Class Meetings: Lecture Monday, Wednesday 1000-1050 + one additional hour meeting for project advancement.

Instructor: Dr. Maude David
Office: Nash 537 email: maude.david@science.oregonstate.edu tel. 7-0629
Office hours: Monday 1100-1200 and other times by appointment

Course Description:
Quantitative skills and biological thinking will be used to analyze and draw conclusions from real-world biological datasets. Projects will be completed in the context of small groups. This is a synthesis course that draws skills in mathematics, statistics, computer science, and biology.
Prerequisites: (ST 351 OR ST 351H) AND (CS 161 OR BOT 476 OR BB 485 OR MTH 427) OR instructor consent
Corequisites: none

BSD 412 Student Learning Outcomes:
At the end of this course, students will be able to:
1. Generate hypotheses
2. Design experiments
3. Apply appropriate quantitative methods and tools to effectively manage, summarize, visualize, manipulate, to analyze large real-world biological datasets
4. Reflect on roles and strategies for group work and communicate effectively to collaborate in accomplishing common goals

Evaluation of Student Performance:

Quizzes: Short quizzes will be given throughout the quarter. These will test the students on knowledge of the basic concepts.

Project: At the beginning of the course, the instructor will present one or more datasets from which students may select. The datasets will either come from local stakeholders or generated by previous classes targeting microbiome datasets at OSU. Student will work in groups of 3 to 5, and each group’s final project data set will be unique. Lab assignments will carry each student through the process of building a code base that addresses his/her project. The final presentation requires each group to demonstrate the analysis on their unique dataset and be critical about it. They will also be evaluated in their effectiveness in communicating by giving to the instructor prior to the presentation two or three concepts or ideas they will convey.

Grading: Course grades will be computed from a weighted sum of points received for the quiz (15%), the project report (20%), the code and communication effort within the
team (15%) and the final project presentation (50%).

Final project presentation: 10-minute presentation. Students will sign up for time slots. Students will explain program data inputs, their analysis, and explain the results, which packages they choose and be critical about their analysis.

Grading scale:

<table>
<thead>
<tr>
<th>% of points earned</th>
<th>Course letter grade</th>
<th>% of points earned</th>
<th>Course letter grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>≥ 93</td>
<td>A</td>
<td>≥ 70</td>
<td>C-</td>
</tr>
<tr>
<td>≥ 90</td>
<td>A-</td>
<td>≥ 67</td>
<td>D+</td>
</tr>
<tr>
<td>≥ 87</td>
<td>B+</td>
<td>≥ 63</td>
<td>D</td>
</tr>
<tr>
<td>≥ 83</td>
<td>B</td>
<td>≥ 60</td>
<td>D-</td>
</tr>
<tr>
<td>≥ 80</td>
<td>B-</td>
<td>≤ 59</td>
<td>F</td>
</tr>
<tr>
<td>≥ 77</td>
<td>C+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥ 73</td>
<td>C</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Course Content:
Sample schedule of class meeting topics:
Week 1: Github and R/python coding reminder. Matching group/project/PIs
Week 2: Soft skills and team communication emphasis.
Week 3: 16S amplicon data analysis, Application Programming Interface to database
Week 4: Hypothesis to be tested for each dataset
Week 6: Data retrieval and cleaning
Week 5: Report methods writing. Emphasis on statistics (power, confounding factors)
Week 7: Team work: current challenges and possible solutions
Week 8: Report introduction
Week 9: Data analysis strategy
Week 10: Presentation

Learning Resources:
None. Course material will be made available by the instructor.

Statement Regarding Students with Disabilities:
Accommodations are collaborative efforts between students, faculty and Disability Access Services (DAS). Students with accommodations approved through DAS are responsible for contacting the faculty member in charge of the course prior to or during the first week of the term to discuss accommodations. Students who believe they are eligible for accommodations but who have not yet obtained approval through DAS should contact DAS immediately at 737-4098.

Statement of Expectations for Student Conduct:  http://oregonstate.edu/studentconduct/

Diversity Statement:
Oregon State University strives to create an affirming climate for all students including underrepresented and marginalized individuals and groups. Diversity encompasses differences in age, color, ethnicity, national origin, gender, physical or mental ability,
religion, socioeconomic background, veteran status, sexual orientation, parental status, and marginalized groups. We believe diversity is the synergy, connection, acceptance, and mutual learning fostered by the interaction of different human characteristics.

Oregon State University strives to respect all religious practices. If you have religious holidays that are in conflict with any of the requirements of this class, please contact the instructor immediately so that we can make alternative arrangements.

Student Evaluation of Courses:
The online Student Evaluation of Teaching system opens to students the Wednesday of week 8 and closes the Sunday before Finals Week. Students will receive notification, instructions and the link through their ONID. They may also log into the system via Online Services. Course evaluation results are extremely important and used to help improve courses and the learning experience of future students. Responses are anonymous (unless a student chooses to “sign” their comments agreeing to relinquish anonymity) and unavailable to instructors until after grades have been posted. The results of scaled questions and signed comments go to both the instructor and their unit head/supervisor. Anonymous (unsigned) comments go to the instructor only.