North Central State College

MASTER SYLLABUS	2022-2023

A. Academic Division: Health Sciences

B. Discipline: Bioscience Technology

C. Course Number and Title: BIOS2410 Advanced Bioscience Techniques

D. Assistant Dean: Leesa Cox MBA, PTA

E. Credit Hours: 4
Lecture: 2 hours
Laboratory: 4 hours

F. Prerequisites: BIOS1010, BIOL1230, BIOL1231c

G. Syllabus Effective Date: Fall, 2022

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	
Information Literacy	
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**
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
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
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
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
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
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
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
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

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	Below Average
67–69	D+	1.33	Below Average
63-66	D	1.00	Below Average
60-62	D-	0.67	Poor
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

http://catalog.ncstatecollege.edu/mime/download.pdf?catoid=5&ftype=2&foid=3

North Central State College

SYLLABUS ADDENDUM

Academic Division:	**Health Sciences**	**Discipline:**	**Biotechnology**
Course Coordinator:	**Jaydip Das Gupta Ph.D.**		
Course Number:	**BIOS -2410**	**Course Title:**	**Advance Bioscience Techniques**
Semester / Session:	**Fall 2025 (16 weeks)**	**Start / End Date:**	**8/11/2025 – 12/12/2025**

Instructor Information

Name:	**Jaydip Das Gupta Ph.D.**	**Credentials:**	**M.Sc, Ph.D.**
Phone Number:	**419-755-4872**	**E-Mail Address:**	**Jdasgupta@ncstatecollege.edu**
Office Location:	**HS 332**	**Office Hours:**	**See the course schedule**

I. Topical Timeline (Subject to Change):

Lecture Schedule

Week	Date	Lecture Topic
1	12-Aug	Virology
2	19-Aug	Nucleic Acids
3	26-Aug	DNA Replication
4	2-Sep	Molecular Biology Techniques
5	9-Sep	DNA Sequencing
6	16-Sep	Exam 1
7	23-Sep	Transcription
8	30-Sept	qPCR, DNA Transformation
9	7-Oct	NO CLASS- FALL BREAK
10	14-Oct	RNA Splicing
11	21-Oct	MBT II, Microsatellites
12	28-Oct	Molecular Evolution
13	4-Nov	Exam 2
14	18-Nov	Translation, Gene Expression
15	25-Nov	Metagenomics, Proteomics, and Bioinformatics
16	2-Dec	Presentation
17	9-Dec	FINAL EXAM/Paper due

Lab Schedule

Week	Date	Lab Topic
1	15-Aug	Syllabus, Documentation, Literature Review
	17-Aug	Model Organisms
2	22-Aug	MiniPrep Isolation of Plasmid DNA I
	24-Aug	MiniPrep Isolation of Plasmid DNA II
3	29-Aug	Cleavage of DNA with Restriction Enzymes I
	31-Aug	Cleavage of DNA with Restriction Enzymes II
4	5-Sep	Restriction Enzyme Mapping I
	7-Sep	Restriction Enzyme Mapping II
5	12-Sep	Separation of DNA and RNA via Gel Filtration I
	14-Sep	Separation of DNA and RNA via Gel Filtration II

6	19-Sep	Spectrophotometry and Volumetric Flasks
	21-Sep	Exam I
7	26-Sep	DNA Transformations I
	28-Sep	DNA Transformations II
8	3-Oct	DNA Transformations III
	5-Oct	DNA Transformations IV
9	10-Oct	NO CLASS- FALL BREAK
	12-Oct	NO CLASS- FALL BREAK
10	17-Oct	DNA Transformations V
	19-Oct	RNA Interference I
11	24-Oct	RNA Interference II
	26-Oct	RNA Interference III
12	31-Oct	CRISPR I
	2-Nov	CRISPR II
13	7-Nov	Exam 2
	9-Nov	Presentation Preparation
14	14-Nov	COVID-19 Diagnostics I
	16-Nov	COVID-19 Diagnostics II
15	21-Nov	Collecting Cancer Causing Changes
	23-Nov	NO CLASS- THANKSGIVING BREAK
16	28-Nov	Presentation Day
	30-Nov	Presentation Day
17	5-Dec	FINAL EXAM
	7-Dec	NO CLASS

II. Course Assignments:

-PubMed Exercise
-Advising Appointment
-Advanced Lab Technique Presentation
-Lab Assignments
-Gateway Quizzes
-Module Quizzes
-Exams
    -Two exams during semester (6^{th} and 13^{th} week)
    -Final Exam

III. Grading and Testing Guidelines:

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

IV. Examination Policy:

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 with the Keel Hall Student Success Center. 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; afterwards, the exam will be sent to the Student Success

Center. 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!

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