



## **BSC 541, Genetic Engineering (CRN: 42103)**

**Summer I, 2022 (6/5/2023 – 7/6/2023)**

<b>Instructor:</b>	<b>Dr. Venu Cheriyaath</b>
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<b>eCompanion Site:</b>	D2L @ MyLeo
<b>Electronic Office hours:</b>	Tuesday and Thursday 12 PM–1 PM Or by appointment, include BSC 541 Genetic Engineering in the subject line of E-mails.

### **Course overview:**

This course will provide graduate students with the basics and applied aspects of genetic engineering. The course is organized into three parts. The first half of the course will introduce the field of genetic engineering and provide the basics of cell and molecular biology, the scientific driver of genetic engineering. The second half of the course will discuss the methodologies and principles of recombinant DNA technology and strategies for gene manipulation and genetic engineering. Since this is a rapidly developing field with sweeping social implications, ethics surrounding recombinant DNA technology will be discussed.

### **Student Learning Outcomes (SLO):**

At the completion of this course, students will be able to:

1. Illustrate Gene structure and flow of genetic information.
2. Define recombinant DNA technology and various strategies and techniques to manipulate the genome.
3. Gain knowledge in genomics-related “omics” disciplines.
4. Explain the applications of genetic engineering in agriculture, animal husbandry, and in medicine.
5. Discuss the pros and cons of genetic engineering and ethical issues associated with recombinant DNA technology.

### **Required Textbook:**

1. **Introduction to Biotechnology**, 4<sup>th</sup> Edition, 2013, by William J. Thieman and Michael A. Palladino, ISBN: 13: 9780134650197

### **INSTRUCTION METHOD**

This syllabus is a suggested outline. It represents the minimum material that we will cover in this course. Dates are approximate and subject to change. If there is any major changes to the syllabus it will be posted in e-College and the syllabus will be updated accordingly. You are responsible for

keeping up with any changes made to the syllabus. *You may be tested on any material listed in the syllabus, on your class page, and discussed in class.*

**Web-Based Course:** The structure of this course is predicated on student reading. Considering the enormous volume of information available in genetic engineering, it is impossible to cover everything in a course. ***Since it is a summer course it will be rather intense and 2 chapters of reading will be required per week. This means you need to spend a considerable amount of time studying and integrating the materials.*** I have selected these chapters to provide basics in recombinant DNA technology. Mastering these basic concepts will enable you to design and apply complicated gene manipulation strategies. Animations, videos, and PowerPoint slides were also included to help your learning. Your progress in this course will be measured using weekly quizzes, discussions, and two exams (a mid-term and a final). You can monitor your progress in eCollege Gradebook.

**How to Succeed in the Class:** For successful course completion, your active and timely participation is essential. As an online class on Genetic Engineering, I expect that you have a background in molecular/cell biology and genetics. You must read the chapters prescribed for each week and go through additional lecture materials, assignments, and activities. From my prior experience, exchanging e-mail is a poor strategy of online learning, therefore, ***I encourage you to clear any questions that you may have during electronic office hours (Tue and Thu 12-1 PM) via the chat feature available in eCollege.***

#### **Class Policies:**

In an online class, students are required to be self-learners and self-directed. The fact that you might be taking several online classes and working full-time may put additional pressure on you, but would not be considered a reason for diluting the rigor of this course. This class will keep a face-to-face class's rigor, timeline, and standards.

**E-mail and Communication:** If you are e-mailing me please use your university e-mail account and put BSC 597, Genetic Engineering in the subject line. If you use an e-mail account without an ".edu" extension, it may end up in my spam folder. During work days, I will respond to e-mails that I receive within 24 hrs. Since I check e-mails occasionally on weekends, e-mails received on weekends will be responded next working day. Most of the correspondence will be announced on the course homepage, therefore check the course homepage as often as possible.

**Electronic Office Hours:** You may access office hours on Monday, Wednesday, and Friday at 12 -1 pm CST.

**Lecture Materials:** PowerPoint slides that I use for delivering lectures will be available in D2L. However, I would like to stress the point that the ***PowerPoint slides that I use for my lectures must not be treated as lecture notes. You may use it as a reference or guide to read the book but not as study material.*** If you ONLY use PowerPoint slides for study, you may not perform well in tests. ***Materials provided in this course including lecture slides are copyrighted and must not share without obtaining permission.***

#### **Overview of Assignments:**

**1) Weekly Quizzes (20% of Total):** After covering each unit, there will be a quiz that needs to be taken online in eCollege. Quizzes are due at @11.59 PM every Monday. ***There won't be any makeup quizzes if you miss a quiz or perform poorly.***

**2) Mini Project:** Analysis of SARS Cov-2 Genome (Details will be provided in D2L).

**Due June 21, 2022**

**3) Bioethics Essay:** Does mRNA or Adenovirus vaccine mandates violate four principles (respect for autonomy, nonmaleficence, beneficence, and justice) of Bioethics.?

**Due July 6, 2022**

**Exams and Grades:** There will be two exams including the final. Exam questions will test critical thinking, analytical ability, and the understanding of subject matter. Therefore, it is important to understand the concepts. *If you miss an exam for reasons other than university-approved emergencies, make-up exams would not be provided.*

**Grading Policy:**

Weekly Quizzes	= 60 points (20%)
Two exams (a Midterm and a Final)	= 150 points (50%)
Project Report (Genome Analysis)	= 45 points (15%)
Bioethics Essay	= 45 points (15%)
<b>Total</b>	<b>= 300 points</b>

**Grading Scale:**

A = ≥90%

B = ≥80%

C = ≥70%

D = ≥58%

F = ≤58%

**To calculate where you stand:** Your up-to-date scores and percentage will be available in the grade book of eCollege. Add your 3 exam scores, scores in assignments, and your final score of lab and assignment plus any extra credit points that you have, which will be your total score of 1000. Calculate the percentage. This will be your grade.

**Course Calendar and Exam Schedule:**

Date	Units	Textbook Chapter and Unit Title
Week 1 (June 5 – 11)	<b>Unit 1</b>	Chapter 1, Introduction to genetic engineering
	<b>Unit 2</b>	Chapter 2, Basic of Genes and Genome
Week 2 (June 12 – 18)	<b>Unit 3</b>	Chapter 3, Recombinant DNA Technology
<b>Project Report Due at 11.59 PM on June 20</b> <b>Midterm Exam (June 26)</b>		
Week 3 (June 20–June 26)	<b>Unit 4</b>	Chapters 6 & 7, Plant and animal genetic engineering
Week 4 (June 27–July 3)	<b>Unit 5</b>	Chapter 11, Genetic Engineering in Medicine Chapter 5, Vaccines
Week 5 (July 4 – July 7)	<b>Unit 6</b>	Chapter 13, Ethics & Recombinant DNA Technology
<b>Essay Due at 11.59 PM on July 5th</b>		

## Final Exam (July 6)

☒ **ALL DATES AND ASSIGNMENTS ARE TENTATIVE AND MAY BE SUBJECT TO CHANGE**

### **Sample Study Week:**

Step 1–Download lecture slides and supporting materials from D2L.

Step 2–**Critically** read chapters and supporting materials, and make notes (*simply going through the materials is not going to be enough, focus on concepts, molecular mechanisms, etc..*)

Step 3–Complete assignments and participate in the discussion.

Step 4–Review materials and your notes and participate in office hours to clear any questions that you may have.

Step 5–Take online quizzes in e-College when they are due.

Step 6–Review again before the test due date and take online tests.

**Academic Integrity:** A Texas A&M University-Commerce student does not lie, cheat, or steal, and does not tolerate those who do. A violation of the Texas A&M honor code and academic integrity involves any of the following offenses: cheating, fabrication, falsification, multiple submissions, plagiarism, and complicity in any of these offenses. The first instance of cheating will result in "ZERO" on the exam and/or on the assignment. The second instance of cheating will result in "ZERO" on the course. Cheating involves copying information from another student, non-allowable materials or sources, and plagiarism. Once again, violations of academic integrity will not be tolerated. This class will be conducted in strict observance of the Honor Code. Refer to your Student Handbook for details.

**Conduct Policy:** All students enrolled at the University shall follow the tenets of common decency and acceptable behavior conducive to a positive learning environment. (See Student's Guide Handbook, Policies, and Procedures, Conduct).

**Behavior:** *All students enrolled at the University shall follow the tenets of common decency and acceptable behavior conducive to a positive learning environment." (See Student's Guide Handbook, Policies, and Procedures, Conduct).*

<http://www.tamuc.edu/academics/universityCollege/successCoaches/default.aspx>

**Plagiarism:** Plagiarism is a criminal activity. You must cite all sources of information. Unreferenced copying of material, whether parts of sentences, whole sentences, paragraphs, or entire articles can result in a score of zero for your assignment and may result in further disciplinary action.

**Piracy:** *Materials provided in this course including lecture slides are copyrighted and must not share without obtaining permission.*

**Students with Disabilities/Reasonable Accommodation:** *The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with*

disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you have a disability requiring an accommodation, please contact: Office of Student Disability Resources and Services, Texas A&M University-Commerce  
 Gee Library, Room 132  
 Phone (903) 886-5150 or (903) 886-5835  
 Fax (903) 468-8148  
[StudentDisabilityServices@tamuc.edu](mailto:StudentDisabilityServices@tamuc.edu)

**If you have not taken a course in e-College before, please use the tutorial provided for students in D2L. It will save you a lot of time and frustration and a lot faster than trial and error.**

## ACCESS AND NAVIGATION

### **D2L Brightspace Access and Log in Information**

This course will be facilitated using D2L Brightspace, the learning management system used by Texas A&M University-Commerce. To get started with the course, go to [myLeo](#) and from App window select [MyLeoOnline \(D2L Brightspace\) App](#). From home menu choose your course. You will need your campus-wide ID (CWID) and password to log into the course. If you do not know your CWID or have forgotten your password, contact the Center for IT Excellence (CITE) at 903.468.6000 or [helpdesk@tamuc.edu](mailto:helpdesk@tamuc.edu).

**Note:** It is strongly recommended you perform a “Browser Test” prior to the start of your course.

### **TECHNOLOGY REQUIREMENTS**

#### **Browser support**

D2L is committed to performing key application testing when new browser versions are released. New and updated functionality is also tested against the latest version of supported browsers. However, due to the frequency of some browser releases, D2L cannot guarantee that each browser version will perform as expected. If you encounter any issues with any of the browser versions listed in the tables below, contact D2L Support, who will determine the best course of action for resolution. Reported issues are prioritized by supported browsers and then maintenance browsers.

Supported browsers are the latest or most recent browser versions that are tested against new versions of D2L products. Customers can report problems and receive support for issues. For an optimal experience, D2L recommends using supported browsers with D2L products.

Maintenance browsers are older browser versions that are not tested extensively against new versions of D2L products. Customers can still report problems and receive support for critical issues; however, D2L does not guarantee all issues will be addressed. A maintenance browser becomes officially unsupported after one year.

Note the following:

☑ Ensure that your browser has JavaScript and Cookies enabled.

For desktop systems, you must have Adobe Flash Player 10.1 or greater.

- The Brightspace Support features are now optimized for production environments when using the Google Chrome browser, Apple Safari browser, Microsoft Edge browser, Microsoft Internet Explorer browser, and Mozilla Firefox browsers.

#### 1. Desktop Support

Browser	Supported Browser Version(s)	Maintenance Browser Version(s)
Microsoft® Edge	Latest	N/A
Microsoft® Internet	N/A	11

Explorer®		
Mozilla® Firefox®	Latest, ESR	N/A
Google® Chrome™	Latest	N/A
Apple® Safari®	Latest	N/A

## 2. Tablet and Mobile Support

Device	Operating System	Browser	Supported Browser Version(s)
Android™	Android 4.4+	Chrome	Latest
Apple	iOS®	Safari, Chrome	The current major version of iOS (the latest minor or <b>point</b> release of that major version) and the previous major version of iOS (the latest minor or <b>point</b> release of that major version). For example, as of June 7, 2017, D2L supports iOS 10.3.2 and iOS 9.3.5, but not iOS 10.2.1, 9.0.2, or any other version. Chrome: Latest version for the iOS browser.
Windows	Windows 10	Edge, Chrome, Firefox	Latest of all browsers, and Firefox ESR.

- You will need regular access to a computer with a broadband Internet connection. The minimum computer requirements are:
    - 512 MB of RAM, 1 GB or more preferred
    - Broadband connection required courses are heavily video intensive
    - Video display capable of high-color 16-bit display 1024 x 768 or higher resolution
  - You must have a:
    - Sound card, which is usually integrated into your desktop or laptop computer
    - Speakers or headphones.
    - \*For courses utilizing video-conferencing tools and/or an online proctoring solution, a webcam and microphone are required.
  - Both versions of Java (32 bit and 64 bit) must be installed and up to date on your machine. At a minimum Java 7, update 51, is required to support the learning management system. The most current version of Java can be downloaded at: JAVA web site  
<http://www.java.com/en/download/manual.jsp>
  - Current anti-virus software must be installed and kept up to date.
- Running the browser check will ensure your internet browser is supported.
- Pop-ups are allowed.
  - JavaScript is enabled.
  - Cookies are enabled.
- You will need some additional free software (plug-ins) for enhanced web browsing. Ensure that

you download the free versions of the following software:

- [Adobe Reader](https://get.adobe.com/reader/) <https://get.adobe.com/reader/>
  - [Adobe Flash Player \(version 17 or later\)](https://get.adobe.com/flashplayer/) <https://get.adobe.com/flashplayer/>
  - [Adobe Shockwave Player](https://get.adobe.com/shockwave/) <https://get.adobe.com/shockwave/>
  - [Apple Quick Time](http://www.apple.com/quicktime/download/) <http://www.apple.com/quicktime/download/>
- At a minimum, you must have Microsoft Office 2013, 2010, 2007 or Open Office. Microsoft Office is the standard office productivity software utilized by faculty, students, and staff. Microsoft Word is the standard word processing software, Microsoft Excel is the standard spreadsheet software, and Microsoft PowerPoint is the standard presentation software. Copying and pasting, along with attaching/uploading documents for assignment submission, will also be required. If you do not have Microsoft Office, you can check with the bookstore to see if they have any student copies.

### **ACCESS AND NAVIGATION**

You will need your campus-wide ID (CWID) and password to log into the course. If you do not know your CWID or have forgotten your password, contact the Center for IT Excellence (CITE) at 903.468.6000 or [helpdesk@tamuc.edu](mailto:helpdesk@tamuc.edu).

**Note:** Personal computer and internet connection problems do not excuse the requirement to complete all course work in a timely and satisfactory manner. Each student needs to have a backup method to deal with these inevitable problems. These methods might include the availability of a backup PC at home or work, the temporary use of a computer at a friend's home, the local library, office service companies, Starbucks, a TAMUC campus open computer lab, etc.

### **COMMUNICATION AND SUPPORT**

Brightspace Support

#### **Need Help?**

##### 3. Student Support

If you have any questions or are having difficulties with the course material, please contact your Instructor.

##### 4. Technical Support

If you are having technical difficulty with any part of Brightspace, please contact Brightspace Technical Support at 1-877-325-7778 or click on the **Live Chat** or click on the words "click here" to submit an issue via email.



##### 5. System Maintenance

Please note that on the 4th Sunday of each month there will be System Maintenance which means the system will not be available 12 pm-6 am CST.

### **COMMUNICATION AND SUPPORT**

All e-mail received during normal business hours will be replied within 48 hrs and e-mails received during weekends will be responded on the following Monday.

### **COURSE AND UNIVERSITY PROCEDURES/POLICIES**

#### **Syllabus Change Policy**

The syllabus is a guide. Circumstances and events, such as student progress, may make it necessary for the instructor to modify the syllabus during the semester. Any changes made to the syllabus will be announced in advance.

#### **University Specific Procedures**

All students enrolled at the University shall follow the tenets of common decency and acceptable behavior conducive to a positive learning environment. The Code of Student Conduct is described in

detail in the [Student Guidebook](#).

<http://www.tamuc.edu/admissions/registrar/documents/studentGuidebook.pdf>

Students should also consult the Rules of Netiquette for more information regarding how to interact with students in an online forum: [Netiquette http://www.albion.com/netiquette/corerules.html](http://www.albion.com/netiquette/corerules.html)

TAMUC Attendance

For more information about the attendance policy please visit the [Attendance](#) webpage and [Procedure 13.99.99.R0.01](#).

<http://www.tamuc.edu/admissions/registrar/generalInformation/attendance.aspx>

<http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/13students/academic/13.99.99.R0.01.pdf>

Academic Integrity

Students at Texas A&M University-Commerce are expected to maintain high standards of integrity and honesty in all of their scholastic work. For more details and the definition of academic dishonesty see the following procedures:

[Undergraduate Academic Dishonesty 13.99.99.R0.03](#)

<http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/13students/undergraduates/13.99.99.R0.03UndergraduateAcademicDishonesty.pdf>

[Graduate Student Academic Dishonesty 13.99.99.R0.10](#)

<http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/13students/graduate/13.99.99.R0.10GraduateStudentAcademicDishonesty.pdf>

**Students with**

**Disabilities**

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you have a disability requiring an accommodation, please contact:

**Office of Student Disability Resources and Services**

Texas A&M University-Commerce Gee Library- Room 132

Phone (903) 886-5150 or (903) 886-5835

Fax (903) 468-8148

Email: [Rebecca.Tuerk@tamuc.edu](mailto:Rebecca.Tuerk@tamuc.edu)

Website: [Office of Student Disability Resources and Services](#)

<http://www.tamuc.edu/campusLife/campusServices/studentDisabilityResourcesAndServices/>

Texas A&M University-Commerce will comply in the classroom, and in online courses, with all federal and state laws prohibiting discrimination and related retaliation on the basis of race, color, religion, sex, national origin, disability, age, genetic information or veteran status. Further, an environment free from discrimination on the basis of sexual orientation, gender identity, or gender expression will be maintained.

Campus Concealed Carry Statement

Texas Senate Bill - 11 (Government Code 411.2031, et al.) authorizes the carrying of a concealed handgun in Texas A&M University-Commerce buildings only by persons who have been issued and are in possession of a Texas License to Carry a Handgun.

Qualified law enforcement officers or those who are otherwise authorized to carry a concealed handgun in the State of Texas are also permitted to do so. Pursuant to Penal Code (PC) 46.035 and A&M-Commerce Rule 34.06.02.R1, license holders may not carry a concealed handgun in restricted locations.

For a list of locations, please refer to the [Carrying Concealed Handguns On Campus](#) document and/or consult your event organizer.

Web url: <http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures>



[es/34SafetyOfEmployeesAndStudents/34.06.02.R1.pdf](#)

Pursuant to PC 46.035, the open carrying of handguns is prohibited on all A&M- Commerce campuses. Report violations to the University Police Department at 903- 886-5868 or 9-1-1.