

**ABE 3000C**  
**APPLICATIONS IN BIOLOGICAL ENGINEERING**

**Instructor:** Dr. Melanie Correll

- a. Office location: 209 Rogers Hall
- b. Telephone: 352-294-6722
- c. E-mail address: [correllm@ufl.edu](mailto:correllm@ufl.edu)
- d. Office hours: Tuesday noon – 1: 30 pm or arranged via email

**Catalog Description:** *3 credits.* Lecture approx. 2 hours with a 3-hour lab.

Overview of the research and applications of Biological Engineering such as bioprocessing, biotechnology, transport processes, biosensors, bioremediation, biological materials, and biomedicine. Hands-on experiments and course projects are required. This course has two to three (on non-laboratory weeks), one-hour lectures and a three-hour lab during lab weeks. (*Offered Spring*)

**Pre-requisites and Co-requisites:** Requires a junior-level standing in engineering or permission of both the instructor and the Agricultural and Biological Engineering Department. It is also expected that the student has basic courses in calculus, chemistry, physics and biology.

**Course Objectives:**

- *Define/differentiate terminology, utilize equipment, and find recent advances in biological engineering (including areas of biomedicine, bioremediation, food production, bioprocessing, biotechnology, water reclamation, packaging)*
- *Solve problems in biological engineering*
- *Hands-on lab techniques used in Biological Engineering*
- *Understand Biological Engineering in terms of ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts in global and societal context (ABET Outcome 4)*
- *Develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions (ABET Outcome 6)*
- *Demonstrate an ability to acquire and apply new knowledge as needed, using appropriate learning strategies (ABET Outcome 7)*

**Contribution of course to meeting the professional component for ABET:**

Contributes 3 credit hours toward meeting the minimum 48 credit hours of Engineering Topics in the basic-level curriculum for the Bachelor of Science Degree in Biological Engineering.

**Relationship of course to ABET program outcomes (1-7):** This course addresses

outcomes 2,3,4,5,6, and 7 but assesses outcomes 3, 4 and 7.

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics (low)
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors (medium)
3. an ability to communicate effectively with a range of audiences (high)
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives (medium)
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions (high)
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies (high)

**Teaching Assistants:** Nathan O’Neil <noneil@ufl.edu>;

**Meeting Times:** MWF (10:40-11:30 am) no Friday Lecture if a lab is given, Labs-Sections APP2 (W,11:45 am- 2:45pm) and Section APP1 (F,10:40am-1:40pm -during lab weeks)

**Class/Laboratory Schedule:** See TENTATIVE SCHEDULE

**Meeting Location:** Lectures: Room 129 and Labs: Room 142 in Frazier Rogers Hall except when noted, Field trip locations vary by year.

**Material and Supply Fees:** as noted

**Textbooks and Software Required:**

Title: Introduction to Biotechnology (eBook)

ISBN: 9780137533220 Cover: N/A

Authors: William J. Thieman and Michael A Palladino

Publisher: Pearson

**Recommended Reading:** NCBioNetwork.org: <https://www.ncbionetwork.org/> ; DNA from the Beginning: <http://www.dnaftb.org/33/> ; <http://www.dnaftb.org/34/>

**Course Outline (the order of these topics may change based on lab/field trip schedules and additional reading is provided on CANVAS):**

Week	Topics (Readings/Lab Weeks)
1	Introduction- Biology in Biological Engineering (Chapter 1)
2	Safety, Regulation, Documentation, Products to Market in Biotechnology (NCBioNetwork and Chapter 12)

3-4	Basics in Laboratory Equipment (NCBioNetwork) (Lab 1 and 2)
5	Biotechnology-GENE to protein- Genetic Engineering- Cell Culture (Chapters 2 and 3, DNA from the Beginning) (Lab 3)
6	Assays-B-gal Enzymes ( <b>Exam I</b> this week) (NC BioNetwork) (Lab 4)
7	Process Scale up (Bench to Market) Fermentation (Chapter 5; NCBioNetwork)(Lab 5)
8	Industry Application Food Engineering (Chapter 5; Content posted on Canvas) (Lab 6)
9	Bioseparations-(CHASM) Chapter 4 (Lab 7 – Virtual)
10	Purification ( <b>Exam II</b> – this week) Chapter 4
11	Wastewater Treatment (Chapter 9; UF Wastewater) (Lab 8)
12	Biosystems Industry – Integration (Lab 9)
13	Biofuels/Biofilms/Guest Lectures
14	Guest Lecture ( <b>Exam III</b> this week)
15	Creative Project Presentations

**Grading:** Homework (10%); Lab Notebook (5%); Lab reports (35%); Three within semester exams (10% each total = 30%); Final Project (10%); Final Exam-cumulative (10%); total: 100%

In the event the final is optional the score will be adjusted out of a 90%.

**Grading Scale:** 93.5-100 = A, 89.5-93.4 = A-, 87.5-89.4 = B+, 83.5-87.4 = B, 79.5-83.4 = B-, 77.5-79.4 = C+, 73.5-77.4 = C, 69.5-73.4 = C-, 67.5-69.4 = D+, 63.5-67.4 = D, 59.5-63.4 = D-, <59.4 = E.

### **Attendance and Expectations:**

#### **Attendance Policy, Class Expectations, and Make-Up Policy**

Absences: Excused absences must be consistent with university policies and can be found here: <https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>

Students are expected to arrive on time and attend all classes and labs. Students are expected to read assignments and TAKE NOTES within lab notebook as guided on the lab notebook best practices. Cell phone use is not allowed during class. Homework assignments are due in class on the day specified for full credit a 10% deduction until the start of the next class, a 20% until the start of the second class day after assignment due date, and a 30% deduction will be given until the start of the third class day following the assignment due date. Late assignments for homework will only be accepted three class days after the assignment is due, no further assignments will be accepted unless under an excused absence and arranged with the instructor. Students are expected to participate in discussion and have read assigned readings prior to lab or class. **Students missing a lab for unexcused absences will get a zero for that lab grade.**

Students who have an excused absence that is documented for a lab will need to arrange a makeup lab (often virtual) with the instructor and TA.

More information on UF grading policy may be found at: <https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>

### ***Students Requiring Accommodations***

Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the disability Resource Center by visiting <https://disability.ufl.edu/students/get-started/>. It is important for students to share their accommodation letter with their instructor and discuss their access needs, as early as possible in the semester.

### ***Course Evaluation***

Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at <https://gatorevals.aa.ufl.edu/students/>. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via <https://ufl.bluera.com/ufl/>. Summaries of course evaluation results are available to students at <https://gatorevals.aa.ufl.edu/public-results/>.

### ***In-Class Recording***

Students are allowed to record video or audio of class lectures. However, the purposes for which these recordings may be used are strictly controlled. The only allowable purposes are (1) for personal educational use, (2) in connection with a complaint to the university, or (3) as evidence in, or in preparation for, a criminal or civil proceeding. All other purposes are prohibited. Specifically, students may not publish recorded lectures without the written consent of the instructor.

A “class lecture” is an educational presentation intended to inform or teach enrolled students about a particular subject, including any instructor-led discussions that form part of the presentation, and delivered by any instructor hired or appointed by the University, or by a guest instructor, as part of a University of Florida course. A class lecture does not include lab sessions, student presentations, clinical presentations such as patient history, academic exercises involving solely student participation, assessments (quizzes, tests, exams), field trips, private conversations between students in the class or between a student and the faculty or lecturer during a class session.

Publication without permission of the instructor is prohibited. To “publish” means to share, transmit, circulate, distribute, or provide access to a recording, regardless of format or medium, to another person (or persons), including but not limited to another student within the same class section. Additionally, a recording, or transcript of a

recording, is considered published if it is posted on or uploaded to, in whole or in part, any media platform, including but not limited to social media, book, magazine, newspaper, leaflet, or third party note/tutoring services. A student who publishes a recording without written consent may be subject to a civil cause of action instituted by a person injured by the publication and/or discipline under UF Regulation 4.040 Student Honor Code and Student Conduct Code.

### ***University Honesty Policy***

UF students are bound by The Honor Pledge which states, “We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: “On my honor, I have neither given nor received unauthorized aid in doing this assignment.” The Honor Code (<https://sccr.dso.ufl.edu/process/student-conduct-code/>) ([Links to an external site.](#)) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.

### ***Commitment to a Safe and Inclusive Learning Environment***

The Herbert Wertheim College of Engineering values broad diversity within our community and is committed to individual and group empowerment, inclusion, and the elimination of discrimination. It is expected that every person in this class will treat one another with dignity and respect regardless of gender, sexuality, disability, age, socioeconomic status, ethnicity, race, and culture.

If you feel like your performance in class is being impacted by discrimination or harassment of any kind, please contact your instructor or any of the following:

- Your academic advisor or Graduate Program Coordinator
- Jennifer Nappo, Director of Human Resources, 352-392-0904, [jpennacc@ufl.edu](mailto:jpennacc@ufl.edu)
- Curtis Taylor, Associate Dean of Student Affairs, 352-392-2177, [taylor@eng.ufl.edu](mailto:taylor@eng.ufl.edu)
- Toshikazu Nishida, Associate Dean of Academic Affairs, 352-392-0943, [nishida@eng.ufl.edu](mailto:nishida@eng.ufl.edu)

### ***Software Use***

All faculty, staff, and students of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.

### ***Student Privacy***

There are federal laws protecting your privacy with regards to grades earned in courses and on individual assignments. For more information, please see: <https://registrar.ufl.edu/ferpa.html> (Links to an external site.) Health and Wellness

***U Matter, We Care:***

Your well-being is important to the University of Florida. The U Matter, We Care initiative is committed to creating a culture of care on our campus by encouraging members of our community to look out for one another and to reach out for help if a member of our community is in need. If you or a friend is in distress, please contact [umatter@ufl.edu](mailto:umatter@ufl.edu) so that the U Matter, We Care Team can reach out to the student in distress. A nighttime and weekend crisis counselor is available by phone at 352-392-1575. The U Matter, We Care Team can help connect students to the many other helping resources available including, but not limited to, Victim Advocates, Housing staff, and the Counseling and Wellness Center. Please remember that asking for help is a sign of strength. In case of emergency, call 9-1-1.

***Counseling and Wellness Center:*** <https://counseling.ufl.edu>, and 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.

***Sexual Discrimination, Harassment, Assault, or Violence***

If you or a friend has been subjected to sexual discrimination, sexual harassment, sexual assault, or violence contact the [Office of Title IX Compliance](#), located at Yon Hall Room 427, 1908 Stadium Road, (352) 273-1094, [title-ix@ufl.edu](mailto:title-ix@ufl.edu)

***Sexual Assault Recovery Services (SARS)***

Student Health Care Center, 392-1161.

***University Police Department at 392-1111 (or 9-1-1 for emergencies), or <http://www.police.ufl.edu/>.***

***Academic Resources***

*E-learning technical support, 352-392-4357 (select option 2) or e-mail to [Learning-support@ufl.edu](mailto:Learning-support@ufl.edu). <https://lss.at.ufl.edu/help.shtml>.*

*Career Connections Center, Reitz Union, 392-1601. Career assistance and counseling; <https://career.ufl.edu>.*

*Library Support, <http://cms.uflib.ufl.edu/ask>. Various ways to receive assistance with respect to using the libraries or finding resources.*

*Teaching Center, Broward Hall, 392-2010 or 392-6420. General study skills and tutoring. <https://teachingcenter.ufl.edu/>.*

Writing Studio, 302 Tigert Hall, 846-1138. Help brainstorming, formatting, and writing papers. <https://writing.ufl.edu/writing-studio/>.

Student Complaints Campus: <https://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/>; <https://care.dso.ufl.edu>.

On-Line Students Complaints: <https://distance.ufl.edu/state-authorization-status/#student-complaint>.

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