



North Central State College

MASTER SYLLABUS

2026-2027

- A. Academic Division: Health Sciences
- B. Discipline: Bioscience Technology
- C. Course Number and Title: BIOS2410 Advanced Bioscience Techniques
- D. Assistant Dean: Dr. Jason Tucker, Ph.D.
- E. Credit Hours: 4
Lecture: 2 hours
Laboratory: 4 hour
- F. Prerequisites: BIOS1010, BIOL1230, BIOL1231c
- G. Last Course/Curriculum Revision Date: Fall 2023 Origin date: 3/7/2011
- H. Textbook(s) Title:

Molecular Biology- Principles of the Genome Function

- Author(s)/Editor(s): Craig, Green, Storz, Greider, Wolberger, Cohen-Fix
- Copyright Year: 2021
- Edition: 3rd
- ISBN #: 9780198788652

- I. Workbook(s) and/or Lab Manual: None
- J. Course Description: This course will focus on Molecular Biology and will examine the advanced instruments and methods of analysis used in the laboratory today. The course will include a comprehensive review of advanced bioscience laboratory techniques utilized in the field today to include indications, process, advantages, disadvantages, analytical protocols, and performing specific laboratory techniques. Students will complete a semester long research project using a model organism which will encompass some of the major molecular biology techniques. Students will then write up results in the form of a scientific publication.
- K. College-Wide Learning Outcomes

College-Wide Learning Outcomes	Assessments - - How it is met & When it is met
Communication – Written	Weekly written entries in lab journal. End of semester Scientific Paper. Communication – Written VALUE Rubric
Communication – Speech	
Intercultural Knowledge and Competence	
Critical Thinking	End of semester Scientific Paper -- Critical Thinking VALUE Rubric
Information Literacy	End of semester Scientific Paper – Information Literacy VALUE Rubric
Quantitative Literacy	

L. Course Outcomes and Assessment Methods:

Upon successful completion of this course, the student shall:

Outcomes	Assessments – How it is met & When it is met
1. Define model organisms and explain their importance to scientific research.	Lab Entries-Week 1-2; First interim exam-Week 6; Final exam, End of Semester Research Paper
2. Describe the types of viruses and their modes of infections.	Lab Entries-Week 3; First interim exam-Week 6; Final exam; End of Semester Research Paper
3. Describe the major concepts in molecular evolution and its impact on nucleic acid sequences.	Lab Entries-Week 4-5; First interim exam-Week 6; Final exam; End of Semester Research Paper
4. Demonstrate the use of spectrophotometry in molecular research.	Lab Entries-Week 4-5; Second interim exam-Week 12; Final exam; End of Semester Research Paper
5. Synthesize the transcription, translation and expression of genes and describe how biotechnology uses these processes to obtain new information.	Lab Entries-Week 7-9; Second interim exam-Week 12; Final exam; End of Semester Research Paper
6. Demonstrate how recombinant DNA technology can be used to study current research topics.	Lab Entries-Week 10; Second interim exam-Week 12; Final exam; End of Semester Research Paper
7. Apply the concepts of nucleic acid sequencing to the study of genomics and proteomics.	Lab Entries-Week 11-13; Second interim exam-Week 12; Final exam; End of Semester Research Paper
8. Apply current research literature, and information related to bioinformatics and relate it to our use in class.	Lab Entries-Week 14-15; Final exam; End of Semester Research Paper
9. Define model organisms and explain their importance to scientific research.	Lab Entries-Week 1-2; First interim exam-Week 6; Final exam, End of Semester Research Paper
10. Describe the types of viruses and their modes of infections.	Lab Entries-Week 3; First interim exam-Week 6; Final exam; End of Semester Research Paper

M. Recommended Grading Scale:

NUMERIC	GRADE	POINTS	DEFINITION
93–100	A	4.00	Superior
90–92	A-	3.67	Superior
87–89	B+	3.33	Above Average
83–86	B	3.00	Above Average
80–82	B-	2.67	Above Average
77–79	C+	2.33	Average
73–76	C	2.00	Average
70–72	C-	1.67	Average
67–69	D+	1.33	Below Average
63–66	D	1.00	Below Average
60–62	D-	0.67	Below Average
00--59	F	0.00	Failure

N. College Procedures/Policies:

North Central State College believes that every student is a valued and equal member of the community.* Every student brings different experiences to the College, and all are important in enriching academic life and developing greater understanding and appreciation of one another. Therefore, NC State College creates an inclusive culture in which students feel comfortable sharing their experiences.

Discrimination and prejudice have no place on the campus, and the College takes any complaint in this regard seriously. Students encountering aspects of the instruction that result in barriers to their sense of being included and respected should contact the instructor, assistant dean, or dean without fear of reprisal.

* *Inclusive of race, color, religion, gender, gender identity or expression, national origin (ancestry), military status (past, present or future), disability, age (40 years or older), status as a parent during pregnancy and immediately after the birth of a child, status as a parent of a young child, status as a foster parent, genetic information, or sexual orientation*

Important information regarding College Procedures and Policies can be found on the syllabus supplement located at

<https://ncstatecollege.edu/documents/President/PoliciesProcedures/PolicyManual/Final%20PDFs/14-081b.pdf>



North Central State College
SYLLABUS ADDENDUM

Academic Division:	<u>Health Sciences</u>	Discipline:	<u>Biotechnology</u>
Course Coordinator:	<u>Tony Miller</u>		
Course Number:	<u>BIOS -2410</u>	Course Title:	<u>Advance Bioscience Techniques</u>
Semester / Session:	<u>Fall 2026</u>	Start / End Date:	<u>8/17/2026 – 12/11/2026</u>

Instructor Information

Name:	<u>Tony Miller</u>	Credentials:	<u>PhD, Ecology & Evolutionary Biology</u>
Phone Number:	<u>419-755-4548</u>	E-Mail Address:	<u>Jmiller2@ncstatecollege.edu</u>
Office Location:	<u>HS-330</u>	Office Hours:	<u>M: 8:15-8:30; 11:25-12:25; 3:20-4:35 T: 8-9, TH: 8:30-9; 10:55-11:55</u>

I. Topical Timeline (Subject to Change):

Lecture Schedule

Week	Date	Lecture Topic
1	18-Aug	Virology
2	25-Aug	Nucleic Acids
3	1-Sep	DNA Replication
4	8-Sep	Molecular Biology Techniques
5	15-Sep	DNA Sequencing
6	22-Sep	Exam 1
7	29-Sep	Transcription
8	6-Oct	qPCR, DNA Transformation
9	13-Oct	NO CLASS- FALL BREAK
10	20-Oct	RNA Splicing
11	27-Oct	MBT II, Microsatellites
12	3-Nov	Molecular Evolution
13	10-Nov	Exam 2
14	17-Nov	Translation, Gene Expression
15	24-Nov	Metagenomics, Proteomics, and Bioinformatics
16	1-Dec	Presentation
17	8-Dec	FINAL EXAM/Paper due

Lab Schedule

Week	Date	Lab Topic
1	18-Aug	Syllabus, Documentation, Literature Review (Due Sep 4)
	20-Aug	Model Organisms
2	25-Aug	MiniPrep Isolation of Plasmid DNA I
	27-Aug	MiniPrep Isolation of Plasmid DNA II
3	1-Sep	Cleavage of DNA with Restriction Enzymes I
	3-Sep	Cleavage of DNA with Restriction Enzymes II
4	8-Sep	Restriction Enzyme Mapping I
	10-Sep	Restriction Enzyme Mapping II
5	15-Sep	Separation of DNA and RNA via Gel Filtration I

Course Number: BIOS 2410
Semester / Session: Fall 2026

Course Title: Advanced Bioscience Techniques
Start / End Date: 8/17/2026 – 12/11/2026

	17-Sep	Separation of DNA and RNA via Gel Filtration II
6	22-Sep	Spectrophotometry and Volumetric Flasks
	24-Sep	Practical Open Lab Review
7	29-Sep	Lab Practical 1
	1-Oct	DNA Transformations I
8	6-Oct	DNA Transformations II
	8-Oct	DNA Transformations III
9	13-Oct	NO CLASS- FALL BREAK
	15-Oct	NO CLASS- FALL BREAK
10	20-Oct	DNA Transformations IV
	22-Oct	DNA Transformations V
11	27-Oct	RNA Interference I
	29-Oct	RNA Interference II
12	3-Nov	RNA Interference III
	5-Nov	CRISPR I
13	10-Nov	CRISPR II
	12-Nov	COVID-19 Diagnostics I
14	17-Nov	COVID-19 Diagnostics II
	19-Nov	Collecting Cancer Causing Changes
15	24-Nov	Presentation Preparations
	26-Nov	NO CLASS- THANKSGIVING BREAK
16	1-Dec	Presentation Day
	3-Dec	Presentation Day
17	8-Dec	FINAL PRACTICAL
	10-Dec	NO CLASS

II. Course Assignments:

-Literature Review Exercise	15 Points
-Advising Appointment	5 Points
-Advanced Lab Technique Presentation	70 Points
-Lab Assignments and Research Papers (11 Total)	515 Points
-Gateway Quizzes (6 Total Quizzes)	30 Points
-Module Quizzes (7 Total Quizzes)	147 Points
-Exams	
-Two exams during semester (6 th and 13 th week)	200 Points
-Final Exam	100 Points
-Two lab practicals during semester (7 th and 17 th Week)	100 Points

TOTAL POINTS** **1182 Points**

**Extra Credit available, but not to exceed 30 points throughout the semester.

III. Grading and Testing Guidelines:

Please refer to the Master Syllabus for the NCSC grading scale.

IV. Examination Policy:

Lecture exams are currently being planned to be administered in-person. On exam days, students will put all notes, textbooks, and cell phones (turned completely off) in their bags and all bags will be placed at the front of the classroom/laboratory. Special accommodations for cell phones, such as potential calls from daycare, sick relatives, etc., can be made on a case-by-case basis. In these situations, the cell phones will be handed to the instructor and notified of potential calls.

Once the exam has been distributed to the class, students are not allowed to leave the classroom/laboratory until they hand in their exam. If the student needs to leave the classroom, they will not be allowed to return and continue their exam (this includes trips to the bathroom).

If a student misses an examination due to an excused absence (such as an illness with doctor's note, death in the family, etc.), the student will have one week from the exam date to make-up the exam. Special accommodations can be made if the student is out for a longer period. It is the responsibility of the student to schedule the make-up exam with the professor. If a student is unable to make the exam due to illness, make-up examinations will NOT be administered if a valid doctor's note is not provided directly to the instructor. There are no exceptions!

Lab practicals will be conducted in-person, and students will be able to utilize their lab notebook only. They can include any supplemental information into their lab notebook that would have come from the lab material handouts or any results/interpretations discussed in lab (cut and tape/paste into the lab notebook).

V. Class Attendance and Homework Make-Up Policy:

The instructor needs to be notified as soon as possible if a student needs to miss class/lab or will be unable to turn in an assignment on time. Due to the nature of some of the planned experiments, make-up labs may be impossible to accomplish. Exceptions (such as illness, family emergency, etc.) can be made on a case-by-case basis. *It is the responsibility of the student to get with the instructor to make-up homework and laboratory assignments.* It is at the instructor's discretion if late assignments without a valid excuse will be graded.

VI. Classroom Expectations:

All communications & conduct in this course is subject to the NC State Student Code of Conduct

General Professionalism Expectations

In general, as a future professional in your field, **you will be expected to conduct yourself as a professional in this course in ALL communications** - assignments, discussion forums, Canvas Inbox, emails etc.

This expectation includes *but is not limited to*:

- **Being respectful of classmates' opinions, work and comments**
Good test = Is this something I would/should say to a co-worker in person?
- **Being respectful in communications with the instructor**
Good test = Is this something I would/should say to my boss in the workplace?
- **Being respectful of diversity**
Good test = Is this a comment/joke that is at some other groups, ethnicity, political etc. expense?
Note: Offensive "jokes", slurs or hate speech will NOT be tolerated
 - **This will immediately escalate to a second level offense if it occurs.**
- **Using Non-Profane, Appropriate Language**
Good test = Is this language you would use in the workplace or in front of your grandmother?
- **Using proper. NON-"Text speak" Language to make Yourself Easily Understood**
Good test = Could my older boss understand what I have written?

Consequences for Failure to Meet These Expectations

Failure to meet these standards will result in the following consequences in this course:

1st Level=

Written warning from the instructor documenting issue

(No points deductions)

2nd Level=

Mandatory meeting with the instructor and or Department Chair or Division Dean

(Related assignment/Participation subject to Point Deductions)

3rd Level=

College Disciplinary procedures filed with the NC State Judicial Committee as a violation of the [NCSC Student Code of Conduct \(Links to an external site.\)](#).

(Course Grade subject to F)

NOTE: For an extreme single incident of disruptive unprofessional behavior I reserve the right to go directly to initiating college disciplinary procedures

NCSC Disciplinary hearings can result in a variety of consequences, including and up to suspension or being expelled from the college.

Resources:

- [University Etiquette 101: How to Deal with Your Professors \(Links to an external site.\)](#)
- [Email Etiquette for Students](#)