BSC 493 01B-SEA-PHAGE II-Bioinformatics
Syllabus

Spring 2026
East Texas A&M University
Class Time: T/TR 1:00-3:00 PM
Classroom: STC 122

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Office Location: NHS 331

Please e-mail me if you have a question. I will try to respond within 24 hours, except for weekends and holidays.

Office Hours: Thursdays 3:30-5:00 PM or by appointment.
I enjoy teaching and talking with you. If you have questions, drop by my office or join the Zoom session (link below) during office hours. If the time does not work for you, feel free to email me, and we can set up a time that does.
Office Hour Zoom link:
https://tamuc.zoom.us/j/7032367457?pwd=RkFQZmtkcm90emNnUGNDL0E0Sjg0UT09
Meeting ID: 703 236 7457
Passcode: OH

COURSE INFORMATION

You do not need to purchase any textbooks or other materials prior to the start of the semester; all tools are provided at the course home page in D2L.

All **Assignment instructions** will be posted to D2L course home page.

Bioinformatics Guide:
https://genomicsguide.seaphages.org/ Step-by-step phage annotation instructions

HHMI SEA-PHAGES **Phage Discovery Guide:**
https://seaphagesphagediscoveryguide.helpdocsonline.com/home Useful for readings on background phage information

The *syllabus/schedule are subject to change.*

Actinobacteriophage Database:
https://phagesdb.org/

Links to **GeneMark** on phage page

Phamerator:
https://phamerator.org/
Phage genome visualization/comparative program

PECAAN:
https://discover.kbrinsgd.org/evidence/summary
Tool for compiling output from bioinformatics programs and final genome calls

ApE:
https://jorgensen.biology.utah.edu/wayned/ape/
Too for molecular biologists to design, visualize, annotate, and manipulate DNA sequences

Course Description

This is the second part of the Howard Hughes Medical Institute's SEA-PHAGES (Science Education Alliance-Phage Hunters Advancing Genomics and Evolutionary Science) program. This course is designed to immerse students in fundamental biological concepts and scientific reasoning through original, hypothesis-driven research. Students will characterize phages discovered by previous cohorts or explore other novel genomes using a comprehensive array of molecular and bioinformatics techniques. They will perform comparative genomics, complete genome annotation, and utilize molecular and recombinant DNA techniques to characterize these novel genomes. The course will be delivered in a blended format, combining traditional lectures with hands-on laboratory sessions. **Prerequisites:** BSC 303 with a grade of C or more.

Detailed Course Description: To learn how novel viruses are evaluated for novelty and gene content, you will work collaboratively in a team to annotate a bacteriophage genome. At the start of the semester, your group will be provided with a raw nucleotide sequence file (a typical phage genome is approximately 40,000 base pairs in length). Using a suite of bioinformatics tools, you will identify predicted genes, determine their positions within the genome, and assess which genes can be assigned putative functions.

Your completed genome annotation will be submitted to the GenBank database, and you will be listed as an author on the submission. As a result, your work will be publicly available to the phage research community and contribute to future studies. In addition, you will select a less-characterized gene for in-depth investigation, predict its potential function, and design experimental approaches to study it. This will include designing PCR primers to amplify the gene and clone it into a bacterial expression vector. Collectively, this work will help advance our understanding of poorly characterized phage proteins.

Course Student Learning Objectives (SLO):

Upon completion of this course, the student will be able to:

1. Describe how a novel virus is identified and characterized.
2. Apply a range of bioinformatics tools to assess whether viral DNA sequences are likely to be a gene, and to predict the potential function of the resulting gene products.
3. Conduct comparative genomic analyses to determine the novelty of a viral genome.
4. Gain foundational experience with molecular biology techniques for bacteriophage gene analysis.
5. Demonstrate a broad understanding of the underlying principles of commonly used bioinformatics programs.
6. Maintain clear, accurate, and reproducible records of experimental work that can be readily interpreted by other scientists.
7. Critically read, document, and present primary scientific data.
8. Develop and write a genome announcement that meets the standards of a peer-reviewed primary research article.

COURSE REQUIREMENTS

Minimal Technical Skills Needed

- Proficiency in using the D2L Brightspace Learning Management System in myLEOOnline
- Proficiency in using and access to Microsoft PowerPoint

Instructional Methods

This is a blended course that includes both in-person class sessions and self-paced online learning activities.

Student Responsibilities or Tips for Success in the Course

- ✓ **Checking both D2L and emails for course-related announcements.**
- ✓ Dedicated time to learn course materials.
- ✓ Have the required technology (a computer, a secure and reliable internet connection, and other requirements detailed in this syllabus – please read the "Technology Requirements" section.
- ✓ **Preparing a poster presentation following the guidelines.**
- ✓ **Submitting the assignments before deadlines.**
- ✓ If special accommodation is needed, notify the instructor in advance.

Assessments:

There will be three types of assessments that will contribute to the grade. They are:

1. Graded Homework

Online homework assignments will be posted on the D2L course homepage in the form of "Quizzes". You may use course materials when taking the quizzes; this includes the guidelines

on the SEA-PHAGE websites, lecture notes, and your notes. Send me an email if you are locked out or have other computer difficulties that prevent you from completing the assignments on time.

Note: Graded homework will not be accepted after the Answer Keys have been posted or given out in class!

Non-graded reading assignment-Readings from websites will be announced and will follow the topic order in the course schedule. To get the most out of the lecture, it is important that you complete the assigned readings before coming to class, since lectures will build on the reading assignment.

2. Assignments
There will be assignments throughout the course, including gene annotation and research project associated activites. All assignments must be submitted by the stated deadlines. Additional details and expectations will be discussed in class.

3. Presentation
All students, either individually or as part of a team, are expected to present a poster during the class and at the SEA Symposium (April 24–26; https://seaphages.org/meetings/90/). This symposium is held virtually. By the end of the semester, you will have accumulated sufficient data to develop a scientific poster.

GRADING

Final grades in this course will be based on the following scale:

	Method of Completion	Due Date	Percentage of Final Grade
Graded Homework	individual	Various times	**15%**
Annotation			**45%**
Coding potential	Team	Jan 29	7 %
Blast	Team	Feb 26	7 %
Start Selection Tools	Team	Feb 19	7 %
Function Calls	Team	Mar 3	10 %
Draft Genome Annotation	Team	Mar 5	5%
Quality Control	Team	Mar 26	5%
Author List	individual	Mar 26	1 %
Final Genome Annotation	Team	April 2	3 %
One Gene Project			**20 %**
Literature Review/Investigation	individual	April 9	12 %
Primer Design	individual	Apr 21	5 %
Lab Notebook	individual	May 7	3 %

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	Method of Completion	Due Date	Percentage of Final Grade
Genome Announcement Draft	Individual	Apr 7	**5%**
Poster Presentation			**15%**
Poster	Team	Apr 16	10 %
Oral Presentation	Individual	Apr 16	5%
	Team		

A = 90%-100%
B = 80%-89%
C = 70%-79%
D = 60%-69%
F = 59% or Below

COURSE OUTLINE / CALENDAR

Week	Lectures	Guide	
1 1/12	Syllabus & Introduction to Phage Biology	Chapter 1/2	
2 1/20	Gene Annotation Procedure 1 GeneMarks/Coding Potential	Chapter 3/4	HW #1
3 1/26	Gene Annotation-Positional calls Blast Analysis **Coding Potential assignment due (1/29)**	Chapter 5~7	HW #2
4 2/2	Gene Annotation-Positional calls Starterator analysis	Chapter 8	
4 2/9	Gene Annotation Procedure 2 Functional Assignment using HHPred/Pharmerator	Chapter 8	HW #3
6 2/16	Gene Annotation-Functional calls Guiding Principles of Annotation/Unusual Phage genes **Start selection assignment due (2/19)**	Chapter 9	
7 2/23	Gene Annotation-Functional calls **Blast assignment due (2/26)**	Chapter 10	
7 3/2	Draft Genome Annotation **Draft genome annotation assignment due (3/5)**		
9 3/9	***Spring Break!***		
10 3/16	Quality control review of peer assigned gene One Gene Project-literature search	Chapter 13	HW #4
11 3/23	Quality control activity/One Gene Project **Quality control activity assignment due (3/26)** **Author List due (3/26)**		
12 3/30	Final gene annotation **Final gene annotation assignment due (4/2)**		

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13 4/6	Work on poster/presentation Introduction to PCR primer design **Genome Announcement Draft due (4/7)**		HW #5
14 4/13	**Poster Presentation (4/16)**		
15 4/20	**Primer design assignment due (4/21)** **Conference Attendance (4/24-26)**		HW #6
16 4/27	PCR and Gel Electrophoresis-Lab		
5-4	**Lab Notebook assignment due (5/7)**		

TECHNOLOGY REQUIREMENTS

LMS

All course sections offered by East Texas A&M University have a corresponding course shell in the myLeo Online Learning Management System (LMS). Below are technical requirements

LMS Requirements:
https://community.brightspace.com/s/article/Brightspace-Platform-Requirements

LMS Browser Support:
https://documentation.brightspace.com/EN/brightspace/requirements/all/browser_support.htm

Zoom Video Conferencing Tool
https://inside.tamuc.edu/campuslife/CampusServices/CITESupportCenter/Zoom_Account.aspx?source=universalmenu

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@etamu.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

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

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Technical Support

If you are having technical difficulty with any part of Brightspace, please contact Brightspace Technical Support at 1-877-325-7778. Other support options can be found here:

https://community.brightspace.com/support/s/contactsupport

STUDENT RESPONSIBILITIES FOR COURSE

CWID and Password

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@etamu.edu.

Technology-Related Issues

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 ETAMU campus open computer lab, etc.

TECHNOLOGY REQUIREMENTS AND SUPPORT

Minimal Technical Skills Needed

Students will need reliable computer and internet access for this course. Students must be able to effectively use myLeo email, myLeo Online D2L, and Microsoft Office.

Learning Management System (LMS) – D2L

All course sections offered by East Texas A&M University have a corresponding course shell in the myLeo Online Learning Management System (LMS). Below are the technical requirements:

- View the Learning Management System Requirements Webpage.
- Learn more on the LMS Browser Support Webpage.

Technical Support

If you are having technical difficulty with any part of Brightspace, please contact Brightspace Technical Support at 1-877-325-7778. Other support options can be found on the Brightspace Support Webpage.

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COMMUNICATION AND SUPPORT

Interaction with Instructor Statement

If you have any questions or are having difficulties with the course material, please contact your instructor. Correspondence will always be through university email (your "myLeo" mail) and announcements in myLeo online (D2L). You will not RECEIVE email through D2L, so be sure to check your ETAMU email for communication. Students are encouraged to check university email daily.

Include the Following in Emails with Instructor:

- Course name and subject in the subject line
- Salutation (Good afternoon, Dr. Jackson)
- Proper email etiquette (no "text" emails – use proper grammar and punctuation)
- Student name and CWID after the body of the email (possibly add to student signature on email)

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.

Student Conduct

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 online in the Student Guidebook.

Students should also consult the Rules of Netiquette Webpage for more information regarding how to interact with students in an online forum.

ETAMU Attendance

For more information about the attendance policy, please view the Attendance Webpage and the Class Attendance Policy

Academic Integrity

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

Undergraduate Academic Dishonesty University Procedure 13.99.99.R0.03

Undergraduate Student Academic Dishonesty Form

Graduate Student Academic Dishonesty University Procedure 13.99.99.R0.10

Graduate Student Academic Dishonesty Form

Use of Artificial Intelligence

East Texas A&M University acknowledges that there are legitimate uses of Artificial Intelligence, ChatBots, or other software that has the capacity to generate text, or suggest replacements for text beyond individual words, as determined by the instructor of the course.

Any use of such software must be documented. Any undocumented use of such software constitutes an instance of academic dishonesty (plagiarism).

Individual instructors may disallow entirely the use of such software for individual assignments or for the entire course. Students should be aware of such requirements and follow their instructors' guidelines. If no instructions are provided the student should assume that the use of such software is disallowed.

In any case, students are fully responsible for the content of any assignment they submit, regardless of whether they used an AI, in any way. This specifically includes cases in which the AI plagiarized another text or misrepresented sources

Students with Disabilities-- ADA Statement

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

East Texas A&M University

Velma K. Waters Library Rm 162

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

Fax (903) 468-8148

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Email: studentdisabilityservices@etamu.edu

Website: Office of Student Disability Services

Nondiscrimination Notice

East Texas A&M University 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 East Texas A&M University 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 ETAMU 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.

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

East Texas A&M Supports Students' Mental Health – Counseling Services

The Counseling Center at East Texas A&M University, located in the Halladay Building, Room 203, offers counseling services, educational programming, and connection to community resources for students. Students have 24/7 access to the Counseling Center's crisis assessment services by calling 903-886-5145. For more information regarding Counseling Center events and confidential services, please visit www.tamuc.edu/counsel

Mental Health and Well-Being

The university aims to provide students with essential knowledge and tools to understand and support mental health. As part of our commitment to your well-being, we offer access to Telus Health, a service available 24/7/365 via chat, phone, or webinar. Scan the QR code to download the app and explore the resources available to you for guidance and support whenever you need it.

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