### BSC 1005L (CRN#17278-Section #006) RI: Life Science Lab (1 credit)

### Spring 2018: January 6 – May 4

### Mondays 9:00 – 10:50 am

### (SC Building, Room 108)

*Professor:*

Dr. Diane Baronas-Lowell

Office hours: Tuesdays 1 pm-3 pm and Thursdays 1 pm-3 pm Sanson (SC) Building, Room 261 and by appointment.

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*Teaching Assistant:*

Ms. Genevieve Liddle

Office hours: Tuesdays and Wednesdays, Sanson Building (SC), Room 294: 1 – 2 pm.

email: [gliddle2012@fau.edu](mailto:gliddle2012@fau.edu)

*Don’t waste your time and money! Use the below tips to get and stay on track for a timely graduation.*

1) Learn how to navigate the “[**MY FAU**](https://myfau.fau.edu/cp/home/displaylogin)” web portal. Familiarize yourself with features available through “**FAU Self-Service**” located within the “**Home**” tab as well as the features available in the “**Students**”, “**Money Matters!**” and “**Success Network**” tabs.

2) Use the “[**Departmental Schedule**](https://banner.fau.edu/FAUPdad/lwskdsch.p_dept_schd)” (not the “Searchable Schedule”) to see **all** courses available (by department) within a given semester when working to schedule your classes.

3) Use the [**Degree Audit Reporting System (DARS)**](https://www.fau.edu/registrar/graduation/degree-audit.php) (<https://www.fau.edu/registrar/graduation/degree-audit.php>) to keep track of which requirements you still need to fulfill in order to graduate. When running your degree audit, you may audit your progress against the catalog year in which you first entered FAU (provided that you have maintained continuous enrollment) OR the current catalog year. You may also select alternate degree options to see if you are closer to completing one degree than another.

*Please note the below* [*excess credit hour policy*](http://www.fau.edu/academic/registrar/FAUcatalog/academics.php#excess)*. It is your responsibility to work with your academic advisor to minimize additional costs to you associated with the completion of excess credits.*

[**Credit Hour Policy: Excess Hours Surcharge**](http://www.fau.edu/academic/registrar/FAUcatalog/academics.php#excess)

[Florida Statute 1009.286](http://www.flsenate.gov/Laws/Statutes/2014/1009.286) defines “excess hours” as credit hours that exceed the completion requirements for a baccalaureate degree program at state universities. For students enrolling in a state university or a Florida State College System institution for the first time in or after the fall 2009 semester, a tuition rate surcharge will be applied for excess hours. The surcharge is assessed only on the tuition portion of the semester hour cost, not on the fees. The amount of the surcharge and the allowable “excess hours” are determined by the initial term of entry as indicated in the catalog.

*Important for Biology Majors:*

Please speak with your academic advisor about your schedule immediately if you are a biology major. This course does **not** count for credit towards a biology majors degree.

*Co-requisite:*

BSC 1005

*Course Description (Intellectual Foundations Program Course):*

This lab is research focused on the discovery of new antibiotics from soil bacteria. Students in this course will join the Small World Initiative (<http://www.smallworldinitiative.org>), a global effort to curb the antibiotic crisis. This is a General Education course.

*Course Objective:*

Welcome to the Small World Initiative (<http://www.smallworldinitiative.org>)! This course’s objective is to expose students to the nature of science and inquiry-based research, along with the dialogue that accompanies it using the Small World Initiative Program.

*Student Learning Outcomes:*

* Read and think before you do.
* Design experimental conditions, hypothesize, predict, use controls and analyze data.
* Have a plan: question, reason quantitatively and be creative.
* Think critically: be skeptical, question your own ideas and keep an open mind.
* Communicate: practice teamwork, exchange ideas, develop and present a Powerpoint presentation.
* Use ethical conduct: exercise good lab practices & safety; complete your assignments in your own words.

*Required:*

"Small World Initiative: Research Protocols" and the "Small World Initiative: A Research Guide to Microbial and Chemical Diversity" (4th edition) bundled together (ISBN 978-1-50669-699-7) and available in the FAU bookstore.

*Canvas*

Canvas will be used for posting the course syllabus, grades, lecture notes and other items of interest. For support/help: <https://cases.canvaslms.com/apex/liveagentchat>

*Code of Academic Integrity Policy Statement:*

“Students at Florida Atlantic University are expected to maintain the highest ethical standards. Academic dishonesty is considered a serious breach of these ethical standards, because it interferes with the university mission to provide a high quality education in which no student enjoys an unfair advantage over any other. Academic dishonesty is also destructive of the university community, which is grounded in a system of mutual trust and places high value on personal integrity and individual responsibility. Harsh penalties are associated with academic dishonesty. For more information, see University Regulation” at <https://www.fau.edu/ctl/4.001_Code_of_Academic_Integrity.pdf>

*Religious Accommodations:*

Students who wish to be excused from a lab session must notify the instructor in advance of their intention to participate in religious observation and request an excused absence.

*Research Intensive Course Designation (RI) and Requirements:*

This course contains multiple assignments designed to help students conduct research and inquiry at an intensive level. If this class is selected to participate in the university-wide assessment program, students will be asked to complete a consent form and submit electronically some of their research assignments for review. Visit the Office of Undergraduate Research and Inquiry (OURI) for additional opportunities and information at <http://www.fau.edu/ouri>.

*Attendance Policy and Classroom Etiquette:*

You must attend every lab session in a punctual manner, be respectful of your lab mates and follow the general lab safety rules. “Students are expected to attend all of their scheduled University classes and to satisfy all academic objectives as outlined by the instructor. The eﬀect of absences upon grades is determined by the instructor, and the University reserves the right to deal at any time with individual cases of non-attendance. Students are responsible for arranging to make up work missed because of legitimate class absence, such as illness, family emergencies, military obligation, court-imposed legal obligations or participation in University approved activities. Examples of University-approved reasons for absences include participating on an athletic or scholastic team, musical and theatrical performances and debate activities. It is the student’s responsibility to give the instructor notice prior to any anticipated absences and within a reasonable amount of time after an unanticipated absence, ordinarily by the next scheduled class meeting. Instructors must allow each student who is absent for a University-approved reason the opportunity to make up work missed without any reduction in the student’s ﬁnal course grade as a direct result of such absence.”

*FAU Disability Policy Statement:*

“In compliance with the Americans with Disabilities Act Amendments Act (ADAAA), students who require reasonable accommodations due to a disability to properly execute coursework must register with Student Accessibility Services (SAS)—in Boca Raton, SU 133 (561-297-3880); in Davie, LA 131 (954-236-

1222); or in Jupiter, SR 111F (561-799-8585).”

*Grading:*

Grades will be determined as follows:

Quizzes, assignments and participation = 215 points

Powerpoint presentation = 85 points

Total possible points = 300

Students are expected to complete lab worksheets/quizzes during the lab as assigned. Homework assignments that are submitted late will be automatically deducted 20%.

*The student’s course grade will be based on the following grading scale:*

Letter Percentage Points (300 total)

A 93% & above 278 & above

A- 90-92% 269-277

B+ 87-89% 260-268

B 83-86% 248-259

B- 80-82% 239-247

C+ 77-79% 230-238

C 73-76% 218-229

C- 70-72% 209-217

D+ 67-69% 200-208

D 63-66% 188-199

D- 60-62% 179-187

F 59% & below 178 & below

*Make-up Policy:*

There will be **no** make-up labs. If you have a legitimate excuse, you can make-up an assignment in your TA’s office hours.

*Extra Credit: Up to 10% of your final grade!*

Throughout the semester, there will be assignments for extra credit that will allow you to earn up to 10% (or 30 points) of your final grade. Pay attention for announcements of these assignments during lab and on Canvas.

*Ensuring Success in the Lab:*

1. Attend every lab.

2. Read the corresponding material in the research guide and protocols **before** the lab.

3. Complete assignments before the end of the lab meeting.

4. Most importantly, ask questions!

*Proposed Lab Schedule (subject to revision during the semester, depending on class needs):*

**Date** **Topic** **Required Reading Before Lab**

January 8 Discuss the rationale behind the research Syllabus

that you will conduct as part of the Small Guide: pg 5-10

World Initiative, as well as, lab safety. Explore Protocols: pg 2-12

food that bacteria eat and get your soil kit.

*January 15 No Lab – Martin Luther King Jr Holiday*

January 22 How do we get the bacteria out of your soil? Bring in your soil and consent forms!

Isolate the bacteria from your soil. Guide: pg 11-23

Protocols: pg 46-48, 50, 58-61, 68-71

January 29 Select which bacteria you want to study. Guide: pg 24-40

Design the growth conditions for your experiment. Protocols: pg 48-49, 62-65

February 5 Choose the safe relatives that you want to try to kill. Guide: pg 49-56

Put your bacteria on your safe relatives. Protocols: pg 53-54

February 12 Did your bacteria kill the safe relatives? Guide: pg 57-71

Based on your observations, streak active Protocols: pg 71-72, 74-76

bacteria for single colonies.

February 19 What do your bacteria look like? Record Guide: pg 41-48

your colony morphologies and put your bacteria Protocols: pg 31-32, 48-49, 53-54

onto new food and test if they kill your safe

relatives again. Can you reproduce your previous results?

February 26 Did your bacteria kill the safe relatives again? Protocols: pg 71-72, 74-76

Based on your observations, streak active

bacteria for single colonies.

*March 5 No Lab – Spring Break*

March 12 Make copies of the DNA in your bacteria. Guide: pg 72-75

Protocols: pg 33, 35-36

March 19 Did you successfully make copies of your DNA? Guide: pg 96

If so, set up DNA to send to Yale University. Protocols: pg 13-15, 41-42, 76-78

Start testing the behavior of your bacteria.

March 26 What are other characteristics of your bacteria? Guide: pg 75-78, 95-98

Protocols: pg 28-30, 38-42, 76-78

April 2 Final test on antibiotic production! Are your Guide: pg 87-91

bacteria resistant to common antibiotics? Protocols: pg 25-28, 43

Preserve your bacteria forever.

April 9 Plug your bacterial DNA sequence into the Guide: pg 109-112

computer. To which known bacteria is your Protocols: pg 16-17, 24-25

bacteria most similar?

April 16 Present your results and other experiments that you’d like to pursue if you could!

**NOTE: The last day to drop a course or withdraw without receiving an “F” is April 6th.**

*General Lab Safety Rules*

This lab uses living organisms. Even though the microorganisms that we use are not considered dangerous, all microorganisms should be treated as potentially unsafe.

Immune-compromised individuals should NOT participate in this lab, unless they have discussed the lab organisms and procedures with their personal physician and the physician has cleared them for work in this lab. Please refer to “Small World Initiative: A Research Guide to Microbial and Chemical Diversity” for a list of organisms (safe relatives of the ESKAPE pathogens) used in this class on page 51 and the lab procedures are outlined in the table of contents.

Lab rules to be observed at all times in the lab:

1. Put personal items in assigned cupboards (not on bench tops).
2. Bag in a zip-lock plastic baggie an electronic device used to take pictures, record data, perform calculations.
3. Clean your bench top with disinfectant at the start and end of each lab.
4. **Wash your hands** with soap and dry with paper towels when entering and leaving the lab.
5. Personal Protective Equipment (required when in the lab):
6. Long pants/skirt and closed-toe shoes
7. Long hair tied back and no dangling jewelry
8. Lab coat
9. Gloves
10. Goggles
11. Facemasks (during stepwise/serial dilutions of bacteria).
12. No hats, baseball caps or scarves.
13. Open wounds, cuts and scratches must be covered with waterproof dressings.
14. Do not put anything in your mouth or eyes or on your face (including pens, food, pipettes, fingers, contact lenses and cosmetics).
15. Never eat or drink in the lab (including gum, cough drops and candy).
16. Do not remove media, equipment or bacterial cultures from the lab.
17. Do not place contaminated instruments (including inoculating loops, needles, pipettes or pipette tips) on bench tops; dispose of them in designated receptacles.
18. Notify your instructor immediately if there has been an accident like a spill or broken glass.
19. At the end of each lab, put all cultures, plates and materials in appropriate waste containers and use disinfectant to clean your lab bench.
20. **Wash your hands**.

Safety Data Sheets (SDS) are located in a binder on the shelf at the front of the room on the right and on the computer. The first aid kit, eyewash station, shower and fire extinguisher are located at the front of the room.

I acknowledge that I have reviewed and understand the lab safety precautions listed above and have had the opportunity to ask questions to clarify any policy pertaining to this lab. I agree to abide by the rules established for safety in this lab.

Signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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