

BIO 280: MOLECULAR BIOLOGY RESEARCH EXPERIENCE

In Workflow

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Approval Path

1. Wed, 27 Sep 2023 05:43:49 GMT
Susanne Lindgren (lindgren): Rollback to Initiator
2. Fri, 17 Nov 2023 21:15:21 GMT
Robin Altman (altman): Rollback to Initiator
3. Thu, 30 Nov 2023 01:09:13 GMT
Robin Altman (altman): Approved for BIO Committee Chair
4. Mon, 11 Dec 2023 17:39:11 GMT
Susanne Lindgren (lindgren): Approved for BIO Chair
5. Wed, 21 Feb 2024 23:28:01 GMT
Mikkel Jensen (mikkel.jensen): Approved for NSM College Committee Chair
6. Thu, 22 Feb 2024 00:08:33 GMT
Shannon Datwyler (datwyler): Approved for NSM Dean

History

1. Sep 12, 2023 by Andrew Reams (andrew.reams)

New Course Proposal

Date Submitted: Mon, 20 Nov 2023 02:38:22 GMT

Viewing: BIO 280 : Molecular Biology Research Experience

Last approved: Tue, 12 Sep 2023 16:56:09 GMT

Last edit: Wed, 21 Feb 2024 23:15:51 GMT

Changes proposed by: Andrew Reams (214603026)

Contact(s):

Name (First Last)	Email	Phone 999-999-9999
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Catalog Title:

Molecular Biology Research Experience

Class Schedule Title:

Molec Bio Research Experience

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:

Fall 2024 (2024/2025 Catalog)

Subject Area: (prefix)

BIO - Biological Sciences

Catalog Number: (course number)

280

Course ID: (For administrative use only.)

203657

Units:

4

Is the only purpose of this change to update the term typically offered or the enforcement of existing prerequisites 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:

This is not a new course proposal, rather it is a request for three changes to an existing course, BIO 280. This graduate-level course is paired with BIO 180, an undergraduate course. Since BIO 180 is making changes (via a parallel Form A) to the course name, course description, and student learning outcomes, these same updates are being made here to BIO 280 (in parallel to the BIO 180 course) to make the two paired courses consistent. These three changes to BIO 280 are:

1) Update BIO 280 course name to be consistent with new BIO 180 course name:

Current Course Name: Advanced Molecular Biology

New Course Name: Molecular Biology Research Experience

2) Update course description to describe current materials covered:

Current course description: Examination of the structure of genes and genomes, the mechanisms by which they change, and the use of evolutionary relationships to understand function. Mechanisms of the regulation of gene expression from gene to phenotype and the tools used to study these processes. Applications of molecular tools in medicine and biotechnology and the ethics around these approaches. Lecture two hours, laboratory six hours.

New proposed course description: Novel research experience investigating unknown biomolecular pathways, genes, genomes, and the mechanisms by which they change. Hands-on experience designing and constructing new mutants using genetic engineering, and analysis of mutants and their phenotypes to study molecular processes. Applications of these approaches to medicine, biotechnology, and debating their surrounding ethics. Paired with BIO 280 and the material covered will be the same. Fee course. Lecture two hours, laboratory six hours. 4 units. Course requires Personal Protective Equipment.

3) Update BIO 280 Student Learning Outcomes

The previous LOs were outdated and at a lower taxonomical level than the current course. Updates were made to reflect the current BIO 280 course's higher taxonomical learning outcomes. In general, BIO 280 students will be required to perform with higher Bloom's taxonomy, emphasizing depth of explanation and synthesis, for oral reports, written reports, quizzes, and exams. Compared to BIO 180 students, BIO 280 students will need to meet larger research production, quality, and troubleshooting progress. Also, unlike BIO 180 students, BIO 280 students will be required to lead class discussions interpreting novel experimental data generated by the class and critique molecular biology literature relevant to interpreting the class data.

Rationale for changes:

• BIO 180 & 280 (lecture and lab) offers students with a unique research experience (CURE) in a class format with 6 hours of lab per week (two 3-hour labs) and an aligned lecture (two 1-hour lectures per week). Students perform novel independent research while performing genetic engineering projects unique to each student. This course is valuable to graduate students in the Microbiology

and Molecular Biology research labs who want to expand their skill set and try a different research experience in a class format while gaining further research experience and technical skills outside their thesis project.

Rationale for change in course name and description:

- The “Advanced” in “Advanced Molecular Biology” makes it appear that BIO 121 or BIO 222 (both courses are named “Molecular Biology”) should be taken as a prerequisite.
- A course name and description change would emphasize the Research Experience part, thereby making this BIO 280 course’s central objective clearer to students seeking research experience.

Notes:

- A Form A for these same requested changes to BIO 180 was submitted in parallel.

Course Description: (Not to exceed 80 words and language should conform to catalog copy.)

Novel course-based research experience investigating unknown biomolecular pathways, genes, genomes, and the mechanisms by which they change. Hands-on experience designing and constructing new mutants using genetic engineering, and analysis of mutants and their phenotypes to study molecular processes. Applications of these approaches to medicine, biotechnology, and debating their surrounding ethics. Paired with BIO 180 and the material covered will be the same. Fee course. Lecture two hours, laboratory six hours. 4 units.

Are one or more field trips required with this course?

No

Fee Course?

Yes

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 safety training and personal protective equipment.

Does this course have prerequisites?

No

Does this course have corequisites?

No

Graded:

Letter

Approval required for enrollment?

No Approval Required

Course Component(s) and Classification(s):

Laboratory

Lecture

Laboratory Classification

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

Laboratory Units

2

Lecture Classification

CS#04 - Lecture /Recitation (K-factor=1 WTU per unit)

Lecture Units

2

Is this a paired course?

Yes

Please confirm that it complies with the Paired Courses Policy and enter the course with which it is paired:

BIO 180

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	Students will apply bioinformatic tools to identify and compare key genomic features in model organisms to investigate evolutionary patterns that provide insight into biological function.	Exams and Quizzes Lab Research Production, Quality, and Troubleshooting Progress Written Research Report
2	Students will use genetic engineering tools to design, construct, and verify site-specific mutants for addressing unanswered research questions.	Exams and Quizzes Lab Research Production, Quality, and Troubleshooting Progress Written Research Report
3	Students will create, analyze, and evaluate novel experimental data to test and identify the unknown functions of gene products and investigate their molecular pathways.	Exams and Quizzes Lab Research Production, Quality, and Troubleshooting Progress Written Research Report
4	Students will predict and evaluate the effects of regulating gene expression by its translation into phenotypes under different environmental conditions.	Exams and Quizzes Lab Research Production, Quality, and Troubleshooting Progress Oral Presentation and Leading Class Discussion Written Research Report
5	Students will use oral and written communication, emphasizing depth of explanation and synthesis, to present and lead class discussions interpreting novel experimental data generated by the class and critique molecular biology literature relevant to interpreting the class data.	Lab Research Production, Quality, and Troubleshooting Progress Oral Presentation and Leading Class Discussions Written Research Report
6	Students will analyze how molecular biology tools are being applied in medicine and biotechnology, evaluate their limitations, and debate some of their surrounding ethical questions.	Exams and Quizzes

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

BIO 180-280 Syllabus & Schedule.pdf

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

No

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

Graduate (Masters) Learning Goals:

Communication
Critical thinking/analysis
Information literacy
Professionalism
Research (optional)

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

Is this a Graduate Writing Intensive (GWI) course?

No

Reviewer Comments:

Susanne Lindgren (lindgren) (Wed, 27 Sep 2023 05:43:49 GMT): Rollback: For recommended edits

Robin Altman (altman) (Fri, 17 Nov 2023 21:15:07 GMT): Rollback for revisions (communicated by email to author.)

Robin Altman (altman) (Fri, 17 Nov 2023 21:15:21 GMT): Rollback: Revisions communicated to author by email.

Key: 14472