

“Epigenetics and Systems Biology”

Spring 2025 (Odd Years) – Course Syllabus

Biol 476/576 Undergraduate/Graduate Course (3 Credit)

SLN: (476) – _____, (576) – _____

Time - Tuesday and Thursday 10:35 am-11:50 am

Course Lectures in person and recorded on Canvas/Panopto and Discussion Sessions live in person and on WSU Zoom for all campuses (Hybrid Course)

Room – CUE 418

Course Director - Michael Skinner, Abelson Hall 507, 335-1524, skinner@wsu.edu

Co-Instructor – Eric Nilsson, Abelson Hall 507, 225-1835, nilsson@wsu.edu

Learning Objective - The objective of the course is to learn the concept and critical role of systems to understand molecular, cell, development, physiology and evolutionary aspects of biology with a focus on the role of epigenetics in systems biology.

Schedule/Lecture Outline –

Week 1	January 7 & 9	Systems Biology (History/ Definitions/ Theory)
Week 2	January 14 & 16	Systems Biology (Networks & Emergence)
Week 3	January 21 & 23	Systems Biology (Components: DNA to Phenotype)
Week 4	Jan 28 & 30	Systems Biology (Genomics / Technology)
Week 5	February 4 & 6	Epigenetics (History / Molecular Processes)
Week 6	February 11 & 13	Epigenetics (Molecular Processes & Integration)
Week 7	February 18 & 20	Epigenetics (Genomics and Technology)
Week 8	Feb 25 & 27	Cell & Developmental Biology
Week 9	March 4 & 6	Epigenetics of Cell & Developmental Biology (& Midterm Exam)
Week 10	March 10 – 14	Spring Break
Week 11	March 18 & 20	Environmental Impact on Biology
Week 12	March 25 & 27	Environmental Epigenetics
Week 13	April 1 & 3	Disease Etiology
Week 14	April 8 & 10	Epigenetics & Disease Etiology
Week 15	April 15 & 17	Evolutionary Biology & Genetics
Week 16	April 22 & 24	Epigenetics & Evolutionary Biology
Week 17	Finals Week	Grant Review/ Study Section Meeting (& Final Exam)

Instruction Format –

- One 1.5 hour overview/lecture per week (In person and Panopto Recording)
- One 1.5 hour literature review presentations/discussion session per week (Live in person and Zoom session Thursdays 10:30-Noon)

Course Requirements –

1. Attendance
2. Participation in literature and discussion sessions

Graduate Students:

3. Grant Proposal (12-page limit) due week 16
4. Student Grant Review session week 17

Undergraduate Students:

3. Two take home exams (weeks 9 & 17)

Late Work is discouraged but can be arranged if notified ahead of time for uncontrolled circumstances, such as health issues.

Grading Policy –

- Both in class attendance (10%) and discussion participation (25%) and (graduate students) the proposal (65%) or (undergraduate students) exams (65%) will be factors considered.
- Grading scale A(90%), B(80%), C(70%), D(60%), F(<60%)

References and Textbooks –

- Reading literature and references provided one week prior to session
- No required textbook (suggested reading provided from selected literature and review articles)

Conjoint Course Requirements –

1) Undergraduate –

- 1) Attendance (10%)
- 2) Participation and presentation in literature and discussion session (25%)
- 3) 2 exams (Midterm and Final), tested on lectured material (65%)

2) Graduate –

- 1) Attendance (10%)
- 2) Participation and presentation in literature and discussion session (25%)
- 3) Grant proposal (12-page limit) and Grant review session participation (65%)

3) Same lecture and literature discussion session for both 476 and 576 level students.

4) Same live discussion session for both 476 and 576 level students.

The 476 and 576 students present specific literature (provided by instructor) overviews and leading discussion on that literature with questions provided by instructor to facilitate.

The 476 and 576 students participating in discussion and are provided selected questions regarding the literature reviewed to answer during class and hand back after class.

5) Students may receive credit in only one component of the conjoint listed course.

Catalog Entry –

SBS 476 level Epigenetics and Systems Biology 3 (Spring odd Years). Pre req Biol 301. Current literature based course on epigenetics and systems biology with topics in environmental epigenetics, disease etiology, and role epigenetics in evolutionary biology. Credit not granted for both 476 and 576.

SBS 576 level Epigenetics and Systems Biology 3 (Spring odd Years) Current literature based course on epigenetics and systems biology with topics in environmental epigenetics, disease etiology, and role epigenetics in evolutionary biology. Credit not granted for both 476 and 576.

Graduate Students

Grant Proposal

Outline:

- Title
- Abstract / Hypothesis
- Specific Aims Page
- Background
- Preliminary Results
- Experimental Design and Methods (Approach)
- References (not part 12 pages)

(12 page maximum single-spaced typed limit)

Key Points:

- Specific aims should be focused, concise and investigate hypothesis
- Be as concise and direct as possible
- Work significance of proposal into grant when appropriate
- Use only critical preliminary results (literature derived results fine)

Additional Information:

- Propose short-range studies to address long-range goals
- Write grant for 3 to 4 year period to complete studies
- Feasibility of success is critical, ask right type of question
- Experimental design needs to address hypothesis

Score/Rating:

Factors involved: Type question addressed, organization of thoughts, preliminary results, feasibility, reasonable completion expectations, focus of aims and proposed studies.

Score		
1.0 - 1.5	Outstanding	Funded
1.5 - 2.0	Excellent	Probably Funded
2.0 - 2.5	Good	Accepted, but not Funded
2.5 - 3.0	Satisfactory	
3.0 - 3.5	Adequate	
3.5 - 4.0	Fair	
4.0 - 5.0	Acceptable	

Review:

NIH Study Section style review with all students/fellows participating in the review. Primary and secondary reviewers will be selected and all grants will be critiqued.

Note:

Welcome to use opportunity to prepare grants for student orals or fellowship applications.

SBS Student Learning Outcomes

The School of Biological Sciences has adopted a standardized set of learning outcomes for our courses. We expect each undergraduate student who has a major in Biology or Zoology to have achieved the following outcomes at the time they graduate with a B.S. from our program:

1. Understand and explain major biological concepts.
2. Use critical thinking and scientific skills to analyze and solve problems.
3. Effectively communicate biological problems and solutions to both the scientific community and the public at large in writing and in discussion.
4. Formulate logical hypotheses and test them by designing and running appropriate experiments or observational studies and analyses.
5. Identify the central body of knowledge in biology or zoology (including knowledge from molecular biology, genetics, evolution, ecology and organismal biology.).
6. Use scientific literacy and knowledge of biology or zoology to analyze contemporary social, cultural, and environmental issues and contribute to informed opinion.

Students with Disabilities

Reasonable accommodations are available for students with documented disabilities or chronic medical conditions. If you have a disability and need accommodations to fully participate in this class, please either visit or call the Access Center at Washington Building 217; Phone: 509-335-3417 to schedule an appointment with an Access Advisor. All accommodations MUST be approved through the Access Center. For more information contact a Disability Specialist on your home campus.

Pullman or WSU Online: 509-335-3417 <http://accesscenter.wsu.edu>, Access.Center@wsu.edu

Academic Integrity

Academic integrity is the cornerstone of higher education. As such, all members of the university community share responsibility for maintaining and promoting the principles of integrity in all activities, including academic integrity and honest scholarship. Academic integrity will be strongly enforced in this course. Students who violate WSU's Academic Integrity Policy (identified in Washington Administrative Code (WAC) 504-26-010(3) and -404) will receive academic sanction (e.g., fail the course, fail the assignment, etc.), will not have the option to withdraw from the course pending an appeal, and will be reported to the Office of Student Conduct.

Cheating includes, but is not limited to, plagiarism and unauthorized collaboration as defined in the Standards of Conduct for Students, WAC 504-26-010(3). You need to read and understand all of [the definitions of cheating](#). If you have any questions about what is and is not allowed in this course, you should ask course instructors before proceeding.

If you wish to appeal a faculty member's decision relating to academic integrity, please use the form available at conduct.wsu.edu.

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Campus safety and Emergency Notification

Classroom and campus safety are of paramount importance at Washington State University, and are the shared responsibility of the entire campus population. WSU urges students to follow the "Alert, Assess, Act," protocol for all types of emergencies and the ["Run, Hide, Fight"](#) response for an active shooter incident. Remain ALERT (through direct observation or emergency notification), ASSESS your specific situation, and ACT in the most appropriate way to assure your own safety (and the safety of others if you are able).

Please sign up for emergency alerts on your account at MyWSU. For more information on this subject, campus safety, and related topics, please view the FBI's [Run, Hide, Fight video](#) and visit the [WSU safety portal](#).

COVID-19 Statement: Students are expected to abide by all current COVID-19 related university policies and public health directives, which could include wearing a cloth face covering, physically distancing, self-attestations, and sanitizing common use spaces. All current COVID-19 related university policies and public health directives are located at <https://wsu.edu/covid-19/>. Students who do not comply with these directives may be required to leave the classroom; in egregious or repetitive cases, students may be referred to the Center for Community Standards for university disciplinary action.

Students are responsible for reading and understanding all university-wide policies and resources pertaining to all courses (for instance: accommodations, care resources, policies on discrimination or harassment), which can be found in the [*university syllabus*](#).