1. **BIO 140-01 DNA Fingerprinting & Genetic Engineering**

**Ferrum College**

**Program: Biology**

**School: Natural Sciences and Mathematics**

1. **Instructor: Instructor Name:** Dr Jinnie Garrett

**Office:** GRB 224

**Phone Number:** 540-365-4370

**E mail address:** jmgarrett@ferrum.edu

**Office Hours:** M 11:30am-1:30 pm; TH 1:30-3:30 pm

1. **Class/lab Meeting Time:** T TH 9:30am-12:00pm; GRB 221
2. **Textbooks and Materials:**

Text - Opposing Viewpoints: Genetic Engineering. Other readings will be provided on Brightspace or handed out in class. Lab procedures will be provided in class

1. **Catalog Course Description:**

This course introduces students to the structure of DNA and the techniques used to manipulate DNA.

*Five hours, 2 credits (6 weeks)*

1. **Purpose/Rationale for this Course:**

This course provides an understanding of the basic structure of DNA and how it can be manipulated in order to modify organisms (bacteria, yeast, plant, animal and potentially humans). The techniques of gene analysis and modification will be discussed with particular focus on the social and ethical consequences (controversies) that arise from recent developments in this rapidly developing science.

1. **Instructional Methodology and Use of Technology**

This course will utilize a combination of lecture, discussion, and laboratory sessions. All lectures and assignments will be posted on the Brightspace management system and some assigned work will be submitted through this system as well.

1. **College and Course Outcomes**

After successful completion of this course students will be able to:

1. Understand the structure of DNA and how it can be transcribed and translated into proteins.
2. Understand the molecular basis of inheritance.
3. Understand and use key terms and concepts related to genetic engineering.
4. Understand the relevance of DNA technology and genetic engineering to concerns of society.
5. Engage with the debates surrounding genetic modification of organisms including humans.

By successfully achieving these course goals students will meet the following college-wide and program student learning outcomes:

**Students will demonstrate competency in quantitative skills and reading**

* Course goal - Analyze and interpret various forms of biological data
  + Instructional methods for this goal include laboratory exercises and practice worksheets.
  + This goal will be assessed based on quantitative sections of laboratory reports, and on content quizzes and the final assessment.

**Students will think critically and solve problems through analysis, evaluation, inference, induction, and deduction**

* Course goal - Students will be able to understand the scientific method and apply it to everyday problems.
  + Instructional methods include laboratory exercises, class discussions highlighting genetic engineering.
  + This goal will be assessed based on laboratory reports and class discussions.

**Students will demonstrate a depth of knowledge, capability and ethical reasoning in a DNA technology and genetic engineering.**

* Course goal - Students will be able to understand and use key terms and concepts currently used in the study DNA technology and genetic engineering.
* Instructional methods include class discussions and laboratory activities.
* This goal will be assessed on quizzes, lab reports and the final assessment.
* Course goal- Students will understand the relevance of biology to concerns of society.
* Instructional methods will include class discussions and videos on ethical issues relating to genetic engineering.
* This goal will be assessed on quizzes, class discussions, and final assessment.

1. **Course Requirements/Assignments**
   1. Come to class on time. Your class time is an important aspect of your college education, and you will gain much more out of this course if you come to class and actively participate in class discussions and activities. (see section XI below). The instructor will dismiss you from class and you will receive an absence for the class if you sleep during class, or use your cell unless instructed to do so by your instructor (refer to college policy)
   2. Assignments must be turned in on time. There will be a 10% deduction from your grade for every day your assignment is late. Graded assignments that are completed in-class cannot be made up for a grade if you have an unexcused absence.
   3. Turn off all cell phones, iPods, and other electronic devices at the start of class. It is inconsiderate and disrupting to your fellow classmates and the professor for cell phones to ring as well as texting during class time. If you consistently disrupt the class you may be asked to leave.
   4. Student will be dismissed from class if showing disrespect to fellow classmates or the instructor (refer to college policy on Civility).

**Course Assignments:**

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| --- | --- | --- |
| **Percentage of Grade** | **Due Date** | **Assignments** |
| 20% | TBA weekly | Lab reports |
| 15% | TBA | Homework & In-class activities |
| 25% | 3/15, 3/22, 3/29,  4/5, 4/12 | Content Quizzes |
| 15% | 4/19 or 4/21 | Final Presentation |
| 15% | 4/21 | Reflection paper |
| 10% | All classes | Attendance and Participation |

**Course Assignment Descriptions:**

**Laboratory Exercises**: The laboratory part of this course is designed to allow students to gain practical experience with work in genetic engineering. Your lab grade will be based on turning in completed lab reports. Due dates will be announced in class and published on Brightspace.

**Homework and In-class Assignments:** Throughout the coursethere will be homework and class activities that will be graded.

**Quizzes:** Questions will relate to the weekly lectures, readings, and lab. Quizzes will cover core concepts that you should be able to recall if you are reading carefully and thinking critically.

**Attendance and Participation:** Your participation grade (10%) is based on class and lab attendance, as well as actively participating in class discussions and lab activities.

**Final Presentation**: Part of the final exam will be a presentation based on the multi-week lab (Secrets of the Rainforest). More information will be provided later in class.

**Reflection Paper:** The remainder of the final assessment will be a written reflective paper on one of the controversies we cover in class, including those raised by the multi-week lab (Secrets of the Rainforest). More information will be provided later in class.

1. **Evaluation and Grading Evaluation Scale**

Your final grade will be based on the percentage of possible points that you earn during the semester.

**A =** 90% or more of possible points

**B =** 80-89% of points

**C =** 70-79% of points

**D=** 60-69% of points

**F =** < 60% of points

1. **Attendance Policy/Missed work**

College policy dictates that attendance is required at a minimum of 75% of all class meetings in order to receive credit in the course no matter what your grade in the course is. Attendance will be taken at the start of every class. One unexcused absence is allowed; each unexcused absence after that will be a 5 point deduction from your attendance grade. Excused absences are at my discretion, if you know there will be a conflict, please see me as soon as possible. If I decide it will be an excused absence I will expect you to make up any missed work. Remember, that both excused and unexcused absences count towards the 25% rule. (Please refer to student handbook on college penalty for missing more than 25% of class time from a course.)

1. **Academic Integrity:**

In all instances, policies identified in the Ferrum College Catalog and the Ferrum College Student and Faculty Handbooks regarding the Honor System shall be followed. Students are expected to display academic integrity (no lying, cheating or plagiarism) at all times and in all circumstances. You will be required to complete a tutorial on plagiarism and turn in a completion certificate to ensure your understanding of plagiarism. If you have completed this assignment in another class, please provide proof of completion.

1. **Office of Academic Accessibility:**

Office of Academic Accessibility (OAA): As directed by Ferrum College’s policy, any student with a disability who qualifies for and seeks academic accommodations (such as testing or other services) must work through the Office for Academic Accessibility for accommodations. The office is located Lower StanleyLibrary, Office 110 and the director may be reached by phone at 365-4262 or by email at [nbeach@ferrum.edu](https://ferrumback3j.ferrum.edu/owa/redir.aspx?C=7a1b1d949f0e45079500524a31db598d&URL=mailto%3anbeach%40ferrum.edu) . Please remember that accommodations cannot be granted retroactively; they must be requested in a timely manner prior to when the accommodation is needed. Students who wish to use accommodations through OAA are encouraged to meet with the director during the first weeks of the semester to discuss the process, and are also invited to read the policy manual on [www.ferrum.edu/disability](https://ferrumback3j.ferrum.edu/owa/redir.aspx?C=7a1b1d949f0e45079500524a31db598d&URL=http%3a%2f%2fwww.ferrum.edu%2fdisability" \t "_blank) for specific information.

1. **Civility in the Classroom Policy**

Civil behavior and mutual respect between faculty and students are critical in the college classroom environment if teaching, learning, critical thinking, and sharing of ideas are to occur. Respectful and civil behavior at a very basic level includes the following: turning off cell phones; arriving to class on time; engaging appropriately in classroom activities, lecture, or discussion through attentive listening without interruption or side chats; and demonstrating the ability to discuss topics without inappropriate language or attacking others (physically or verbally). Students who do not comply with the Civility in the Classroom policy described in the Faculty Handbook and the Student Handbook may be removed from the academic setting and may risk serious consequences as outlined in the Civility policy.

**Tentative Lecture/Lab Syllabus**

**Term:** Spring 2016

**Instructor:** Dr Jinnie Garrett

**Class Time:** T TH 9:30am-12:00pm; GRB 221

**Course:** SCI 140 DNA Technology & Genetic Engineering

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| **Week** | **Dates** | **Topic** | **Assessments and Assignments** | **Labs** |
| 1 | 3/8  3/10 | Course Introduction;  Cells/macromolecules  Inheritance  Human Genetics | Overview of Genetics  Introduction  BrightSpace videos | T. Intro to Lab: Pipetting and metric measurements  TH. DNA spooling |
| 2 | 3/15  3/17 | Intro to genetic engineering  Analyzing DNA: techniques | Quiz 1.  Readings and videos on BrightSpace | T. Virtual lab exercises  TH. DNA fingerprinting  DNA digest |
| 3 | 3/22  3/24 | DNA fingerprinting and forensics  DNA databases | Quiz 2.  Readings and videos on BrightSpace | T. DNA fingerprinting –  agarose gel  TH. Analyze gel results |
| 4 | 3/29  3/31 | Genetic modification of plants and animals Intro to Secrets of the Rainforest | Quiz 3.  Readings and videos on BrightSpace | T. Virtual bacteria lab.  TH. Rain Forest 1 |
| 5 | 4/5  4/7 | Medical genetic technologies  Screening, gene therapy, GMHs | Quiz 4.  Readings and videos on BrightSpace | T. Rain Forest 2  TH. Rain Forest 3 |
| 6 | 4/12  4/14 | Genetics and society: Regulation of the technologies, global perspectives | Quiz 5.  Readings and videos on BrightSpace | T. Rain Forest 4  TH. Rain Forest 5 & 6 |
| 7 | 4/19  4/21 | Presentations on, and discussion of, controversies pertaining to genetic engineering | Final reflection paper due 4/21 |  |