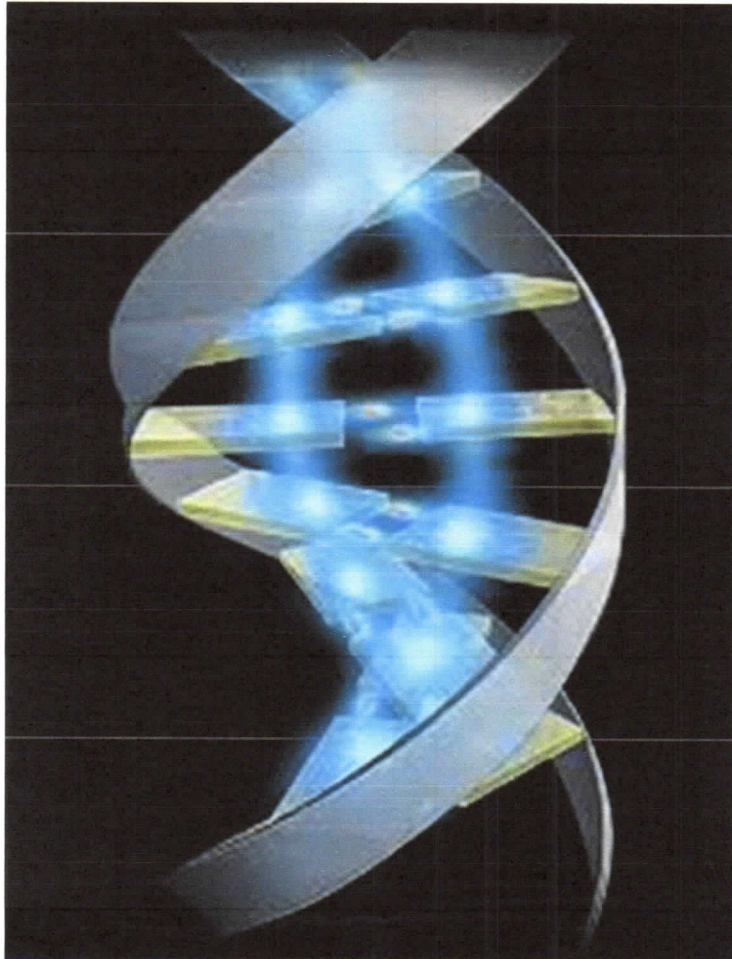


Laboratory Methods in Biotechnology
BSC 4403L -001 (3 credits)
CRN
Spring 2019



Course Prerequisites

Permission of instructor

Course Logistics

The course will meet in SC 107 during the Spring 2019 term on MWF from 9:00am-12:50pm.

Announcements, assignments, the lab manual, etc. will be available on Canvas.

Instructor:

David Binninger, PhD

Office: Biological Sciences Building; Sanson Science; Room 210

Office Hours: Tuesday and Thursday from 12:30-1:30PM or
by appointment

Phone: 297-3323

Email: binninge@fau.edu



E-mail is the most effective way of reaching me

Teaching Assistant

Teaching Assistant: TBA

Office Hours: TBA

Course Description and Objective and Student Learning Outcomes

The overarching objective of this laboratory course is to provide students with hands-on experience in some of the basic, but essential laboratory skills required in molecular biology and biotechnology. Emphasis will be placed on understanding the concepts behind designing and implementing controlled experiments. These techniques involve manipulation of DNA, RNA and protein. These skills are directly transferable to the workplace.

Required

1. Laboratory notebook, which is available in the FAU campus bookstore in the textbook section. It has a very colorful cover, numbered pages and carbonless tear-out pages.
2. Laboratory manual, which can be downloaded from Blackboard.

Lab Practical is TBA

Bioinformatics Assignments

These out of class assignments are designed to provide the student with an introduction to using DNA and protein databases.

Assignment 1 will be due on TBA

Assignment 2 will be due on TBA

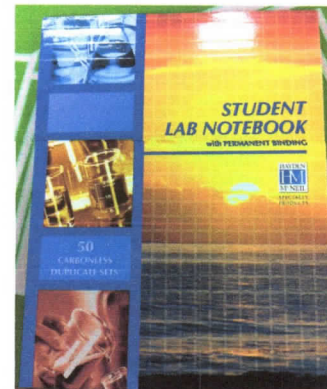
Assignment 3 will be due on TBA

Assignment 4 will be due on TBA

Assignment 5 will be due on TBA

Laboratory notebook

The laboratory notebook must be purchased from the FAU bookstore. The notebook has carbonless pages that will be torn out and turned into your TA before you leave the laboratory. These pages must be well thought out and legible. We will be going over, in detail, what is expected of you in this record-keeping process.



Quizzes

Unannounced quizzes will be given at the beginning of the class. Collectively, the quizzes account for 10% of your grade.

A Clean Working Environment

Now is the time to develop good laboratory techniques that include keeping your lab space clean and organized. Please note that “your mother doesn’t work here”. The following is a list of “behaviors” which will result in a 1-point deduction in your “notebook” grade.

- “Disappear” for extended periods of time
- Leaving trash in the sink
- Not cleaning up properly
- Negligence and/or abuse of equipment
- Questions that clearly indicate that you are not prepared
- Non-participation (your lab partner(s) are doing all of the work)

Results

At this stage in your academic career, it is reasonable to expect an acceptable level of proficiency in the laboratory. The instructor, along with the teaching assistant, will evaluate the quality of your work.

Late for Class

You are expected to be in the lab, ready to work promptly at 9AM. ***If you are late, there will be a 1-point penalty on your final course average.***

Missed Lab Periods

It is important that you attend every lab. Most of the experiments will develop over a course of several lab periods. ***Making-up a missed lab is not practical!***

An absence from lab will be allowed only in truly exceptional circumstances and a written, verifiable excuse is provided. Examples of acceptable excuses include a doctor's note showing illness, court subpoena or a family tragedy. If you are going to miss (or have already missed) a lab and have a written excuse, please talk with Dr. Binninger as soon as possible. For an excused absence, you will be offered an opportunity to receive credit for the missed lab by doing an out-of-class written assignment. Please see Dr. Binninger for additional details. Note that in keeping with FAU policy, reasonable accommodations for religious observances will be made.

Unexcused absences will result in lose of all points associated with that day's activities.

Ensuring Success in the Course

1. Attend all labs.
2. Read the corresponding material in the manual **before** the lab. See comments concerning quizzes above.
3. **Most importantly, try to understand the purpose of the experiment before you enter the lab!**
4. Go back over your lab notes as soon as possible after the lab and determine where any weaknesses in your understanding lie.
5. Utilize the office hours of the instructor and teaching assistant to ask questions about areas with which you are having difficulty.
6. Use your other biology textbooks, or go to the library for related books, as resources for understanding basic concepts.
7. Explore the Internet.

Grading Scale

Grade	Percentage	Grade	Percentage
A	≥93	C	76-73
A-	92-90	C-	73-70
B+	89-87	D+	69-67
B	86-83	D	66-63
B-	80-82	D-	62-60
C+	79-77	F	≤59

Policy on makeup tests, late work, and incompletes

If a student cannot attend an exam or hand in a homework project on time due to circumstances beyond their control then the instructor may assign appropriate make-up work. Students will not be penalized for absences due to participation in University-approved activities, including athletic or scholastics teams, musical and theatrical performances, and debate activities. These students will be allowed to make up missed work without any reduction in the student's final course grade. Reasonable accommodation will also be made for students participating in a religious observance. Also, note that grades of Incomplete ("I") are reserved for students who are passing a course but have not completed all the required work because of exceptional circumstances. A grade of "I" will only be given under certain conditions and in accordance with the academic policies and regulations put forward in FAU's University Catalog. The student must show exceptional circumstances why requirements cannot be met. A request for an incomplete grade has to be made in writing with supporting documentation, where appropriate.

FAU Attendance Policy Statement:

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.

Classroom etiquette policy

University policy on the use of electronic devices states: “In order to enhance and maintain a productive atmosphere for education, personal communication devices, such as cellular telephones and pagers, are to be disabled in class sessions.”

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) and follow all SAS procedures. SAS has offices across three of FAU’s campuses – Boca Raton, Davie and Jupiter – however disability services are available for students on all campuses. For more information, please visit the SAS website at www.fau.edu/sas/.

Counseling and Psychological Services (CAPS) Center

Life as a university student can be challenging physically, mentally and emotionally. Students who find stress negatively affecting their ability to achieve academic or personal goals may wish to consider utilizing FAU’s Counseling and Psychological Services (CAPS) Center. CAPS provides FAU students a range of services – individual counseling, support meetings, and psychiatric services, to name a few – offered to help improve and maintain emotional well-being. For more information, go to <http://www.fau.edu/counseling/>

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 4.001](https://www.fau.edu/ctl/4.001).
<https://www.fau.edu/ctl/4.001> [Code of Academic Integrity.pdf](https://www.fau.edu/ctl/4.001)

Supplemental Reading

Most students will find that the lab manual contains sufficient background information. However, if additional reading is needed, online searches of the topic will probably be the most productive. Students should utilize the online content (including videos, animations, podcasts, etc.) to improve their understanding of the technology.

Proposed Experiments

Week 1

Experiment 1 – *The Growth Curve*

Assignment: Read background information, rationale, and procedure for Experiment 1 in the Laboratory Methods in Biotechnology Manual.

Week 2

Experiment 2 – *Identification of Yeast Auxotrophic Mutants and Genetic Complementation*

Assignment: Read background information, rationale, and procedure for Experiment 2 in the Laboratory Methods in Biotechnology Manual.

Week 3

Experiment 2 – *Identification of Yeast Auxotrophic Mutants and Genetic Complementation*

Assignment: Read background information, rationale, and procedure for Experiment 2 in the Laboratory Methods in Biotechnology Manual.

Week 4

Experiment 3 – *Molecular Cloning of the RecA Gene of E. coli*

Assignment: Read background information, rationale, and procedure for Experiment 3 in the Laboratory Methods in Biotechnology Manual.

Week 5

Experiment 3 – *Molecular Cloning of the RecA Gene of E. coli*

Assignment: Read background information, rationale, and procedure for Experiment 3 in the Laboratory Methods in Biotechnology Manual.

Week 6

Experiment 4 – *Molecular Analysis of the MsrA and MsrB Genetic Loci of Drosophila*

Assignment: Read background information, rationale, and procedure for Experiment 4 in the Laboratory Methods in Biotechnology Manual.

Week 7

Experiment 4 – *Molecular Analysis of the MsrA and MsrB Genetic Loci of Drosophila*

Assignment: Read background information, rationale, and procedure for Experiment 4 in the Laboratory Methods in Biotechnology Manual.

Week 8

Experiment 4 – *Molecular Analysis of the MsrA and MsrB Genetic Loci of Drosophila*

Assignment: Read background information, rationale, and procedure for Experiment 4 in the Laboratory Methods in Biotechnology Manual.

Week 9

Experiment 5 – *Measuring Changes in Gene Expression Using RT-PCR*

Assignment: Read background information, rationale, and procedure for Experiment 5 in the Laboratory Methods in Biotechnology Manual.

Week 10

Experiment 5 – *Measuring Changes in Gene Expression Using RT-PCR*

Assignment: Read background information, rationale, and procedure for Experiment 5 in the Laboratory Methods in Biotechnology Manual.

Week 11

Experiment 5 – *Measuring Changes in Gene Expression Using RT-PCR*

Assignment: Read background information, rationale, and procedure for Experiment 5 in the Laboratory Methods in Biotechnology Manual.

Week 12

Experiment 6 – *Construction of an Expression Vector for Synthesis of Recombinant Drosophila MsrB Protein in E. coli*

Assignment: Read background information, rationale, and procedure for Experiment 6 in the Laboratory Methods in Biotechnology Manual.

Week 13

Experiment 6 – *Construction of an Expression Vector for Synthesis of Recombinant Drosophila MsrB Protein in E. coli*

Assignment: Read background information, rationale, and procedure for Experiment 6 in the Laboratory Methods in Biotechnology Manual.

Week 14

Experiment 7 – *Overexpression, Isolation, and Characterization of a Human Recombinant Protein in E. coli*

Week 15

Experiment 7 – *Overexpression, Isolation, and Characterization of a Human Recombinant Protein in E. coli*

Week 16

Experiment 7 – *Overexpression, Isolation, and Characterization of a Human Recombinant Protein in E. coli*