organs function for homeostasis? What are the cellular components that control the function of cells, tissues and organs in an organ system?**

Prepared by: Christian Duncan
Creation date: 06/26/2021
Revised:

1. Course number and name
   BIO150L, General Biology for Majors Lab

2. Credits and contact hours
   0

3. Instructor's or course coordinator's name
   Coordinator: Prof. Nancy Burns

4. Text book, title, author, and year
   ***A Student Handbook for Writing in Biology, 5th Edition*, Knisely, Karin, 2017.**

   a. Other supplemental materials
      ***BIO 150L General Biology Lab Manual* and Biology (or Chemistry) Googles (all available at the University Bookstore)**

5. Specific course information

   a. Catalog description of the content of the course
      Lab to accompany BIO 150. Students take an investigative/inquiry-based approach and become competent within the process of science including experimental design and analysis, as well as scientific communication and collaboration.

   b. prerequisites or co-requisites
      Corequisites: BIO150

   c. indicate whether a required, elective, or selected elective
      Selected elective

6. Specific goals for the course

   (a) specific outcomes of instruction
      Learning Objectives (the student will be able to):
      - **Learn basic laboratory and microscope skills**
      - **Assume leadership and responsibility for designing, executing, analyzing and reporting scientifically sound experiments**
      - **Learning to write and present in scientific format**

   (b) explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course.
      None

7. Brief list of topics to be covered
   Lab Topics

   - **Scientific Method**
   - **Scientific Writing/Plagiarism**
   - **Biological Molecules**
   - **Enzymes**
   - **Microscopy**
   - **Osmosis**
   - **Cellular Respiration**
   - **Anatomy**

Prepared by: Christian Duncan
Creation date: 06/26/2021
Revised:

1. Course number and name
   BIO151, Molecular and Cell Biology and Genetics

2. Credits and contact hours
   4

3. Instructor's or course coordinator's name
   Coordinator: Prof. Nancy Burns

4. Text book, title, author, and year

   - ***A Student Handbook for Writing in Biology, 5th Edition*, Knisely, Karin, 2017.**
   - ***Mastering Biology Online Study System, 12th Edition* (ISBN 9780135855836), Urry, L. A., Cain, M. L., Wasserman, S. A., Minorsky, P. V., Orr, R. B., Campbell, N.A, 2020.**

   a. Other supplemental materials
      None.

5. Specific course information

   a. Catalog description of the content of the course
      Students investigate key concepts in molecular and cell biology and genetics. Topics include evolution, the central dogma, regulation of gene expression, cell structure and physiology, cell communication, immunology, cancer and cell division.

   b. prerequisites or co-requisites
      Prerequisites: BIO150, BIO150L (Minimum Grade C-)
      Corequisites: BIO151L

   c. indicate whether a required, elective, or selected elective
      Selected elective

6. Specific goals for the course

   (a) specific outcomes of instruction
      Learning Objectives (the student will be able to): Outcomes are given as a list of topics (see below).

   (b) explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course.
      None

7. Brief list of topics to be covered
   Lecture Topics

   - **Gene Expression. How do the molecular structures of DNA, RNA, and protein enable expression of the same information in the three different kinds of molecules? What is the genetic code and how was it elucidated? What are the roles of ribosomes, tRNA, rRNA, and mRNA in protein synthesis? What major kinds of regulation of gene expression are exhibited in prokaryotes? How is this system more complicated in the multicellular eukaryotic descendants of prokaryotes?**
   - **Cell Communication. How do cells receive and interpret information from their surrounding environment? How do cells communicate with one another? What are the major signaling pathways in eukaryotic cells and how do they influence cell behavior? What are the apoptotic pathways and what signals trigger them? What is the cell cycle? How do cyclin and cyclin-dependent kinases influence cell cycles? How does loss of cell cycle control lead to cancer?**

- **Genetics. What are the fundamental processes of meiosis? How are the traits of parents transmitted to their offspring? How is genetic variation produced and the evolutionary importance of this variation? What two laws of inheritance did Gregor Mendel discover using a scientific approach? What is the importance of Morgan's discovery and how does it apply to patterns of inheritance? How do alterations of chromosome number or structure result in a genetic disorder? What are non-Mendelian patterns of inheritance?**
- **Evolution. What is the central dogma of biology and how does it relate to the biological capabilities of the hereditary molecule, to the very existence and nature of evolution? What are viruses and how do they replicate? What are the key concepts of Darwin's Theory of evolution? What is the biological species concept? How does natural selection influence adaptive evolution? What roles do genetic drift and gene flow have in natural selection? How has life evolved?**

Prepared by: Christian Duncan
Creation date: 06/26/2021
Revised:

1. Course number and name
   BIO151L, Molecular and Cell Biology and Genetics Lab

2. Credits and contact hours
   0

3. Instructor's or course coordinator's name
   Coordinator: Prof. Nancy Burns

4. Text book, title, author, and year
   ***A Student Handbook for Writing in Biology, 5th Edition*, Knisely, Karin, 2017.**

   a. Other supplemental materials
      ***BIO 151L General Biology Lab Manual* and Biology (or Chemistry) Googles (all available at the University Bookstore) and Basic Calculators**

5. Specific course information

   a. Catalog description of the content of the course
      Selected projects enable students to develop skills in experimental design through an investigative/inquiry-based approach, data analysis and scientific writing.

   b. prerequisites or co-requisites
      Prerequisites: BIO150, BIO150L (Minimum Grade C-)
      Corequisites: BIO151

   c. indicate whether a required, elective, or selected elective
      Selected elective

6. Specific goals for the course

   (a) specific outcomes of instruction
      Not specified. See Topic list and Course Description.

   (b) explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course.
      None

7. Brief list of topics to be covered
   Lecture Topics

   - **DNA Fingerprinting**
   - **Gene Expression**
   - **Scientific Writing**
   - **Cell Signaling**
   - **Cell Communication**
   - **Evolution**

Prepared by: Christian Duncan
Creation date: 06/26/2021
Revised:

1. Course number and name
   CHE 110, General Chemistry I

2. Credits and contact hours
   3

3. Instructor's or course coordinator's name

4. Text book, title, author, and year

   a. Other supplemental materials

5. Specific course information

   a. Catalog description of the content of the course
      Students study the atomic theory of matter, nomenclature, chemical formulas and reaction equations, stoichiometry, the gas laws and the kinetic molecular theory, thermochemistry, atomic structure, periodicity of the elements, chemical bonding and molecular structure. (Note: this course is designed for science majors.)

   b. prerequisites or co-requisites
      Corequisites: CHE110L

   c. indicate whether a required, elective, or selected elective
      Selected elective

6. Specific goals for the course

   (a) specific outcomes of instruction
      Learning Objectives (the student will be able to):

      - **TBD**

   (b) explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course.
      None

7. Brief list of topics to be covered
   Lecture Topics

   - **TBD**

Prepared by: Christian Duncan
Creation date: 06/26/2021
Revised:

1. Course number and name
   CHE 110L, General Chemistry I Lab

2. Credits and contact hours
   1

3. Instructor's or course coordinator's name

4. Text book, title, author, and year

   a. Other supplemental materials

5. Specific course information

   a. Catalog description of the content of the course
      Lab must be taken with CHE 110. (3 lab hrs.)

   b. prerequisites or co-requisites
      Corequisites: CHE110

   c. indicate whether a required, elective, or selected elective
      Selected elective

6. Specific goals for the course

   (a) specific outcomes of instruction
      Learning Objectives (the student will be able to):

      - **TBD**

   (b) explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course.
      None

7. Brief list of topics to be covered
   Lecture Topics

   - **TBD**

Prepared by: Christian Duncan
Creation date: 06/26/2021
Revised:

1. Course number and name
   CHE 111, General Chemistry II

2. Credits and contact hours
   3

3. Instructor's or course coordinator's name

4. Text book, title, author, and year

   a. Other supplemental materials

5. Specific course information

   a. Catalog description of the content of the course
      Students study intermolecular forces, properties of solutions, kinetics, chemical equilibrium, pH, acid-base solution chemistry, thermodynamics and electrochemistry. Problem-solving is emphasized.

   b. prerequisites or co-requisites
      Prerequisites: CHE110, CHE110L (Minimum Grade C-)
      Corequisites: CHE111L

   c. indicate whether a required, elective, or selected elective
      Selected elective

6. Specific goals for the course

   (a) specific outcomes of instruction
      Learning Objectives (the student will be able to):

      - **TBD**

   (b) explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course.
      None

7. Brief list of topics to be covered
   Lecture Topics

   - **TBD**

Prepared by: Christian Duncan
Creation date: 06/26/2021
Revised:

1. Course number and name
   CHE 111L, General Chemistry II Lab

2. Credits and contact hours
   1

3. Instructor's or course coordinator's name

4. Text book, title, author, and year

   a. Other supplemental materials

5. Specific course information

   a. Catalog description of the content of the course
      Lab must be taken with CHE 111. (3 lab hrs.)

   b. prerequisites or co-requisites
      Prerequisites: CHE110, CHE110L (Minimum Grade C-)
      Corequisites: CHE111

   c. indicate whether a required, elective, or selected elective
      Selected elective

6. Specific goals for the course

   (a) specific outcomes of instruction
      Learning Objectives (the student will be able to):

      - **TBD**

   (b) explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course.
      None

7. Brief list of topics to be covered
   Lecture Topics

   - **TBD**

Prepared by: Christian Duncan
Creation date: 06/26/2021
Revised:

1. Course number and name
   PHY 121, University Physics I

2. Credits and contact hours
   4

3. Instructor's or course coordinator's name
   Prof. Robert Fischetti

4. Text book, title, author, and year

   a. Other supplemental materials

5. Specific course information

   a. Catalog description of the content of the course
      This is a calculus-based physics course. Students examine classical Newtonian physics from kinematics, the study of motion, to dynamics, the study of why motion occurs. Topics include Newton's laws, conservation of energy and momentum, torque, equilibrium of static bodies and fluids, and thermal properties of matter. Through experimentation, computer modeling and group problem-solving, students apply these principles to predict the outcome of a number of reality-based and open-ended problems. (6 studio-lab hrs.)

   b. prerequisites or co-requisites
      Prerequisites: MA141 or MA151 (Minimum Grade C-)

   c. indicate whether a required, elective, or selected elective
      Selected elective

6. Specific goals for the course

   (a) specific outcomes of instruction
      Learning Objectives (the student will be able to):

      - **TBD**

   (b) explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course.
      None

7. Brief list of topics to be covered
   Lecture Topics

   - **TBD**

Prepared by: Christian Duncan
Creation date: 06/26/2021
Revised:

1. Course number and name
   PHY 122, University Physics II

2. Credits and contact hours
   4

3. Instructor's or course coordinator's name
   Prof. Douglas S. Goodman

4. Text book, title, author, and year

   a. Other supplemental materials

5. Specific course information

   a. Catalog description of the content of the course
      This is a calculus-based physics course. Students examine physical phenomena including vibrations and waves, sound, light, optics, electricity and magnetism including the study of D.C. and A.C. circuits and some elements of modern physics. Through experimentation, computer modeling and group problem-solving, students apply these principles to predict the outcome of a number of reality-based and open-ended problems. (6 studio-lab hrs.)

   b. prerequisites or co-requisites
      Prerequisites: PHY121 (Minimum Grade C-)

   c. indicate whether a required, elective, or selected elective
      Selected elective

6. Specific goals for the course

   (a) specific outcomes of instruction
      Learning Objectives (the student will be able to):

      - **TBD**

   (b) explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course.
      None

7. Brief list of topics to be covered
   Lecture Topics

   - **TBD**

Prepared by: Christian Duncan
Creation date: 06/26/2021
Revised: