MIMG 109BL – SPRING 2019 SYLLABUS
ADVANCED RESEARCH ANALYSIS IN MICROBIOLOGY

INSTRUCTOR
Dr. Amanda Freise
afreise@ucla.edu
Please address all emails with “109BL-S19” and your lab section in email subject.

Office Location: 3801A Molecular Sciences Building
(Exit the lab classroom, turn left, walk into next building. First door on the right.)
Office Hours by appointment: https://doodle.com/AmandaFreise

TEACHING ASSISTANT
Chris Dao
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CLASS TIME AND LOCATION
TR 2:00 PM – 4:50 PM, 3336 Young Hall computer lab

COURSE DESCRIPTION: In 109BL, you will use bioinformatics and/or mathematical modeling software to interpret, expand, or refine datasets generated in MIMG 109AL. You will generate 16S phylogenetic trees to assign identities to their isolates and use statistical tools to make comparisons of the microbial communities from different environments. The final deliverables are 16S sequences ready for publication to Genbank, with the you and your team as submission authors. You will learn to use graphics software to prepare figures and illustrations for presentations, posters, reports, and websites (database entries). Primary literature will be discussed in Journal Club-style meetings in which you will create PowerPoint slides and formally present results to the class. Production of a research seminar presentation, team poster, and final report describing the entire research project are required to complete the two-course series.

MIMG 109BL is limited to MIMG and MCDB majors. Enforced requisite is course 109AL.

RESEARCH OBJECTIVES:
(1) Discover new microbes, novel DNA sequences, and previously unknown phenotypes
(2) Identify bacteria using standard molecular, microbiological, and bioinformatics techniques
(3) Generate phylogenetic trees from nucleotide sequence data
(4) Use bacterial community profiles (metagenomics) for comparative analysis of different environments
(5) Publish 16S sequence data in Genbank

STUDENT LEARNING OUTCOMES
(1) Demonstrate knowledge of key disciplinary concepts & their relationship to biological systems.
(2) Demonstrate knowledge of research project.
(3) Develop technical expertise/confidence through hands-on experience.
(4) Develop problem-solving skills associated with conducting experiments.
(5) Address scientific questions using quantitative, computational, and inquiry-related skills.
(6) Improve presentation skills (oral communication needed for seminar & poster presentations)
(7) Improve scientific writing abilities (written communication needed for research papers).
(8) Effectively work in both individual and collaborative contexts.
(9) Value research and its relevance to own life and society.
(10) Understand the process of scientific research.
COURSE MATERIALS


2. Valid email account (the one on file with the Registrar’s office) and internet access to course management website, online instructional materials, and instructor/TA/student correspondence.

3. Student teams will be responsible for the cost of printing their poster for the Poster Symposium. The instructor will schedule printing appointments with the LSSA Illustration Office for the posters. Each poster will cost $68, and must be paid by cash or check at the time of pickup. Please plan ahead.

INCLUSIVITY
Diversity among students, faculty, and staff is part of what makes UCLA an incredible institution, and should be celebrated. I believe that every student has the right to feel comfortable and safe on campus and in the classroom. To this end, I strive to make the MIMG103 class a welcoming environment for all, and expect students, staff, and instructors to treat each other with dignity and respect. Statements or actions that disparage a person or group’s ethnicity, religion, sexual orientation, gender, gender identity, age, disability, or socioeconomic status will not be tolerated. If you have any concerns or suggestions, please contact me and I will be happy to meet with you.

COMMUNICATION AND PROVIDING FEEDBACK
I encourage your feedback at any time throughout the quarter about things that are helping you learn, or things that aren’t helping. Please let communicate with me or with your TA if there are ways that we can improve the course to better support student learning.

PERSONAL AND TEAM PROBLEMS
I understand that sometimes life makes it difficult to focus on schoolwork. If you are having a personal problem that affects your participation in this course, please talk to me to create a plan. There are many resources on campus that may be able to help and I am more than happy to assist you, even if it is just to offer a listening ear. Please do not wait until the end of the quarter to share any challenges that have negatively impacted your engagement and academic performance. The sooner we meet, the more options we will have available to us to support your overall academic success. If you are not comfortable speaking with me directly, please utilize the other student resources provided on CCLE in order to understand how to best achieve success in this course given your personal needs.

GRADES
As this course is intended to be highly collaborative, your grade is therefore not based on how you did in comparison to your peers (not curved), but instead how successful you and your team are at evidencing that you have mastered the intended learning goals for that specific assessment. Rubrics and/or specific assignment expectations will be provided for each assignment. Final grades are assigned on a straight scale,
without limits on the proportion of each grade. Note that there will be no grade inflation – A’s and B’s must be earned, but it is possible for every student to potentially earn an A if they meet all of the learning outcomes.

Collaborative Work: You will maintain your Project Teams established in MIMG 109AL and are expected to continue working together during the course both inside and outside the classroom (the latter according to your own arranged schedules). The score for the “collaborative points” that each student receives for an assignment will be the same score for his/her entire team. The individual progress reports will provide an opportunity for you to reflect on the collaborative effort of the team. It is at the sole discretion of the instructor to adjust collaborative scores if all members of the team are not contributing equally to the research project and assignments.

### POINTS

<table>
<thead>
<tr>
<th>Assignment</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fulfillment of lab research hours</td>
<td></td>
</tr>
<tr>
<td>mandatory</td>
<td></td>
</tr>
<tr>
<td>Lab Citizenry and Individual Progress Reports</td>
<td>120</td>
</tr>
<tr>
<td>Class Discussion and Misc. Participation</td>
<td>75</td>
</tr>
<tr>
<td>Reflection Questions</td>
<td>50</td>
</tr>
<tr>
<td>Laboratory Notebook and Data Files</td>
<td>150</td>
</tr>
<tr>
<td>Reading Assessments</td>
<td>40</td>
</tr>
<tr>
<td>Journal Club Presentation</td>
<td>150</td>
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<tr>
<td>Peer Evaluation of Presentations (5pts each)</td>
<td>60</td>
</tr>
<tr>
<td>Team Writing Assignments (20 pts each)</td>
<td>120</td>
</tr>
<tr>
<td>Peer Review of Team Writing Assignments (10 pts each)</td>
<td>60</td>
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<tr>
<td>Review of Reviewers (1 per team)</td>
<td>20</td>
</tr>
<tr>
<td>Team Research Seminar Talk</td>
<td>125</td>
</tr>
<tr>
<td>Team Research Poster</td>
<td>170</td>
</tr>
<tr>
<td>Team Research Manuscript</td>
<td>200</td>
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<tr>
<td>Extra Credit</td>
<td></td>
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<td><strong>Course Total</strong></td>
<td>1340</td>
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**EXPLANATION OF ASSIGNMENTS:**

**Most assignments will be submitted electronically on CCLE.**

**Fulfillment of Laboratory Research Hours (0 pts)**

Attendance at each lab period is required. The instructor must be notified ahead of time for anticipated lab absences or late arrivals to lab. One absence is permitted per quarter; additional unexcused absences may result in a penalty of up to 100 points for each absence. If additional labs are missed, it will be at my discretion as the instructor, in each individual case, as to whether a student will be allowed to prorate points for the missed lab, or merely lose those points.

**Laboratory Citizenry and Progress Reports (120 pts)**

Up to 100 points will be awarded for laboratory citizenry. The expectations for working in a computer laboratory are not any different than those expected for working at the bench in a wet laboratory. The instructor will evaluate your overall performance in the class based on a number of criteria including
preparation for class, demonstrated mastery of computational techniques, organization, adherence to computer lab policies (e.g., no food/drinks in the classroom, keep workstation areas clean), professional behavior during laboratory (which includes being respectful of instructors and fellow students), and collaborative efforts between Project Team members. Points will be deducted for poor conduct at the discretion of the instructor for any of the following: breaking or abusing computer equipment, not keeping workstation area clean, consistently arriving to or leaving class late, unexcused absences, unwillingness to work with Project Team members on a consistent basis, etc.

**Individual Progress Reports (20 pts; 10pts each)**

In order to gauge individual contributions to team projects, you will be required to submit individual progress reports during Week 5 and Week 10. These progress reports should outline the status of your team’s analysis so far, and detail the individual contributions each student made to the work. In addition, you should reflect on your specific contributions to the Team Writing Assignments and Peer Reviews. These reports will be used in part to help determine Laboratory Citizenry scores.

**Class Discussion Participation (50 pts)**

Participation continues to be an important aspect of this class. There will be a few lectures in the first couple of weeks based on the reading assignments, which should help you understand how to analyze your results using various bioinformatics and computational software. The majority of participation points can be earned by participating in Journal Club and Team Presentation discussions. The opportunity to participate is what you make of it – you can EARN up to **50 points** by asking questions during Journal Club and Research Presentation Q/A sessions. **All students start at zero and must EARN these points during the discussions.**

**Miscellaneous Participation (25 pts)**

Throughout the quarter, there will be opportunities to gain participation points that are not included in class participation, including the concept inventory and research surveys.

**Reflection Questions (50 pts)**

Each week, you will have a set of Reflection Questions to answer and submit. These questions will ask you to think about both the technical aspects of their project, and the bigger picture of the project. Reflection questions should be submitted to CCLE by the end of the day of the second lab period of the week (i.e. Thursday for a Tuesday/Thursday section). Each set of questions is to be answered individually and is worth 5 points. Your responses will be used together with the post-quarter survey data for assessment of the curriculum.

**Laboratory Notebook and Data Files (150 pts)**

Since much of the research will be conducted on the computer this quarter, you should maintain your electronic notebook as well as your Team Box folder. Your notebook must be **updated daily** with written entries (data, observations, other research notes). Your notebook will be checked by your TA periodically throughout the quarter, so keep it organized and up to date!

**MIMG109BL Lab Server Folder and Team Box Folder.** The Lab Server folder is a temporary local storage space on the YHS 3336 desktops and will include:

1. Software files used during the analysis of your team’s data.
2. Any other information specified by the instructor during the quarter.
Teams must back up all work by the end of each class period in their respective Box folders. You do not need to upload every single file used in your analysis to Box (there will be a lot of them!), but do upload final versions of files/analyses at the end of every class period.

**Reading Assessments (40 pts total):**

Homework assignments based on the reading for lecture will be given during the quarter. Assignments must be submitted to CCLE at least one hour before the lecture period. Reading Assessments can be downloaded from the CCLE course page as Word documents. Student responses should be typed into the document and saved with the appropriate file name as a PDF (see below), then uploaded to the appropriate assignment in CCLE.

**Journal Club Presentations (150 pts total)**

The first oral presentation you will give this quarter is a journal club style presentation on a research paper pertaining to microbial ecology, phylogeny, metagenomics, bioenergy, antibiotic-resistance, or other relevant topics. These presentations will be given by students starting week 3. Each presentation should be approximately 20 minutes long with 5 minutes for questions from the class/instructor. Detailed instructions will be provided.

**CREATES Preparation Steps (50 pts):** At least two weeks before giving the presentation, select 3 possible journal articles, read the abstracts, and review the figures. Send them to me with a 1-2 sentence summary, describing what the paper is about, why it interested you, and how it is relevant to the class. Together, you and I will select one paper for the journal club presentation. After you have chosen an appropriate article, critically read your article using the CREATE approach, then you may begin preparing your presentation (outline your talk, make PowerPoint slides).

At least 7 days before giving the presentation, set up a second meeting with me (JC2) to review these materials and make improvements. Use the Journal Club Presentation Guidelines as an outline for your slides.

Give multiple practice talks to members of your team or other students in the class, asking for feedback/constructive criticism. This likely will lead to further revisions of your slides (e.g., tweaking slide order, detecting obvious transition gaps, or identifying format problems). Remember, the more prepared the student, the better the presentation!

**Evaluation of Oral Presentation and Slides (100 pts):** During the presentation, I will evaluate your oral presentation and slide construction based on a number of criteria using the evaluation form provided on CCLE.

OPTIONAL: You may schedule a meeting with me after your presentation to obtain additional feedback about your performance or clarification of written comments.

**Peer Evaluation of Presentations (Journal Club – 50 pts, Research Talks – 35 pts)**

Presenting ideas and results in an oral format, whether it be a journal club or research talk or poster presentation, to an audience of peers is a valuable skill in research laboratory environments. Information should be shared in a concise but accurate and thorough manner. You will fill out a questionnaire, evaluating the intellectual and cosmetic quality of the presentation as well as the presenters’ knowledge of the material. Forms will be collected by the instructor to monitor participation. The forms will also be
submitted to the presenter(s) with anonymous feedback and constructive criticism from students. Due to the nature of the presentations and peer evaluations, no makeups will be available.

**Team Writing Assignments (120 pts total – 20 collaborative pts each)**

Teams will write the final Research Manuscript in sections. Each week a specific section will be drafted by the team and submitted to CCLE. Each section will be assigned to another team, who will use a rubric to evaluate the quality of the product and provide comments. Teams then will have the opportunity to revise and receive instructor feedback prior to incorporating suggestions into the final version of the Research Manuscript. Team Writing Assignments must be posted to CCLE by the time designated by the instructor. Any assignment received after that time on the due date will earn a maximum of 75% credit. A maximum of only 50% credit will be earned for assignments that are one day late. No credit will be earned for assignments that are more than one day late. NO exceptions! Unforeseen problems sometimes do occur, so PLAN AHEAD and complete the assignments early.

**Peer Review of Team Writing Assignments (60 pts)**

Throughout the quarter you will participate in the peer evaluation process, offering feedback on the Team Writing Assignments. This information will assist teams during the revision process, enabling the research manuscript to evolve from draft to final, publication-ready form. You will be given a set of guidelines or rubrics, which they will use to evaluate the written work. Each team will review one Team Writing Assignment in a given week and write a detailed evaluation for this assignment (at least ½ page).

**Review of Reviewers (20 pts)**

The quality of feedback provided to other teams during the peer review process will be assessed by your instructors and by other teams. Points will be given for direct, thoughtful feedback from which other teams benefit. Each assignment has a set of guidelines, which will be use to evaluate the Team Writing Assignments. The team will later assess how useful your review was to their manuscript revision process. The reviews will be ranked 1-6 (1 = most helpful to 6 = least helpful) and a score assigned based on the quality of feedback provided over the duration of the quarter.

**Team Research Seminar Talks (125 pts)**

Towards the end of the quarter, each team will give a seminar-style presentation in which you will discuss the research goals of the project, methodological strategies taken to accomplish the goals, results obtained, and conclusions drawn based on experimental evidence. Each presentation should be approximately 25 minutes long with 5-10 minutes for questions from the class/instructor. The score for the “collaborative points” that each student receives will be the same provided all team members contribute equally; otherwise, individuals will receive the average score for his/her entire team.

**Preparation Steps (25 pts):** At least one week before giving the presentation, the team should set up a meeting with your instructor to discuss your project and develop and outline for your talk. After this meeting, begin preparing your presentation (make PowerPoint slides). At least 2-3 days before giving the presentation, set up a second meeting with your instructor to review these materials and make improvements. Bring a hard copy of your CREATE materials and any slides you have prepared. This meeting is a good time for your instructor to prime teams for potential questions they may be asked during their presentations. Continue preparing slides for your presentation incorporating suggestions from your instructor. Give multiple practice talks to other students in the class, asking for
feedback/constructive criticism. This likely will lead to further revisions of your slides (e.g., tweaking slide order, detecting obvious transition gaps, or identifying format problems).

**Evaluation of Oral Presentation and Slides (100 pts):** During the presentation, I will evaluate your oral presentation and slide construction based on a number of criteria using the evaluation form provided on CCLE.

OPTIONAL: You may schedule a meeting with me after your presentation to obtain additional feedback about your performance or clarification of written comments.

**Team Research Poster (170 pts)**
Each team is required to prepare and present a poster describing their research findings at the MCDB/MIMG Undergraduate Poster Symposium on **Friday of Week 10 from 2:00 – 4:00 PM**. Posters will be printed in week 9. The cost of printing one poster per team must be paid for by the team members, and costs $68 when printed by the UCLA Life Sciences South Administration (LSSA) Illustration Office. Your instructor will make the printing appointments, as long as abstracts and poster files are submitted by the deadline provided. Evaluation criteria will be provided later in the quarter. UCLA faculty and other undergraduates in the curriculum or major will be invited to attend the poster sessions.

**Evaluation of Content/Format (70 pts):** Teams may earn up to **50 pts** for the creation of the final poster. Two drafts will be due throughout the quarter (**20 pts**). Detailed guidelines for constructing a poster will be provided on the class site.

**Evaluation of Oral Presentation (Final Exam 50 pts):** Your team will schedule 60 minutes during week 10 to present their poster for a limited audience (Your instructor plus other faculty, TAs, and ULAs). Teams should be prepared to give a 20-minute presentation followed by 10 minutes of Q&A with evaluators. Then teams will be asked to give a 5-minute (timed) version of their poster presentation in anticipation of the ‘short version’ requested at the poster symposium.

**Participation in Poster Symposium:** The final **50 pts** for this assignment will be earned for the professional presentation of the team’s research project (**30 pts**) and peer review of two other team posters (**20 pts**) at the MCD/MIMG Undergraduate Poster Symposium on **Friday of Week 10 from 2:00 – 4:00 PM.** Please make sure you have NO SCHEDULE CONFLICTS with this day/time as it cannot be rearranged for individual students.

**Team Research Manuscript (200 pts)**
The final Team Research Manuscript will summarize the work you and your Project Team members have performed and completed for both the cultivation-dependent and cultivation-independent aspects of the research project. Detailed guidelines for this paper will be provided on the CCLE site. Team Research Manuscripts should contain a paper summary (abstract), an introduction with background information about the project and clear project objectives/hypothesis, an experimental procedures section, results and discussion sections, as well as a bibliography with all references cited in the report. **DUE Tuesday, of Finals Week by 6:00 PM.** Any assignment received after that time on the due date will receive a maximum of 75% credit. A maximum of only 50% credit will be given for assignments that are one day late. No credit will be given for assignments that are more than one day late. NO exceptions! Unforeseen problems sometimes do occur, so PLAN AHEAD and complete the assignment early.
EXTRA CREDIT

UCLA Microbiology Research Seminar (Up to 10 pts)
Attend a research seminar/talk at UCLA on a microbiology, virology, or health topic. Write a summary (1 page, double-spaced) about the topic. Include the following: speaker's name, title of the talk, general research topic, specific research problem/question, methods, major results, discussion, and potential future directions. You may attend talks with your classmates, but please be sure to take notes and write the summary in your own words. If you cannot find a seminar that works with your schedule, please ask me for suggestions.

Contribute to the “Advice for Future Students” Wall (5 pts)
Share any advice you have for future AL and/or BL students. They will definitely appreciate hearing any lessons you may have learned during your quarter of hard work! Show your instructor your advice and then add it to the “Advice” wall to earn points.

EIP Course Evaluations (Up to 5 pts)
Please complete the instructor/course evaluations at the end of the quarter.

PLEASE NOTE THAT THIS SYLLABUS MAY BE REVISED OR UPDATED DURING THE QUARTER. CHANGES WILL BE ANNOUNCED IN LECTURE AND POSTED ON COURSE WEBSITE.