**SPRINGVILLE HIGH SCHOOL**

**"HOME OF THE MIGHTY RED DEVILS"**

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| UVU Course Number: **BTEC 1010**<br>UVU Course Title: **Fundamentals of Biotechnology -- 3.0 Credits**<br>***** NOTE: Only available to Juniors and Seniors** | High School Course Number: **51.1201**<br>High School Course Title: **Biotechnology**<br>1.0 Credit in Career and Technology Education (CTE) |


Instructor Name: **Sterling Wadley**
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## COURSE DESCRIPTION

This is a Concurrent Enrollment Course, offering both high school CTE credit through Springville High School and college credit through Utah Valley University. It covers the fundamentals of biotechnology and is laboratory-based designed to teach students the basic principles and techniques associated with the field of biotechnology. Students will be introduced to the biology and chemistry of DNA, RNA and proteins. The following are major topics that will be covered: genetics, molecular biology, biochemistry, microbiology, DNA/RNA analysis, genetic engineering, bioethics, forensics and biotech careers. Registration in Concurrent Enrollment is not mandatory, however, it is a major part of the curriculum and highly recommended. **ONLY HIGH SCHOOL JUNIORS AND SENIORS CAN ENROLL IN CONCURRENT ENROLLMENT CLASSES (UVU POLICY).**

**Concurrent enrollment deadlines: Last day to apply for admission September 9th. Last day to register for classes September 16th. Both these process will be covered in class.**

## COURSE PREREQUISITES

Students must have successfully completed biology and/or chemistry as a prerequisite for this course.

## TEXTBOOKS AND INSTRUCTIONAL MATERIALS

*Biotechnology: Science for the New Millennium*, by Ellyn Daugherty. Paradigm Publishing.
*Biotechnology: Science for the New Millennium Lab Manual*, by Ellyn Daugherty. Paradigm Publishing.

## COURSE TOPICS/ CHAPTERS/ UNITS/ TENTATIVE SCHEDULE

| MONTH | TOPICS | LABS |
|---|---|---|
| Aug/Sept | History of Biotechnology<br>Lab Safety<br>Lab Notebook<br>Lab Equipment<br>Scientific Reading<br>Chemistry<br>Conversions<br>Solutions/Dilutions/pH<br>Micropipetting | Micropipetting Practice<br>Solution Preparation<br>pH Activity<br>Molarity/Dilution/Concentration |
| October | DNA Structure/Replication<br>RNA Structure<br>Genetic Code<br>Protein Synthesis | Structure DNA/Replication<br>Genes in a Bottle<br>PCR Paper Activity<br>PCR<br>Dye Electrophoresis<br>BLAST Computer Activity<br>Spectrophotometer |
| November | Manipulation/Analysis of DNA<br>VNTR,STR,RFLP<br>DNA Fingerprinting<br>Forensics/CODIS<br>Mitochondrial DNA<br>Restriction Enzymes<br>Plasmid Maps | DNA Scissors<br>Lambda DNA Digestion<br>Purity of DNA<br>Digest/Electrophoresis<br>PTC SNPs Analysis<br><br>DNA Fingerprinting Lab<br>PCR Mt DNA |
| December | Genetic Disorders<br>Chromosomal Abnormalities<br>Gene Abnormalities | Computer Activity<br>Genetic Disorder Research<br>Presentation to Class |
| January | DNA Sequencing<br>Evolution/Bioinformatics<br>Alu Insertions<br>Hardy Weinberg | PV92<br>Computer Analysis Activity<br>Bioinformatics Analysis |
| February | Protein Function/Structure<br>Protein Chemistry | Bradford Assay<br>Protein Electrophoresis w/Muscle Tissue<br>SDS-PAGE Electrophoresis |
| March | Microbiology<br>Aseptic Techniques<br>Bacterial Morphology<br>Transformations<br>Antibiotic Resistance<br>Chromatography<br>Recombinant DNA | Gram Stain<br>Bacterial ID<br>Bacterial Transformation w/pGlo<br>Creating Antibiotic Resistant Bacteria<br>Digestion/Purification of Plasmids |
| April | Transgenic Organisms<br>Genetically Modified Foods<br>Agricultural Impact | Digest and Ligate DNA<br>Independent Project Research |
| May | Independent Project Presentations<br>Careers in Biotechnology | State Assessment Test<br>Independent Project Lab Time<br>Resume' Development<br>Mock Interviews |

## EXAMS & QUIZZES

Since one of the goals of this course is to pass the state CTE exam, you will take routine tests to help prepare for the exam. You will have a chance to go over practice tests and correct any questions you missed. Periodic quizzes will be given to check your reading and self-study.

## GRADES

You will receive the same grade for your high school course as you receive for your college course. Your grade will be based upon the total points possible from homework, quizzes, assignments, Lab Book, laboratories, projects, and participation.

10% of your grade will be based on attendance.

**Letter grades will be assigned on a percentage basis as follows**:

| | | |
|---|---|---|
| 93-100 = A | 77-80 = B- | 63-67 = D+ |
| 87-93 = A- | 73-77 = C+ | 57-63 = D |
| 83-87 = B+ | 70-73 = C | 50-657 = D- |
| 80-83 = B | 67-70 = C- | Below 50 = F |

Grades are given each term, at parent conferences, on progress reports at parent's request, on request by the student and on mail-home notifications. Grades can be accesses on the SIS system at www.shs.nebo.edu and will be updated daily. Be aware that late work and make-up work will be entered at the teacher's convenience. You will need a confidential user name and password which are available from school administration.

**NOTICE: If you are registered for Concurrent Enrollment, your grade for this class will become part of your permanent college transcript and will affect your GPA. A low grade can affect college acceptance and scholarship eligibility.**

**Extra Credit:**

Extra credit is available on a limited basis. One project during the entire year. You must choose which term to which it is applied and can only improve your grade by one step on the grade scale. You can move extra credit to the next term if you wish but, you cannot go back and change a previous term's grade. All projects are individual efforts and can include, but are not limited to: bulletin boards, written research papers, class presentations, etc. Ask Mr. Wadley for ideas and rules.

## DROPPING THE CLASS – UVU DEADLINES

_____ is the last day to drop the course without it showing on your transcript.
_____ is the last day to withdraw from the class
If you drop the high school class, you must also withdraw from the UVU class to avoid receiving an E or UW (unofficial withdrawal).

## INSTRUCTOR POLICIES

**General Class Rules:**

* Come to class prepared each day.
* Do your own work.
* Listen carefully and follow directions.
* Only one person speaking at a time during lecture.
* Use proper language.
* Ask before leaving the classroom.
* Eat and drink OUTSIDE of the class areas.
* Respect faculty and other students.
* Respect school property.

**Laboratory Rules:**

* **ABSOLUTELY** no food or drink in the lab! This is a safety issue and correct lab protocol!
* Wear closed-toed shoes and clothing that covers the legs.(Bring an extra pair of shoes to keep in the lab.)
* Use lab equipment properly and ONLY when directed to use it.
* Clean up after yourself before leaving an area of the lab.
* Always work in a safe and professional manner.
* Report any accidents immediately.
* ALWAYS wash your hands before leaving the lab.
* Know the location and proper use of emergency equipment.

**Computer Lab Rules:**

* Use the Internet only for classroom assignments, **no surfing, email, games, etc.**
* Do not change any aspect of the computers configuration or programs.
* Follow the Nebo School District's "Computer Use Policy"

**Safety:**

Students will be trained in laboratory safety procedures. Before students can participate in the laboratory activities they must read, sign and return a lab safety contract; and pass a laboratory safety quiz. Students who are reckless in the lab **WILL LOSE LAB PRIVELEGES,** this will result in afailing grade since more than half the course is based on labs. Contact Mr. Wadley if you have any reservations about laboratory activities and or safety issues.

**Personal Electronics:**

Nebo School District policy states that electronic devises such as cell phones, pagers, CD players,games, etc. are not allowed during class time. They will be confiscated if **used in class**. A parent or guardian will have to reclaim them from an administrator in the front office.

**Disease Education:**

This is a college level biotechnology class. Topics such as viruses, bacteria, and disease transmission will be discussed. These topic MAY address include issues such as AIDS/HIV andother health issues. **State law requires that written parental consent must be obtained before a student can participate in these types of discussions and that parents be given the opportunity to review the curriculum. A permission letter will be sent home at a later date.**

**Attendance:**

You are expected to be in class every day of the school year. The concepts and skills taught in this class are continually building on previous lessons. The labs performed are costly and time consuming to prepare. Therefore, daily attendance is important for students to fully learn and understand the principles of biotechnology. 10% of your grade will be based on attendance.

**Make-up Procedure:**

All absences must be made up including school excused, illness, travel, etc. DO NOT ASSUME THAT JUST COPYING SOMEONE'S NOTES HAS MADE UP THE ACADEMIC DAY MISSED. Due to the set-up time and limited supplies and equipment, most of the laboratories cannot be made up.

**ACADEMIC STANDARDS**

Each student is expected to maintain academic ethics and honesty in all its forms, including but not limited to cheating and plagiarism. One of the goals of Springville High School is to help students become competent, confidant, contributing people. You are expected to display honesty, dignity, and respect in your behavior at all times. Students who exhibit poor citizenship will be encouraged to improve their behavior by any or all of the following: verbal or written warnings; conferences with student, teacher, parent/guardian, administration, and/or counselor; etc.

**ATTENTION STUDENTS WITH DISABILITIES**: If you have any disability, which may impair your ability to successfully complete this course, please contact your school counselor in the Counseling Office. Academic accommodations are granted for all students who have qualified documented disabilities. All services are coordinated through the Counseling Office.

**Please sign this page after reading the entire disclosure document. Detach and return to Mr. Wadley by September 1st.**

I have read all four pages of the SHS Biotechnology disclosure document and I am aware of the policies and procedures as outlined. I understand that I cannot continue in the class if I do not follow them.

Student name (please print): _____

Student Signature: _____ Date: _____

Parent/Guardian Signature: _____ Date: _____

Please contact Mr. Wadley if you have questions or concerns.

School: 801-489-2870
Home: 801-785-6405
Email: sterling.wadley@nebo.edu

Please provide the following information if possible:

Student Email: _____

Parent Email: _____

Parent contact phone #: _____