I. Course Description
This lab course will allow you to apply the content knowledge you learn in the Molecular, Cellular and Developmental Biology lecture-style course to the scientific process. You will continue to 1) practice the process of science, 2) collaborate with others, and 3) communicate scientifically as you did in BIOL 1615 and 1625. You will be trained in common techniques used in the broad field of molecular, cellular and developmental biology.

II. Instructor Information: Justin A. Jones

Contact information:
justin.a.jones@usu.edu
435-797-9292
Drop-in office hours: Tuesday 9:00-10:00, Thursday 3:15-4:15
Zoom conference by appointment.

Graduate Teaching Assistants (GTAs):

III. Required Lab Materials
- **Course fee:** Your $110 fee is used for consumables ($40), equipment ($20) and GTA support ($50).
- **Canvas:** Use our course Canvas site to receive announcements, download free lab manual documents, take quizzes, and submit group assignments.
- **Safety equipment:** You will agree to abiding by lab safety requirements on Canvas at the beginning of the course, and any violation will result in disciplinary action. Wear long pants/skirt and covered shoes every week. If you are not wearing the proper attire, you will be sent home with an unexcused absence. No food or drink is allowed outside of your bag while in the classroom. You will have an assigned locker for use during class time. We provide PPE (disposable gloves, lab coats, goggles) for use when necessary. If you bring your own lab coat and goggles, store them in a sealed container in your bag when not in use and clean them frequently at home.
- **Printing:** Bring hard copies of lab documents to class. Store them in a binder for reference throughout the semester. For a list of printers on campus, see: [http://campusprint.usu.edu/](http://campusprint.usu.edu/)
- **Laptop:** You will put away electronic devices during the TA’s brief presentation, and when we are working with chemicals and equipment. Reminder: do not touch laptops with gloved hands.
IV. Course Objectives.

<table>
<thead>
<tr>
<th>Biology Department learning outcomes</th>
<th>IDEA Center learning objectives</th>
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| 1. Practice the process of science (including using quantitative reasoning). | • Develop specific skills, competencies, and points of view needed by professionals in the field most closely related to this course  
• Learn appropriate methods for collecting, analyzing, and interpreting numerical information  
• Learn to apply course material to improve thinking, problem solving, and decisions |
| 2. Collaborate with others and work as a team. | • Acquire skills in working with others as a member of a team. (Limited due to Covid) |
| 3. Communicate interpretations to scientists and the general public. | • Develop skill in expressing oneself orally or in writing  
• Learn how to find, evaluate, and use resources to explore a topic in depth |
| 4. Learn common techniques in Molecular, Cellular and Developmental Biology | • Develop skills in performing techniques, accurately describing techniques and in interpreting data collected using these techniques. |

V. Meeting Course Objectives: Assignments & Assessment

Meeting Course Objectives: Assignments & Assessment

- **Online pre-lab quizzes (15% of grade).** You will read the prelab’s, and watch any recommended videos and visit certain informational websites. A short quiz covering this material will be administered in the first 10 minutes of each class period. The quiz will become available at the beginning of the laboratory period. The quizzes are timed, and you are allowed only one attempt. We will go over the correct answers together at the beginning of class.

- **Rough Drafts (10% of grade).** You will submit rough drafts of the relevant sections of a laboratory report prior to submission of the final document. These sections (Introduction, Materials and Methods, Results, Discussion, Conclusions, and an Abstract) will be due prior to the start time of the assigned date on the laboratory schedule. Failure to submit will result in a 0. You are encouraged to use the USU Science Writing Center as a resource for this assignment ([https://www.usu.edu/science/swc](https://www.usu.edu/science/swc)).

- **Research Proposal (20% of grade).** You will write a 2-page research proposal according to instructions provided in lecture. Your proposal will cover the scope of experiments for the class and explain how you will achieve the goals of your proposal in limited detail. You are encouraged to use the USU Science Writing Center as a resource for this assignment ([https://www.usu.edu/science/swc](https://www.usu.edu/science/swc)). Your instructor will grade this assignment with a published grading rubric used commonly in the College of Science.

- **Group Presentation (20% of grade).** You and your partner will prepare and then deliver a presentation on your projects. The presentation should be 10 minutes in length and cover the elements of your lab report. You will receive a 0 if you have an unexcused absence the day of your presentation.

- **Individual lab report (35% of grade).** You will write a lab report, in the format of a scientific manuscript, regarding your project. A lab report is typically 8 pages of single
space text that includes all laboratory report elements (including abstract). You will receive details in class and on Canvas. You are encouraged to use the USU Science Writing Center as a resource for this assignment (https://www.usu.edu/science/swc). Your instructor will grade this assignment with a published grading rubric used commonly in the College of Science.

**Grading Policy.** Your grade will be reflected by your performance on these four major assignments. Final course grades are based on the following scale and will not be rounded up to the nearest whole number: A (93 to 100%), A- (90 to <93%), B+ (87 to <90%), B (83 to <87%), B- (80 to <83%), C+ (77 to <80%), C (73 to <77%), C- (70 to <73%), D+ (67 to <70%), D (60 to <67%), and F (0% to <60%).

**VI. Tentative Lab Project Schedule**

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<thead>
<tr>
<th>Week</th>
<th>Lab project</th>
<th>Due Dates: TBD</th>
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<tbody>
<tr>
<td>Jan 27</td>
<td>Course introduction: Safety, Syllabus, and Intro</td>
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<tr>
<td>Feb 3</td>
<td>Context for the course and micropipettes</td>
<td>PreLab #1 Rough Draft Research Proposal Due</td>
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<tr>
<td>Feb 10</td>
<td>Cloning: Restriction Enzyme digestion and Agarose Electrophoresis</td>
<td>PreLab #2 Research Proposal Due</td>
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<td>Feb 17</td>
<td>No Class</td>
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<td>Feb 24</td>
<td>DNA purification and Quantification</td>
<td>PreLab #3 Introduction Outline Due</td>
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<tr>
<td>Mar 3</td>
<td>Ligation and Transformation (electrocompetent)</td>
<td>PreLab #4 Introduction Rough Draft Due</td>
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<tr>
<td>Mar 10</td>
<td>Plasmid Isolation/Purification Endonuclease confirmation of cloning</td>
<td>PreLab #5</td>
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<tr>
<td>Mar 17</td>
<td>Agarose Electrophoresis and BL21DE3 transformation</td>
<td>PreLab #6 Research Plan/Methods Rough Draft Due</td>
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<tr>
<td>Mar 24</td>
<td>Protein Expression</td>
<td>PreLab #7</td>
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<tr>
<td>Mar 31</td>
<td>Cell lysis and separation of soluble/insoluble fractions</td>
<td>PreLab #8</td>
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<td>Apr 7</td>
<td>SDS-PAGE</td>
<td>PreLab #9 Results Rough Draft Due</td>
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<tr>
<td>Apr 14</td>
<td>Western blot</td>
<td>PreLab #10 Discussion and</td>
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VII. Attendance Policy (adapted from the USU Course Catalog):
The university views class attendance as an individual student responsibility. You may not attend a lab other than the one for which you are registered. Your TA will not provide you an opportunity to make up work missed because of an unexcused absence.

Unexcused absences include: being sent home due to coming to lab without the proper attire (in which case you will be sent home); coming to lab more than five minutes late (in which case you will be sent home); family vacation; work.

The following are considered excused absences if properly documented: absences demanded by university-sponsored or sanctioned activities; mandatory participation as a student-athlete in NCAA-sanctioned competition; injury, illness or medical condition/status that is too severe or contagious for the student to attend class; major injury, illness, medical condition/status, or death in a student's immediate family; required participation in military duties; mandatory admissions interviews for professional or graduate school; participation in legal proceedings that require the student's presence.

In the case of an excused absence, you must provide your TA with written evidence substantiating the reason for the absence (for example, a medical confirmation note that contains the date and time of the visit and the medical professional's confirmation) prior to the date of absence if feasible. In cases where advance notification is not feasible (e.g., accident or emergency), the student must provide written documentation by the end of the second working day after the absence. If the absence is excused and properly documented, you must meet with your TA outside of class to discuss what you missed and your make-up work assignment. Any make-up work must be completed within 14 calendar days of the last day of the absence. Your TA will deny any excused absence make-up work requests that exceeds 20% of class sessions (more than two class sessions).

VIII. Academic Freedom and Professional Responsibilities:
The university is a community dedicated, through promulgation of thought, truth, and understanding, to teaching, research, and service. It must therefore, be a place where innovative ideas, original experiments, creative activities, and independence of thought are not merely tolerated but actively encouraged. Thought and understanding flourish only in a climate of academic freedom and integrity, expressed collectively by colleges and departments as well as individually through research and teaching and as they exist within the wider context of advanced study as commonly understood by all universities. The community also values diversity and respect, without which there can be no collegiality among faculty and students. In addition, the university community values individual rights and freedoms, including the right of
each community member to adhere to individual systems of conscience, religion, and ethics. Finally, the university recognizes that with all rights come responsibilities. USU Policy 403 further defines academic freedom and professional responsibilities.

IX. University Regulations Regarding Student Conduct:
The University respects the rights of faculty to teach and students to learn. Maintenance of these rights requires classroom conditions that do not impede the learning process. Disruptive classroom behavior will not be tolerated. An individual engaging in such behavior may be subject to disciplinary action. “Disruptive classroom behavior” involves physical actions, verbal utterance, or other activities which interfere with either the faculty member’s ability to conduct the class or the ability of other students to profit from the instructional program. For more information: http://studentconduct.usu.edu/studentcode/article5

IX. Final Examination: No-Test Days Policy:
For classes that meet for a full semester, a five-day period designated as "no-test" days precedes final examinations. During this time, no major examinations, including final examinations will be given in order that students may concentrate on classwork, the completion of special assignments, writing projects, and other preparation for duly scheduled final examinations. Approved exceptions include final papers, weekly chapter quizzes, quizzes, projects, and examinations associated with a lab that does not meet during final examinations.

X. Academic Appeals:
When a student feels that he/she has been treated unfairly by a specific professor or existing rules or regulations, there is a sequential process which should be followed in handling the situation. Problems in this area include disagreements regarding a course grade, intervening circumstances which prevented the student from following an assigned procedure, etc. When a student experiences such difficulties, he/she should first go to their TA within two weeks of receiving the posted grade in Canvas. It may be possible to resolve the problem at this level. Should no agreement be reached, the student may then take the situation to Lauren Lucas, the lab coordinator. Should no agreement be reached, the student may then take the situation to the department head. If no resolution is reached at that level, the student may take the problem to the dean of the college. If there is still no resolution, the matter will be forwarded to an appeals committee. As a final recourse, the student may take the problem to the Provost’s Office, where a final decision will be made.

XI. The Honor System and Plagiarism:
The University expects that students and faculty alike maintain the highest standards of academic honesty. The Code of Policies and Procedures for Students at Utah State University (Student Conduct) addresses academic integrity and honesty and notes the following:

**Academic Integrity**: Students have a responsibility to promote academic integrity at the University by not participating in or facilitating others' participation in any act of academic dishonesty and by reporting all violations or suspected violations of the Academic Integrity Standard to their instructors.

**The Honor Pledge**: To enhance the learning environment at Utah State University and to develop student academic integrity, each student agrees to the following Honor Pledge: "I pledge, on my honor, to conduct myself with the foremost level of academic integrity".
Violations of the Academic Integrity Standard (academic violations) include, but are not limited to cheating, falsification, and plagiarism. Plagiarism includes knowingly "representing by paraphrase or direct quotation, the published or unpublished work of another person as one's own in any academic exercise or activity without full and clear acknowledgment. It also includes the unacknowledged use of materials prepared by another person or agency engaged in the selling of term papers or other academic materials." The penalties for plagiarism are severe. They include warning or reprimand, grade adjustment, probation, suspension, expulsion, withholding of transcripts, denial or revocation of degrees, and referral to psychological counseling.

XII. Students with Disabilities:
USU welcomes students with disabilities. If you have, or suspect you may have, a physical, mental health, or learning disability that may require accommodations in this course, please contact the Disability Resource Center (DRC) as early in the semester as possible (University Inn # 101, 435-797-2444, drc@usu.edu). All disability related accommodations must be approved by the DRC. Once approved, the DRC will coordinate with faculty to provide accommodations.

XIII. Service Animals in Biology Labs:
Utah State University is committed to providing access for service dog handlers. Due to the unique nature of the laboratory environment service animal handlers must meet with the Disability Resource Center prior to bringing a service dog into the lab. The purpose of this meeting is not to prevent you from having your service animal with you but rather to understand how to best accommodate your needs and the needs of your animal. Please contact the Disability Resource Center at 435-797-2444 or drc@usu.edu to set up an appointment. Note that it is USU policy that other animals, including emotional support animals, are not permitted in USU buildings or facilities without the express permission of the organization responsible for that particular building.

XIV. Mental Health:
Mental health is critically important for the success of USU students. As a student, you may experience a range of issues that can cause barriers to learning, such as strained relationships, increased anxiety, alcohol/drug problems, feeling down, difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may lead to diminished academic performance or reduce your ability to participate in daily activities. Utah State University provides free services for students to assist them with addressing these and other concerns. You can learn more about the broad range of confidential mental health services available on campus at Counseling and Psychological Services (CAPS).