**Syllabus: Concepts of Biology (BIOL 111)**

**Term**: Spring 2016

**Credits**: 3 Semester Credits

**Location and Meeting Time**: Gate City Bank Auditorium

**Instructor:** Mrs. Tami Dahl, M.S.

E-mail: tami.dahl@ndsu.edu

Office Hours: Tuesday 8:00-9:00am, Thursday 8:00-9:00am, and by appointment

Office Location: Stevens Hall 224

Office Phone: 701-231-7224

**Questions about the Course:** Please use the Question and Answer Board (on Blackboard) to post questions about the course and its content. The instructor will check the discussion board once a day Monday-Friday. If you have a question, please check the Q&A Board, somebody else may have had the same question. Students are encouraged to answer questions on the Q&A Board.

**Communicating with the instructor**: Students should only email the instructor when personal correspondence is necessary such as with specific questions about a grade or personal issues. Use only your NDSU email for these communications. Non-NDSU email addresses tend to go to junk mail. When emailing, be sure to include necessary information such as:

* The course you are in (i.e. Concepts of Biology)
* The assignment you are referencing (i.e. RQ 1.2)
* The group you are in (i.e. Group 10)

**On-Campus Office Hours:** Tuesday 8:00-9:00am, Thursday 8:00-9:00am, and by appointment. Please feel free to stop by to discuss the course content, get additional clarification on concepts, or just to say hello.

**Learning Assistants:** Philip Duckworth, Logan Scott, Valery Benson, and Shannon

This course is designed to be an active learning course in which students are engaged with the material and cognizant of their learning process. To assist students with this, several Learning Assistants will be available each class period to answer student questions and to guide student learning. Learning Assistants will also hold weekly office hours and will answer student questions on the Q&A Board (on blackboard). Learning Assistants are a valuable resource for students, and students are strongly encouraged to interact with them and utilize their expertise.

**Catalogue Description:** Introduction to a wide range of biological topics, from the organism, ecology, and evolution to the cell, molecular biology, and genetics.

**Course Description:** This one semester course is designed to give non-science majors an in-depth look at specific topics in the field of biology with a focus on the themes of information flow and evolution. Major concepts of biology will be studied including DNA, genetics, evolution, biodiversity, and biotechnology, and the application of these concepts to contemporary issues will be emphasized. In particular, students will investigate cancer, inheritance, genetic testing, gene therapy, antibiotic resistant bacteria, GMOs in agriculture and medicine, forensics, DNA sequencing, and epigenetics. This course is designed to look at current biological issues in society with an in-depth study of the biological concepts that underlie them in order to gain a knowledge base capable of making informed decisions for the benefit of the individual and for the world. An optional lab is available for this course.

**Course Goals:**

1. Students will develop skills in critical thinking, collaboration, and design.
2. Students will value knowledge produced through the process of scientific inquiry.
3. Students will develop foundational content knowledge and create concepts in the areas of DNA, genetics, microevolution, macroevolution, taxonomy, biodiversity, human evolution, and biotechnology.
4. Students will apply that knowledge to investigate biological issues important to society such as cancer, genetic diseases, genetic testing, gene therapy, evolution of resistant bacteria, viral infections, genetically modified organisms, forensics, and DNA sequencing.
5. Students will form opinions on societal issues and articulate them in writing and orally.
6. Students will be empowered and motivated to speak up or act on important societal issues related to their knowledge of biology.

**Intended Outcomes and Their Relationship to General Education:** This course has been approved for Category 3: Science and Technology, of the general education requirements. Students will investigate the work of scientists in creating knowledge and analyze how this information is disseminated to the general public and will evaluate sources of information to make informed decisions. General Education Outcomes 5 & 6 will be supported by student participation in the course learning activities and the various formative and summative assessment exercises. Examples of such exercises include reading quizzes, coaching activities, biology in the news, collaborative activities, and unit exams.

Outcome 5: Comprehend concepts and methods of inquiry in science and technology, and their applications for society.

Outcome 6: Integrate knowledge and ideas in a coherent and meaningful manner.

**Course Requirements:** Students are expected to read and understand the syllabus, complete all pre-lecture reading quizzes by the due date, participate in in-class learning activities, participate in the group blog on blackboard, and complete all of the online unit exams and in-class unit exams. Students are expected to work collaboratively with other students in class and through the collaborative tools on blackboard.

**Special Needs:** Any student with disabilities or other special needs including additional accommodations is invited to share their concerns with the instructor, or contact the [Disability Services Office](http://www.ndsu.edu/disabilityservices). Veterans and student soldiers with special circumstances or who are activated are encouraged to notify the instructor in advance so accommodations can be made.

**Required Student Resources:**

* Textbook: Biology: The Core, Simon, 2014, Pearson with MasteringBiology. Students are required to purchase access to MasteringBiology and either the electronic or printed form of the textbook. Students should choose 1 of the 3 options below:
  + Option 1: Printed textbook and MasteringBiology (includes eText): 0133894630
  + Option 2: eText and MasteringBiology code: 0321856082
  + Option 3: MasteringBiology code only without eText: Purchase from Pearson online.
* Blackboard Question and Answer Board – All general questions about class assignments or class content must be posted to the Blackboard Q&A discussion board. The instructor or learning assistants will check the Q&A board daily (M-F).

**Evaluation Procedure:** Points can be earned in the course by completing all of the learning and assessment activities in the five units. The categories of learning and assessment activities in this course are:

1. **Pre-Lecture Reading Quizzes** – Before most class period students will be given a reading assignment and a Reading Quiz to be completed at the MasteringBiology website. The purpose of this assignment is to become familiar with the basic terminology of the content that will be the focus of the upcoming class period. The reading quizzes will not be timed, and students will get three attempts at each question (each wrong answer is docked slightly). The overall score for this category will be the total points earned divided by total points possible. The lowest 2 scores will be dropped. (Category Weight = 30% of grade)
2. **Clicker Questions** – Throughout each class period students will be asked Clicker Questions. Attendance in class with a working clicker is required to get credit for clicker questions. If you are absent you will not be able to make up these points. However, students are allowed to miss 30% of the clicker points and still earn full credit in this category. The purpose of clicker questions is to encourage students to be engaged with the material, for students to check their own understanding of the material, and for the instructor to check the understanding of the class. (Category Weight = 10% of grade)
3. **Group Blog** – Each student has been placed in a group on blackboard with whom to interact with using the collaboration tools on blackboard. Once per unit students will be asked to comment on an issue posted by the instructor. Students should post their comments in their Group Blog on blackboard. Students should also reply to at least one other person per unit. The purpose of this assignment to encourage students to be aware of current biological issues in the popular press, and to encourage students to evaluate issues and form opinions about biological issues. Up to 2 points can be earned for each article (1 for post, 1 for reply). (Category Weight = 15% of grade)
4. **Online Unit Exams** – At the end of each unit students will take an Online Unit Exam at the MasteringBiology website. The purpose of this assignment is to assess the sum of student learning in the unit, particularly from the reading assignments and online activities. The online unit exams will be open for several days at the end of the unit. Students may use resources such as their book or their notes during the exam. Each exam will be timed (2 hours), and students will get 1 attempt at each question. The exams will be equally weighted. (Category Weight = 20% of grade)
5. **In-Class Unit Exams –** At the end of each unit students will complete an In-Class Exam. These exams will contain open-ended questions from the in-class activities that were completed during the unit. The purpose of this is to assess the sum of your learning in the unit, particularly from the daily in-class activities. The exams will be equally weighted. (Category Weight = 25% of grade)

**Evaluation Criteria:** Your grade in this class will be determined by weighted categories. Weighted percentages will be calculated for each category and summed to determine your total weighted percentage for the course. Your grade will then be assigned according to this scale: A=100-90%, B=89-80%, C=79-70%, D=69-60%, and F=<60.

Weighted Score Calculation Example:

Category Score Weight (% value) Points per Category / 100

Reading Quizzes 130/140 30 = (.93 x 30) = 27.9

Clicker Questions 20/25 10 = (.80 x 10) = 8

Group Blog 8/10 15 = (.85 x 15) = 12.75

Online Exams 450/500 20 = (.90 x 20) = 18

In-Class Exams 475/500 25 = (.95 x 25) = 23.75

Total Percentage = 94.04 %

Letter Grade = A

**Attendance/ Late Assignments:** Attendance is expected. In-class activities (clicker questions and in-class exams) require the student to be present. The online assignments (reading quizzes, group blogs, and unit exams) have strict due dates. Reading Quizzes are reduced 25% per day if submitted late. Group Blog posts and the Online Unit Exams CANNOT be completed after the due date.

**Exam Make-up Policy:** Make-up exams will only be allowed in documented cases of emergency or in cases of absences due to official university activity. Formal notification must be given two weeks before the event. If you miss an exam due to an emergency or serious illness, you must notify the instructor within 24 hours. Please note that work schedules and vacation activities do *NOT* qualify as a reason to miss an exam, so plan accordingly.

**Extra Credit:** Extra credit can be earned by following the course on Twitter @HumBio126NDSU and doing one of the following: 1) Replying to posts on the course’s Twitter feed @HumBio126NDSU, 2) Tweeting to @HumBio126NDSU an article that is related to our study of biology, along with a comment. Each reply to or tweet to will be worth 1 point. Students can earn up to 4 points per unit. Students that earn a total of 10 points will be given a 2% bonus on top of their final score at the end of the semester.

**Student Responsibilities:** Students are expected to be responsible for their own learning. Please contact the instructor in a timely manner if you are experiencing difficulty with the course.

**Policy 335: Code of Academic Responsibility and Conduct:** The academic community is operated on the basis of honesty, integrity, and fair play. NDSU Policy 335: Code of Academic Responsibility and Conduct applies to cases in which cheating, plagiarism, or other academic misconduct has occurred in an instructional context. Students found guilty of academic misconduct are subject to penalties, up to and possibly including suspension and/or expulsion. The Office of Registration and Records maintain student academic misconduct records. Informational resources about academic honesty for students and instructional staff members can be found at [www.ndsu.edu/academichonesty](http://www.ndsu.edu/academichonesty).

**Plagiarism:** All written work completed in this class shall be original statements from you, the student, not “cut and pasted” from another source. “Cut and pasting” statements from other sources, and using them as if they are your own, is plagiarism. Plagiarism is cheating. The policy for plagiarism in this course is as follows: First offense of plagiarism: Your final grade will be docked 25%. Second offense of plagiarism: You will be failed in the course and receive a grade of “F”.

**Detailed Course Outline**

This course is broken into 5 units of study.  Each unit consists of 3-5 "parts".  Each "part" consists of several sections of textbook reading assignments and several associated pre-lecture reading quizzes.  You will take the pre-lecture reading quizzes during the unit, and you will also participate in a group blog assignment.  At the end of each unit you will take an online unit exam and an in-class unit exam.

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| Concepts of Biology (BIOL 111) | |
| THEMES – Information Flow and Evolution  TOPICS - DNA, Genetics, Evolution, Biodiversity, Biotechnology | |
| **UNIT 1 – DNA, Mitosis, Protein Synthesis, & Cancer** | **Unit 1, part 1: DNA, Cells, and the Nucleus**  1.1 All living organisms share certain properties (Reproduction, cells, evolution)  6.1 DNA is a polymer of nucleotides  3.1 Cells are the fundamental units of life  3.2 Plant and animal cells have common and unique structures  3.5 The nucleus houses DNA packaged as chromosomes |
| **Unit 1, part 2: Cell Reproduction, Chromosomes, the Cell Cycle, and Mitosis**  5.1 Cell division provides for reproduction, growth, and repair  5.2 Chromosomes are associations of DNA and protein  5.3 Cells have regular cycles of growth and division  6.2 During DNA replication, a cell duplicates its chromosomes  5.4 During mitosis, the nucleus is ~~duplicated~~ divided  5.5 During cytokinesis, the cell is split in two |
| **Unit 1, part 3: Protein Synthesis Overview**  6.3 DNA directs production of proteins via RNA  2.12 Proteins perform many of life’s functions  3.6 Several organelles participate in the production of proteins  6.4 Genetic information flows from DNA to RNA to protein |
| **Unit 1, part 4: Detailed Protein Synthesis**  6.5 Transcription creates a molecule of RNA from a molecule of DNA  6.6 Translation involves the coordination of three kinds of RNA  6.7 Translation creates a molecule of protein via the genetic code  6.8 Gene expression is regulated in several ways  6.9 Signal transduction pathways can control gene expression |
| **Unit 1, part 5: Mutations and Cancer**  6.10 Mutations can have a wide range of effects  6.11 Loss of gene expression control can result in cancer  6.12 Cancer is caused by out-of-control cell growth |
| **UNIT 2 – Meiosis, Genetics, Inheritance, & Gene Therapy** | **Unit 2, part 1: Meiosis and Gametogenesis**  5.2 Chromosomes are associations of DNA and protein (review)  6.3 DNA directs production of proteins via RNA (review)  5.6 Gametes have half as many chromosomes as body cells  5.7 Meiosis produces gametes  11.17 Males and females produce, store, and deliver gametes  5.9 Several processes produce genetic variation among sexually reproducing organisms  5.8 Mitosis and meiosis have important similarities and differences |
| **Unit 2, part 2: Genetics & Simple Inheritance**  5.10 Mistakes during meiosis can produce gametes with abnormal numbers of chromosomes  5.11 Mendel deduced the basic principles of genetics by breeding pea plants  5.12 A Punnett square can be used to predict the results of a genetic cross  5.13 Mendel’s law of independent assortment accounts for the inheritance of multiple traits  5.14 Pedigrees can be used to trace traits in human families  5.17 Sex-linked genes display unusual inheritance patterns |
| **Unit 2, part 3: Complex Inheritance**  5.15 The inheritance of many traits is more complex than Mendel’s laws  5.16 Linked genes may not obey the law of independent assortment |
| **Unit 2, part 4: Gene Therapy**  6.19 Gene Therapy aims to cure genetic diseases |
| **UNIT 3 – Evolution, Taxonomy, & Phylogenetic Trees** | **Unit 3, part 1: Basic Ecology & Natural Selection**  5.9 Several processes produce genetic variation among sexually reproducing organisms (review)  1.5 All organisms interact with their ecosystems  1.6 Biologists organize species into groups  1.7 Evolution by natural selection is biology’s unifying theme  1.8 Evolution affects our daily lives  7.1 Darwin’s influences and experiences led him to publish his theory of evolution  7.2 Unequal reproductive success leads to natural selection |
| **Unit 3, part 2: Evidence for Evolution**  7.3 The fossil record provides important evidence for evolution  7.4 Much evidence for evolution is found in the natural world |
| **Unit 3, part 3: Microevolution, Macroevolution, & Speciation**  7.5 Populations are the units of evolution  7.6 Evolution proceeds through several mechanisms  7.7 Macroevolution encompasses large-scale changes  7.9 Species are maintained by reproductive barriers  7.10 Speciation can occur through various mechanisms |
| **Unit 3, part 4: Taxonomy, & Phylogenetic Trees**  7.11 Taxonomy is the classification of life  7.12 Phylogenetic trees represent evolutionary history |
| **UNIT 4 – Origin of Life, Biodiversity, & Human Evolution** | **Unit 4, part 1: Origin of Life, Prokaryotes, & Protists**  7.8 The geological record ties together the history of Earth its life  8.1 Biologists hypothesize that life originated in a series of stages  8.2 Prokaryotes have unique cellular structures  8.3 Achaea are found in extreme habitats  8.4 Bacteria are very numerous and common  8.5 Bacteria can transfer DNA  8.6 Eukaryotic cells evolved from prokaryotic cells  8.7 Protists are very diverse  8.8 The origin of multicellular life was a major milestone in the evolution of life on earth |
| **Unit 4, part 2: Viruses, Prions, & Viroids**  8.9 Viruses are nonliving parasites  8.10 HIV cripples the human immune system  8.11 Prions and viroids are nonliving parasites even smaller than viruses |
| **Unit 4, part 3: Fungi, Plants, and Animals**  9.1 Fungi are a diverse group of eukaryotes  ~~9.2 Fungi have specialized structures and means of reproduction~~  9.3 Plants have unique adaptations that allow them to survive on land  10.1 Animals are consumers that evolved from colonial protists |
| **Unit 4, part 4: Human Evolution**  10.10 Humans are primates  10.11 Humans have evolved in the past few million years |
| **UNIT 5 – Biotechnology (GMOs, Forensics, DNA Sequencing)** | **Unit 5, part 1: Review of DNA & Protein Synthesis**  1.4 Cells, the fundamental units of life, contain DNA  5.2 Chromosomes are associations of DNA and protein (review)  6.1 DNA is a polymer of nucleotides (review)  6.3 DNA directs the production of proteins via RNA (review)  6.4 Genetic information flows from DNA to RNA to protein (review) |
| **Unit 5, part 2: Tools of Genetic Engineering**  6.13 Genetic engineering involves manipulating DNA for practical purposes  6.14 DNA can be manipulated many ways within the laboratory  6.16 PCR can be used to multiply samples of DNA |
| **Unit 5, part 3: GMOs**  6.15 Plants and animals can be genetically modified |
| **Unit 5, part 4: Forensics & DNA Sequencing**  6.17 DNA profiles are based on STR Analysis  6.18 Whole genomes can be mapped and sequenced |

**Daily Class Schedule and Due Dates for Pre-Lecture Reading Quizzes**

Before most lectures you will read particular sections of the textbook and take a pre-lecture reading quiz to prepare you for the lecture. The Reading Quizzes are found at the MasteringBiology website. There is a 25% reduction for each day late; after 4 days no credit.

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| **Week** | **Class Period** | **Pre-Lecture Reading Quizzes are due the night before class at 11:59pm.** | **Class Period Topic** |
| 1 | Tues, Jan. 12 | None | Welcome & Syllabus |
|  | Thurs, Jan. 14 | MasteringBiology Introduction  Reading Quiz 1.1 | DNA |
| 2 | Tues, Jan. 19 | Syllabus & FAQs Quiz  Reading Quiz 1.2 | Chromosomes & The Cell Cycle |
|  | Thurs, Jan. 21 | Reading Quiz 1.3 | Protein Synthesis |
| 3 | Tues, Jan. 26 | Reading Quiz 1.4 | Detailed Protein Synthesis-Gene Expression |
|  | Thurs, Jan. 28 | Reading Quiz 1.5 | Cancer |
| 4 | **Tues, Feb. 2** | **Unit 1 Group Blog Final Response**  **Unit 1 Online Exam**  **(These are due the night before the In-Class Exam)** | **Unit 1 In-Class Exam** |
|  | Thurs, Feb. 4 | Reading Quiz 2.1 | Sperm and Egg Production |
| 5 | Tues, Feb. 9 | Reading Quiz 2.2 | Punnett Squares |
|  | Thurs, Feb. 11 | Reading Quiz 2.3 | Complex Inheritance |
| 6 | Tues, Feb. 16 | None | Pedigrees |
|  | Thurs. Feb. 18 | Reading Quiz 2.4 | Gene Therapy |
| 7 | **Tues, Feb. 23** | **Unit 2 Group Blog Final Response**  **Unit 2 Online Exam**  **(These are due the night before the In-Class Exam)** | **Unit 2 In-Class Exam** |
|  | Thurs. Feb. 25 | Reading Quiz 3.1 | Natural Selection |
| 8 | Tues, Mar. 1 | Reading Quiz 3.2 | Evidence for Evolution |
|  | Thurs Mar. 3 | Reading Quiz 3.3 | Speciation |
| 9 | Tues, Mar. 8 | Reading Quiz 3.4 | Phylogenetic Trees |
|  | **Thurs. Mar. 10** | **Unit 3 Group Blog Final Response**  **Unit 3 Online Exam**  **(These are due the night before the In-Class Exam)** | **Unit 3 In-Class Exam** |
| *10* | *Tues, Mar. 15* | *SPRING BREAK* | *SPRING BREAK* |
|  | *Thurs. Mar 17* | *SPRING BREAK* | *SPRING BREAK* |
| 11 | Tues, Mar 22 | Reading Quiz 4.1 | Origin of Life |
|  | Thurs. Mar 24 | None | NO CLASS - Outside Assignment |
| 12 | Tues, Mar. 29 | Reading Quiz 4.2 | Viruses and Prions |
|  | Thurs. Mar. 31 | None | Bacteria |
| 13 | Tues, Apr. 5 | Reading Quiz 4.3 | Fungi and Plants |
|  | Thurs. Ap. 7 | None | Animals |
| 14 | Tues, Apr. 12 | Reading Quiz 4.4 | Human Evolution |
|  | **Thurs. Apr. 14** | **Unit 4 Group Blog Final Response**  **Unit 4 Online Exam**  **(These are due the night before the In-Class Exam)** | **Unit 4 In-Class Exam** |
| 15 | Tues, Apr. 19 | Reading Quiz 5.1 | Review of Protein Synthesis |
|  | Thurs, Apr. 21 | Reading Quiz 5.2 | Tools of Genetic Engineering |
| 16 | Tues, Apr. 26 | Reading Quiz 5.3 | Genetic Engineering |
|  | Thurs, Apr. 28 | None | Forensics |
| 17 | Tues, May 3 | Reading Quiz 5.4 | DNA Sequencing |
|  | **Thurs, May 5** | **Unit 5 Group Blog Final Response**  **Unit 5 Online Exam**  **(These are due the night before the In-Class Exam)** | **Unit 5 In-Class Exam** |
| \*\*Reading quizzes are docked 25% per day late – after 4 days late, no credit.  \*\*Class does not meet during finals week. There is not a final exam. | | | |

**Due Dates for Group Blog Assignments (Due at 11:59pm)**

Once per unit you will be asked to create an original post to a topic chosen by the instructor in your **Group Blog**.  You will also be asked to post a final response to at least 1 person in your group. Your original post is due about 1 week before the end of the unit so that your group mates and you have something to comment on. Your final response is due the night before the unit exam.  Your original post and your final response are each worth 1 point for a total of 2 points.  While only being worth a total of 10 points, these are worth 15% of your grade so be sure not to skip them.

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| **Due Date** | **Assignment Due** |
| Wednesday, Jan. 27 | Unit 1 Group Blog Original Post |
| Monday, Feb. 1 | Unit 1 Group Blog Final Response |
| Wednesday, Feb. 17 | Unit 2 Group Blog Original Post |
| Monday, Feb. 22 | Unit 2 Group Blog Final Response |
| Friday, March 4 | Unit 3 Group Blog Original Post |
| Wednesday, March 9 | Unit 3 Group Blog Final Response |
| Friday, April 8 | Unit 4 Group Blog Original Post |
| Wednesday, April 13 | Unit 3 Group Blog Final Response |
| Friday, April 29 | Unit 5 Group Blog Original Post |
| Wednesday, May 4 | Unit 5 Group Blog Final Response |
| Late Penalties | NO CREDIT  Group Blogs close at 11:59pm on their due dates and cannot be completed after that. |

**Due Dates for Online Unit Exams (Due at 11:59pm)**

The online unit exams cover the material that you read in the textbook.  These are timed (2 hours) and you get 1 attempt at each question.  You may use your textbook, textbook notes, and class notes.  These are due the night before the in-class unit exam.  These cannot be completed after the due date.

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| Unit 1 Online Exam | Monday, Feb. 1 |
| Unit 2 Online Exam | Monday, Feb. 22 |
| Unit 3 Online Exam | Wednesday, March 9 |
| Unit 4 Online Exam | Wednesday, April 13 |
| Unit 5 Online Exam | Wednesday, May 4 |
| Late Penalties | NO CREDIT  Online Unit Exams close at 11:59pm on their due dates and cannot be completed after that. |

**Due Dates for In-Class Unit Exams**

These exams are short answer.  You only need to bring a pencil and your student ID.  You are allowed to bring your notes to use on these exams.  You will not need a scantron.  Don't forget your student I.D.!

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| Unit 1 In-Class Exam | Tuesday, Feb. 2 |
| Unit 2 In-Class Exam | Tuesday, Feb. 23 |
| Unit 3 In-Class Exam | Thursday, March 10 |
| Unit 4 In-Class Exam | Thursday, April 14 |
| Unit 5 In-Class Exam | Thursday, May 5 |
| Missed Exam | Please see syllabus for policy. |