

Integrative Biology 473 – Plant Genomics
Spring 2023

Meeting day and time: Monday and Wednesday 3-3:50 pm

Location: 2084 Natural History Building

Coordinator: Steven Burgess email: sjb287@illinois.edu
Office: 283 Morrill Hall

Note: this is a provisional syllabus and may be subject to change

Learning Objectives

- Design a plasmid for plant transformation using modular cloning
- Explain methods of plant transformation
- Analyze data from a genotyping experiment
- Design and analyze an experiment to delete a plant gene using CRISPR/Cas9
- Design and analyze a qPCR experiment using best practices
- Design and analyze an immunoblot experiment using best practice

Pre-requisites

- IB201 or equivalent introductory molecular biology course

Required Course Texts

- None

Course Grade Breakdown

Assessment Type	Percent
Assignments (5 non-cumulative)	60%
Presentation	20%
Attendance	20%

Letter grades and cutoffs: The grading scale is roughly set at 100-90% (A+/A/A-), 89-80 (Bs), and so forth. Grades for each assignment are satisfactory based on completion / or unsatisfactory in the case of failure to turn in work.

Assessment Due Dates

The course is tutorial based and assignments are designed to be largely completed within class time, with additional time post-lecture available when necessary. The two presentations will be done within class time and graded by pass/fail based on completion of peer-evaluation forms.

Assessment	Topics	Due Date	Points
Assignment 1	Using Biomart	3/27/2023 2:59:00 PM	12
Assignment 2	Phylogenetic analysis	4/03/2023 2:59:00 PM	12
Assignment 3	Chromatin accessibility analysis	4/03/2023 2:59:00 PM	12
Assignment 4	CRISPR analysis	4/10/2023 2:59:00 PM	12
Assignment 5	Network analysis	4/24/2023 2:59:00 PM	12
Assignment 6	Summary analysis	5/06/2023 2:59:00 PM	12
Presentation 1	Feedback form	4/17/2023 2:59:00 PM	20

Course expectations

- Each student is expected to attend all classes in person.
- Assignments will be designed to be completed during class time, but students will have until before the following lecture to submit if additional time is required. Failure to submit will result in a 'U' for a given assignment
- Each student will give two group presentations during the semester

Materials

Students will need to bring a laptop to class as the course involves completion of online activities. Pen and paper are also necessary for group work.

Course Policies

Communication: Announcements will be made via Canvas page. General questions regarding course materials should be posted to the Q&A forum on canvas, and any questions specific to an individual's situation should be directed to the instructor at sjb287@illinois.edu. Office hours can be scheduled by appointment.

Course Materials and Assignments: The course schedule and materials will be posted on the IB472 canvas site, and course assignments should be submitted via canvas.

Attendance: Your regular attendance and engagement with course materials are vital to your success in IB473 and **non-attendance may affect financial aid**. Student attendance is defined as active participation in the course as described in the course syllabus. This course will have multiple mechanisms for student participation, which can be documented by any of the following methods:

- Submission/completion of assignments and/or quizzes
- Communication with the instructor
- Or other course participation

In the case of an anticipated absence, such as military deployment, the student should contact the instructor in advance and make arrangements to complete the required assignments. In the case of an emergency (illness/accident or death in family), a student should contact the instructor as soon as possible providing documentation supporting the need for any late submission of a graded event. If a student misses many major assignments, then they may have to withdraw from the class. If you have any questions regarding these policies, please see the lecture coordinator. If you foresee having any long-term problems, please contact us immediately to make arrangements at the beginning of the semester; such accommodations cannot be made after the fact.

COVID-19 and Monkeypox Virus (MPV): We will follow the University guidelines related to the ongoing COVID-19 pandemic and the spread of MPV (<https://covid19.illinois.edu/>). We plan to be as flexible as possible with regards to COVID-19 and MPV and we hope you will extend the same grace to the instructors of all of your classes as we continue to navigate these challenges.

Accommodations: If you require special accommodations, please tell faculty or the lecture coordinator within the first two weeks of class. All accommodations will follow the procedures as stated in Article 1-110 of the Student Code (<http://studentcode.illinois.edu>). To obtain disability-related academic adjustments and/or auxiliary aids, students with disabilities must contact the course instructor and the Disability Resources and Educational Services (DRES) as soon as possible. To contact DRES, you may visit 1207 S. Oak St., Champaign, call 217-333-4603, e-mail: disability@illinois.edu or go to the DRES website. If you are concerned you have a disability-related condition that is impacting your academic progress, there are academic screening appointments available on campus that can help diagnosis a previously undiagnosed disability by visiting the DRES website and selecting "Sign-Up for an Academic Screening" at the bottom of that page.

Emergency response recommendations can be found at the following website: <http://police.illinois.edu/emergency-preparedness/>.

Family Educational Rights and Privacy Act (FERPA) Statement: Any student who has suppressed their directory information pursuant to Family Educational Rights and Privacy Act (FERPA) should self-identify to the instructor to ensure protection of the privacy of their attendance in this course. See <https://registrar.illinois.edu/academic-records/ferpa/> for more information on FERPA.

Sexual Misconduct Policy and Reporting Statement: The University of Illinois is committed to combating sexual misconduct. Faculty and staff members are required to report any instances of sexual misconduct to the University's Title IX and Disability Office. In turn, an individual with the Title IX and Disability Office will provide information about rights and options, including accommodations, support services, the campus disciplinary process, and law enforcement options. A list of the designated University employees who, as counselors, confidential advisors, and medical professionals, do not have this reporting responsibility and can maintain confidentiality, can be found here:

<https://wecare.illinois.edu/resources/students/#confidential>. Other information about resources and reporting is available here: <https://wecare.illinois.edu>.

Inclusivity Statement: The effectiveness of this course is dependent upon the creation of an encouraging and safe classroom environment. Exclusionary, offensive or harmful speech (such as racism, sexism, homophobia, transphobia, etc.) will not be tolerated and in some cases subject to University harassment procedures. We are all responsible for creating a positive and safe environment that allows all students equal respect and comfort. We expect each of you to help establish and maintain an environment where you and your peers can contribute without fear of ridicule or intolerant or offensive language.

General netiquette: In any social interaction, certain rules of etiquette are expected and contribute to more enjoyable and productive communication. The following are tips for interacting online via e-mail or discussion board messages, adapted from guidelines originally compiled by ChuqVon Rospachand Gene Spafford (1995):

- Remember that the person receiving your message is someone like you, deserving and appreciating courtesy and respect.
- Avoid typing whole sentences or phrases in Caps Lock.
- Be brief; succinct, thoughtful messages have the greatest effect.
- Your messages reflect on you personally; take time to make sure that you are proud of their form and content.
- Use descriptive subject headings in your e-mails.
- Think about your audience and the relevance of your messages.
- Be careful when you use humor and sarcasm; absent the voice inflections and body language that aid face-to-face communication, Internet messages are easy to misinterpret.
- When making follow-up comments, summarize the parts of the message to which you are responding.
- Avoid repeating what has already been said; needless repetition is ineffective communication.
- Cite appropriate references whenever using someone else's ideas, thoughts, or words.

Provisional Schedule

Week	Month	Day	Topic
1	Mar	20	Introduction to Plant Genomics: logistics and overview
	Mar	22	Genes, genomes and sequence comparisons, using Biomart
2	Mar	27	Sequence evolution and analysis software
	Mar	29	Activity: Phylogenetic analysis using MEGA
3	Apr	3	RNA-SEQ technologies
	Apr	5	Activity: Data analysis using Galaxy workbench
4	Apr	10	Transcription factor analysis ChIP-SEQ
	Apr	12	Group activity: Analysis of genomic data
5	Apr	17	Chromatin accessibility analysis- ATAC-SEQ
	Apr	19	Activity: Using a genome browser to view chromatin accessibility data
6	Apr	24	Introduction to biological network analysis
	Apr	26	Activity: Network Analysis using Cytoscape
7	May	1	Summary activity