BIO 2: CELLS, MOLECULES AND GENES

In Workflow

1. BIO Committee Chair (ballerini@csus.edu)
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9. Catalog Editor (catalog@csus.edu)
10. Registrar's Office (k.mcfarland@csus.edu)
11. PeopleSoft (PeopleSoft@csus.edu)

Approval Path

1. Tue, 18 Mar 2025 19:47:19 GMT
   Susanne Lindgren (lindgren): Approved for BIO Committee Chair
2. Tue, 18 Mar 2025 21:31:05 GMT
   Susanne Lindgren (lindgren): Approved for BIO Chair
3. Wed, 19 Mar 2025 23:30:20 GMT
   Mikkel Jensen (mikkel.jensen): Approved for NSM College Committee Chair
4. Fri, 21 Mar 2025 16:09:26 GMT
   Chris Taylor (ctaylor): Approved for NSM Dean

Date Submitted: Tue, 18 Mar 2025 17:29:08 GMT

Viewing: BIO 2 : Cells, Molecules and Genes

Last edit: Tue, 18 Mar 2025 21:08:22 GMT

Changes proposed by: Joya Mukerji (223004470)

Contact(s):

Name (First Last)	Email	Phone 999-999-9999
Joya Mukerji	joya.mukerji@csus.edu	916-278-4065

Catalog Title:
Cells, Molecules and Genes

Class Schedule Title:
Cells,Molecules+Genes

Academic Group: (College)
NSM - Natural Sciences & Mathematics

Academic Organization: (Department)
Biological Sciences

Will this course be offered through the College of Continuing Education (CCE)?
No

Catalog Year Effective:
Spring 2025 (2025/2026 Catalog)

Subject Area: (prefix)
BIO - Biological Sciences

Catalog Number: (course number)
2

Course ID: (For administrative use only.)
105641

Units:
5

Is the ONLY purpose of this change to update the term typically offered or the enforcement of existing requisites at registration?
No

In what term(s) will this course typically be offered?
Fall, Spring

Does this course require a room for its final exam?
Yes, final exam requires a room

This course complies with the credit hour policy:
Yes

Justification for course proposal:
We propose changing CHEM 1A from a prerequisite to "prerequisite, may be taken concurrently" for BIO 2. Many BioSci students struggle to pass CHEM 1A on their first attempt, delaying when they can enroll in BIO 2 and delaying progress through the BioSci degree in general. Several studies have begun to examine how learning about chemistry principles in an applied biological context can help improve chemistry learning for biology students. We hope that allowing students to enroll in CHEM 1A and BIO 2 concurrently will allow students to learn chemistry principles with more biological context and improve first-time CHEM 1A pass rates for BioSci students by enhancing their metacognition and study skills.

In addition, if concurrently enrolled students pass BIO 2 but not CHEM 1A on the first try, those students could continue on to some BIO courses that only require BIO 1 and BIO 2 and continue to make progress to their degree while retaking CHEM 1A.

Additional CHEM 1A prerequisites have been added to specific BIO courses (e.g., BIO 184, BIO 128) to ensure that students do meet the necessary chemistry requirements for BIO courses that absolutely require introductory chemistry knowledge, and additional upper division BIO courses already have even more advanced chemistry prerequisites.

The overall chemistry requirements for the BioSci degree have not changed and we do not anticipate substantial changes to chemistry enrollment, although a slight dip in enrollment could occur if CHEM 1A DFW rates for BIO students improve through this change and fewer BioSci students need to repeat CHEM 1A.The Dept Chair of BioSci has conferred with the Dept Chair of Chemistry. The Chemistry chair supports this proposal.

Course Description: (Not to exceed 90 words and language should conform to catalog copy.)
Introduction to molecular and cellular biology and genetics. Topics include biomolecules, cell structure and function, cellular energetics, molecular flow of information, cell division, and genetic inheritance. Development of scientific skills and a scientific mindset will be emphasized throughout the course, particularly in lab exercises and activities. Designed for science majors. Lecture three hours; Laboratory three hours; Activity two hours.

Are one or more field trips required with this course?
No

Fee Course?
No

Is this course designated as Service Learning?
No

Is this course designated as Curricular Community Engaged Learning?
No

Does this course require safety training?
Yes

Does this course require personal protective equipment (PPE)?
Yes

Course Note: (Note must be a single sentence; do not include field trip or fee course notations.)
This course requires in-class safety training and a lab-coat; personal protective equipment (PPE) is provided for students, except lab-coat.

Does this course have prerequisites?
Yes

Prerequisite:
BIO 1 and CHEM 1A; CHEM 1A may be taken concurrently.

Prerequisites Enforced at Registration?
Yes

Does this course have corequisites?
No

Graded:
Letter

Approval required for enrollment?
No Approval Required

Course Component(s) and Classification(s):
Activity
Laboratory
Lecture

Activity Classification
CS#07 - Fine Arts and Science Activity (K-factor=1.3 WTU per unit)
Activity Units
1

Laboratory Classification
CS#16 - Science Laboratory (K-factor=2 WTU per unit)
Laboratory Units
1

Lecture Classification
CS#02 - Lecture/Discussion (K-factor=1WTU per unit)
Lecture Units
3

Is this a paired course?
No

Is this course crosslisted?
No

Can this course be repeated for credit?
No

Can the course be taken for credit more than once during the same term?
No

Description of the Expected Learning Outcomes and Assessment Strategies:

List the Expected Learning Outcomes and their accompanying Assessment Strategies (e.g., portfolios, examinations, performances, pre-and post-tests, conferences with students, student papers). Click the plus sign to add a new row.

	Expected Learning Outcome	Assessment Strategies
1	Identify structural components of prokaryotic and eukaryotic cells and explain their functional relevance.	In-class activities, Pre-class assignments, Lecture Quizzes, Lecture Exams
2	Explain how information flows from DNA to RNA to protein during gene expression, and compare and contrast how prokaryotic and eukaryotic cells perform gene expression.	In-class activities, Pre-class assignments, Lecture Quizzes, Lecture Exams

3	Explain how DNA is replicated and describe the molecular process.	In-class activities, Pre-class assignments, Lecture Quizzes, Lecture Exams
4	Compare and contrast mitosis and meiosis, and explain how they contribute to the diversity of life	In-class activities, Pre-class assignments, Lecture Quizzes, Lecture Exams
5	Explain the basis of Mendel's Laws, and apply the multiplication and addition rules of probability to solve problems that relate to the transmission of genetic material.	In-class activities, Pre-class assignments, Lecture Quizzes, Lecture Exams
6	Specify how genetic mutations can lead to disease phenotypes and how those genetic mutations are inherited.	In-class activities, Pre-class assignments, Lecture Quizzes, Lecture Exams
7	Give examples of cellular work that requires energy, and describe how ATP hydrolysis or reaction coupling can facilitate processes that require energy.	In-class activities, Pre-class assignments, Lecture Quizzes, Lecture Exams
8	Given the summary reactions for photosynthesis and cellular respiration, compare the reactants and products of each process, and the energy transformations that occur.	In-class activities, Pre-class assignments, Lecture Quizzes, Lecture Exams
9	Demonstrate the evidence-based formulation of hypotheses and knowledge of the scientific method.	In-class activities, Lab assignments, Lab quizzes
10	Distinguish between primary articles and review articles and use references within reviews to access primary literature.	In-class activities, Lab assignments, Lab quizzes
11	Navigate within the structure of a primary scientific article to find information central to the investigation, such as the motivation for conducting the study (hypothesis, question, or gap in the field's knowledge), relevant background information, methods used, data obtained, interpretations and/or claims made, and future questions to address.	Lab assignments, Lab quizzes
12	Explain procedures to safely handle hazardous waste, including solids, liquids and biologicals.	Lab assignments, Lab quizzes
13	Describe how to perform key laboratory techniques (e.g., pipetting, gel electrophoresis, and PCR), and explain the purpose of using these methods and/or what data can be obtained from using them.	Lab assignments, Lab quizzes

Attach a list of the required/recommended course readings and activities:

Reading List for Bio2.pdf

Is this course required in a degree program (major, minor, graduate degree, certificate?)

Yes

Has a corresponding Program Change been submitted to Workflow?

No

Identify the program(s) in which this course is required:

Programs:
BA in Biological Science
BS in Biological Science (Biomedical Sciences)
BS in Biological Science (Cell and Molecular Biology)
BS in Biological Science (Clinical Laboratory Sciences)
BS in Biological Science (Ecology, Evolution, and Conservation)
BS in Biological Science (Forensic Biology)
BS in Biological Science (General Biology)
BS in Biological Science (Microbiology)
BS in Biochemistry
BA in Chemistry (Biochemistry)

Does the proposed change or addition cause a significant increase in the use of College or University resources (lab room, computer)?

No

Will there be any departments affected by this proposed course?

No

I/we as the author(s) of this course proposal agree to provide a new or updated accessibility checklist to the Dean's office prior to the semester when this course is taught utilizing the changes proposed here.

I/we agree

University Learning Goals

Undergraduate Learning Goals:

Competence in the disciplines
Knowledge of human cultures and the physical and natural world
Intellectual and practical skills
Personal and social responsibility
Integrative learning

Is this course required as part of a teaching credential program, a single subject, or multiple subject waiver program (e.g., Liberal Studies, Biology) or other school personnel preparation program (e.g., School of Nursing)?

No

GE Course and GE Goal(s)

Is this a General Education (GE) course or is it being considered for GE?

No

Please attach any additional files not requested above:

Bio2 Syllabus Spring 2026 - to submit with Form A 031725.pdf
review of changes in CHEM prereq for 3 BioSci courses.pdf

Reviewer Comments:

Susanne Lindgren (lindgren) (Tue, 18 Mar 2025 21:30:51 GMT): BIO 2 is a "Fee Course". Course Lab Fees approved at inception of course and in an April 15, 2009 Memo to President Alexander Gonzalez from Gina Curry, Student Fee Advisory Committee Chair/Univ Busar & Director, Student Financial Services Ctr. Funds currently route to Acct# TS007. We cannot run the laboratory portion of this course without these funds.

Key: 493