BIOL 3400 Fall 2024
Plant Physiology and Biotechnology
Credit hours: 4

Instructor: **Dr. Ansul Lokdarshi**
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Office (Student) hours (BC2212) **Tuesday and Thursday 11 AM-1:30 PM**
Or by appointment (please send an email to my valdosta.edu account with "appointment" in the subject line and I will accommodate as time permits).

Lecture (BS 1024)	**Tuesday and Thursday**	**9:30 AM – 10:45 AM**
Lab (BS 2071)	**Tuesday and Thursday**	**2:00 PM – 4:50 PM**

Important points in the syllabus are in bold or highlighted in yellow or marked with red. Please pay special attention and make a note of these points.

Pre-requisites: BIOL 1107K, BIOL 1108K, BIOL 3200.

General Course Objectives: To give students a greater appreciation of the plant world we depend on and provide understanding of physiology of plants under changing environments. Additionally, this course will provide students with training in current plant biotechnology tools.

Recommended Text: **No Book Required.**
Suggested readings below.
Text: 1) Biochemistry and Molecular Biology of Plants 2nd Edition by Bob B. Buchanan (Editor), Wilhelm Gruissem (Editor), Russell L. Jones (Editor)
2) Plant Biotechnology - Experience and Future Prospects. Editors: Agnès Ricroch, Surinder Chopra, Marcel Kuntz.
Laboratory Manual: None; mainly handouts or laboratory protocols and papers. TBA

Attire: Lab aprons and face shields will be provided and must be worn during lab. **SANDALS, FLIP-FLOPS AND OTHER OPEN-TOED SHOES ARE NOT PERMITTED IN LAB. IF YOU ARRIVE IN FOR LABS SANDALS OR FLIP-FLOPS YOU WILL NOT BE ALLOWED ENTRY INTO THE LAB AND WILL BE MARKED AS ABSENT.**

Attendance: Attendance policy: **Attendance to both lecture and lab is required.** If you miss a lecture or lab I reserve the right to determine what constitutes an excused or unexcused absence. To name a couple of examples of unexcused absences, scheduled appointments or leaving town, except for University related activities (e.g. you are on a sports team or are presenting at a conference), do not constitute excused absences. "Not feeling well" will only work one time as an excused absence; any additional "not feeling well" absences will be counted as unexcused.
Quizzes and in-class assignments will be given throughout the semester, which is why attendance is required. Generally, quizzes or in-class assignments in lecture cannot be made up if lecture is missed. If you miss the lecture and I approved your absence the total number of points possible to you will be reduced. If you miss quizzes and/or in-class lecture assignments and I did not approve the absence a zero will be given for that particular assignment, quiz, etc.

Lectures and Labs cannot be made up; therefore do not miss either. I also reserve the right to determine what constitutes an excused absence from lab. If you miss 2 labs (excused or unexcused) you will earn an F for the course as per University policy.

If students must be absent due to a quarantine or isolation requirement for COVID-19, they must report this situation via the COVID Self Reporting Link in MyVSU and through the Dean of Students Office to report any other absences as well.

Conduct: Arrive on time to lecture and lab. Turn off cell phones during lecture and lab. Don't talk during lecture; if you don't understand something or didn't hear something ask. Unless it's an emergency (and texting does not constitute an emergency) do not get up in the middle of lecture, leave and come back. Do not ask to get up and leave the room during an exam, unless it is an emergency.

Mid-term and Attendance: Students will have several lecture and laboratory assignments to determine their overall grade by the Mid-Term and decide whether to withdraw at the deadline date **(STUDENT IS RESPONSIBLE TO CHECK THE DEADLINE)**. As detailed above, attendance is mandatory.

Lab rules and regulations:

- Be on time for lab. Instructions, clarifications and changes in protocols will be given at the beginning of lab, and I will not repeat myself just because you are late.
- No eating or drinking in the lab at any time. Some of the chemicals we will be using are toxic or mutagenic.
- Clean up after yourself. Remove all labels/tape from the glassware, rinse and place in the tub by the sink.
- If you break something or think you may have broken something, please tell me. Accidents happen. It's a bigger problem if you do not tell me because I won't be able to fix or replace whatever is non-functional. If you have any questions about using a piece of equipment, it's always better to ask.

Mask mandates: This course is offered ONLY face-to-face. Everyone is encouraged to wear mask during the lecture and labs.

Lecture Exams:

- There will be three lecture exams worth 100 points based on lecture notes.
- The format of exams will be discussed in the class.
- Dates of these exams are included in the attached schedule of lectures.
- If you fail to attend one of the exams for any reason, you **must provide documented evidence** (e.g., from doctor, police, etc.) that circumstances beyond your control prevented you from taking the exam. **Failure to provide reasonable evidence for absence within one week of the exam will result in a grade of 0 for the exam**.
- Only one time makeup exam is allowed and will be administered at any time during the semester at the discretion of the instructor. Under extraordinary circumstances only the students may be allowed for another make up exam. This will require strong evidence of excuse as mentioned above and will solely depend on the discretion of the instructor.
- If you arrive late for an exam you will be allowed to take the exam. However, you must turn in the exam paper at the regular scheduled end of the class. You will not be allowed extra time unless a documentable emergency has occurred.
- **All exam paper will remain with the instructor after the course completion and students are not allowed to take pictures or maintain a copy of the exam paper in any form. Students found breach of this contract will get F in the course with administrative action.** Advance appointment will be required to view answered exam papers in person in my office.
- During the test, all smart devices must be stowed away. It is your responsibility to take care of your items.

Lab Exams: There will be two lab exams worth 100 points. Format will be discussed in class.

Quizzes: Quizzes will be unannounced and will be given during the lecture and/or lab at any given point. **THERE IS NO MAKE UP FOR MISSED QUIZZES.** Quizzes will be comprised of a combination of multiple choice

and short answer type questions. These quizzes are designed to evaluate your knowledge of the various concepts in the lecture and labs.

Study Tips

- It is recommended that you form small study groups and study together in the library or other locations without TV, stereo or other distractions.
- Before you begin reading a chapter, make a very quick outline using the chapter subheadings, this will give you some idea of what the chapter is all about and how it is organized.
- You should read ahead of the schedule. So, when you come to class you can ask questions.
- When studying, ask yourself how this information would be applied.
- Come to office (student) hours and ask questions if there is material you do not understand.
- Ask questions in class! This is graded and you can earn free points.

Grading: Your grade will depend on how well you do on the exams, quizzes, and lab report. Expect the following grading scale (based on the total number of points actually assigned:

Grade Calculation	
Category	**Possible weight**
Lecture Exam 1	20%
Lecture Exam 2	20%
Lecture Exam 3	20%
Quizzes	5%
Lab Exam 1	15%
Lab Report	15%
Participation	5%
Total	**100%**

Grade distribution	
Letter	**Percentage**
A	89-100%
B	79-88%
C	69-78%
D	59-68%
F	⩽58%

Notes on grading: Students should note that a grade of "A" in this course represents an exemplary command of the material covered. To obtain this grade of excellence, it is recommended that students study daily, be prepared to participate in class discussion and laboratory sessions, and clarify with their instructor any problems regarding course information, as they arise.

Cheating or Plagiarism

- Incidents of cheating or plagiarism will result in an automatic "**F" grade for the course and referral to the Office of Student Conduct for disciplinary action.**
- For the VSU's Academic Integrity Code please see http://www.valdosta.edu/administration/student-affairs/student-conduct-office/
- For the VSU's Academic Honesty policies and procedure please see https://www.valdosta.edu/administration/student-affairs/student-conduct-office/student-code-of-conduct/appendix-a-academic-integrity/academic-integrity-code.php
- VSU's Academic Student Conduct Code states that "no student shall engage in plagiarism, which is presenting the words or ideas of another person as if they were the student's own." Content generated by an Artificial Intelligence third-party service or site (AI-generated content) without proper citation is another form of plagiarism. If you are unsure about whether something may be plagiarism or another form of academic dishonesty, please reach out to me as soon as possible.

COVID-19 related policy

As the Blazer Creed articulates, members of the VSU community are expected to live by the high standards of

civility, integrity, and citizenship and embrace their responsibility as a member of the Blazer community. In recognition of this responsibility, and in response to the best available science and current guidance from the Centers for Disease Control and Prevention and the Georgia Department of Public Health, while face coverings are no longer required, individuals are strongly encouraged to continue wearing a face covering indoors. **Unvaccinated individuals are strongly encouraged to get vaccinated. Vaccines remain available at no cost for all members of the university community by appointment at Student Health Services.**

Learning Support

- **Access Office**: Students with disabilities who are experiencing barriers in this course may contact the Access Office for assistance in determining and implementing reasonable accommodations. The Access Office is located in Farbar Hall. The phone numbers are 229-245-2498 (V), 229-375-5871 (VP) and 229-219-1348 (TTY). For more information, please visit VSU's Access Office or email: access@valdosta.edu.
- **The Academic Support Center**: The Academic Support Center provides free peer tutoring for most core courses and some upper-division courses. It also offers time management and study skills workshops as well as other learning support services. Call 333-7570 to make an appointment, or visit the website: https://www.valdosta.edu/asc/
- **Odum Library** provides a variety of services to assist classroom instruction, including library instruction, course reserves, and interlibrary loan. Please see https://www.valdosta.edu/academics/library/ for further information.
- **Title IX Statement:** Valdosta State University (VSU) upholds all applicable laws and policies regarding discrimination on the basis of race, color, sex (including sexual harassment and pregnancy), sexual orientation, gender identity or expression, national origin, religion, age, veteran status, political affiliation, or disability. The University prohibits specific forms of behavior that violate Title IX of the Education Amendments of 1972. Title IX of the Education Amendments of 1972 prohibits discrimination on the basis of sex in education programs and activities that receive federal funding. VSU considers sex discrimination in any form to be a serious offense. Title IX refers to all forms of sex discrimination committed against others, including but not limited to: sexual harassment, sexual assault, sexual misconduct, and sexual violence by other employees, students or third parties and gender inequity or unfair treatment based on an individual's sex/gender. The designated Title IX Coordinator for VSU is Ms. Selenseia Holmes. To view the full policy or to report an incident visit: https://www.valdosta.edu/administration/student-affairs/title-ix/

Privacy Act (FERPA): The Family Educational Rights and Privacy Act (FERPA) prohibit the public posting of grades by Social security number or in any manner personally identifiable to the individual student. No grades can be given by email or over the telephone, as positive identification cannot be made by this manner.

Student identification: Students should have in their possession at all times their VSU student identification card. In order to verify the identification of students officially enrolled in the course, it is the instructor's prerogative to request official student photo identification cards at any time during lecture or during exams.

Students with Disabilities: Students requesting classroom accommodations or modifications because of a documented disability should discuss this need with the instructor at the beginning of the semester. These students must contact the Access Office for Students with Disabilities located in Farber Hall. The phone numbers are 245-2498 (V/VP) and 219-1348 (TTY).

Upon completion of this course the student should be able to:

Course outcomes support the VSU Biology Department Outcomes # 1, 3, & 4 and the University General Educational Outcomes # 4, 5 & 7 as listed in the VSU Undergraduate Catalogue (see below).

VSU Biology Department Objectives:

BO1. Develop and test hypotheses, collect and analyze data, and present the results and conclusions in both written and oral formats.

BO3. Demonstrate an understanding of the cellular basis of life.

BO4. Relate the structure and function of DNA/RNA to the development of form and function of the organism and to heredity.

VSU General Educational Outcomes:

GE4. Students will express themselves clearly, logically, and precisely in writing and in speaking, and they will demonstrate competence in reading and listening.
GE5. Students will demonstrate knowledge of scientific and mathematical principles and proficiency in laboratory practices.
GE7. Students will demonstrate the ability to analyze, to evaluate, and to make inferences from oral, written, and visual material.

Experiential Learning Syllabus Statement

This course includes an Experiential Learning opportunity carefully designed to allow students to explore concepts, skills, and principles beyond the traditional classroom, lab, or studio. Students will have opportunities to make connections across campus, collaborate with others, and apply and synthesize what they have studied in the course. In addition to the experience, students reflect on what they have learned during and at the completion of the course/activity to deepen their learning. Reflections help students transfer skills and concepts to different contexts including 'real-world' settings. For more information about Experiential Learning please visit https://qep.valdosta.edu/experiential-learning/.

Tentative schedule: Please check BV for any changes that may occur during the semester.

		LECTURE	LAB
Day	**Date**	**Topic**	**Topics**
Tue	20-Aug	Syllabus overview	**LAB 1:** Lab overview – Goals and Expectations. Completion of online pre-course survey.
Thu	22-Aug	Lecture 1 - Plant cell structures	
Tue	27-Aug		**LAB 2:** Basic lab techniques, buffers, dilutions,
Thu	29-Aug	Lecture 2 - Energy processes	
Tue	3-Sep		**LAB 3:** Organization of CEBOT devices and Plant stress experiments / Raspberry Pi set up/ Arabidopsis, Tomato and Peanut plant set up
Thu	**5-Sep**	**Review/Q&A**	
TUE	**10-SEP**	**LECTURE EXAM 1**	**LAB 4:** Plant microscopy – Organelle visualization
Thu	12-Sep	Lecture 3 – Nitrogen fixation	
Tue	17-Sep	Lecture 3 – Nitrogen fixation	**LAB 5:** Arabidopsis genomic DNA isolation and PCR analysis – PART I and II
Thu	19-Sep	Lecture 4 – Plant Stress biology – 1	
Tue	24-Sep	Lecture 4 – Plant Stress biology – 1	**LAB 6:** Arabidopsis total isolation and SDS-PAGE gel analysis
Thu	26-Sep	Lecture 5 – Plant Stress biology – 2	
Tue	1-Oct	Lecture 5 – Plant Stress biology – 2	**LAB 7: DYI labs** - Arabidopsis genomic DNA isolation, PCR, Protein isolation and SDS-PAGE gel analysis
Thu	3-Oct	Lecture 6 – Plant Stress biology – 3	
Tue	**8-Oct**	**Review/Q&A**	**LAB EXAM 1**
THU	**10-Oct**	**LECTURE EXAM 2**	
Tue	**15-Oct**	**NO CLASS FALL BREAK**	
Thu	17-Oct	Lecture 7 – Plant Biotechnology 1	**QEP ACTIVITY Pre-activity survey:** https://valdosta.co1.qualtrics.com/jfe/form/SV_0weyvpRR1MusIce
Tue	22-Oct	Lecture 7 – Plant Biotechnology 1 Lecture 8 – Plant Biotechnology 2	**LAB 8:** Stress to plants from Lab 3 and monitoring health – Photosynthetic efficiency/ Image J introduction. **Lab report preparation**
Thu	24-Oct		**QEP ACTIVITY**
Tue	29-Oct	Lecture 8 – Plant Biotechnology 2	**LAB 9:** Monitoring plant health – Photosynthetic efficiency/ Image J Analysis. **Lab report update**
Thu	31-Oct	Lecture 9 – Plant Biotechnology 3	**QEP ACTIVITY**
Tue	5-Nov	Lecture 9 – Plant Biotechnology 3	**LAB 10:** Monitoring plant health – Photosynthetic efficiency/ Chlorophyll and Anthocyanin estimation. **Lab report update**
Thu	7-Nov	Lecture 10 – Plant Biotechnology 4	**QEP ACTIVITY**
Tue	12-Nov	Lecture 10 – Plant Biotechnology 4	**LAB 11:** DYI Monitoring plant health – Photosynthetic efficiency/ Chlorophyll and Anthocyanin estimation **Lab report update**
Thu	14-Nov	Lecture 11 – Plant Biotechnology 5	**LAB 12: Lab report readiness and Peer Review**
Tue	19-Oct	Lecture 11 – Plant Biotechnology 5	**Post-activity survey:** https://valdosta.co1.qualtrics.com/jfe/form/SV_0weyvpRR1MusIce
Thu	21-Nov	**Lab Report finalization and upload to BlazeVIEW**	
Tue	26-Nov		
Thu	28-Nov	**NO CLASS THANKSGIVING BREAK**	
Tue	**3-Dec**	**Lecture Exam 3**	
Thu	**5-Dec**	**Optional Comprehensive Exam 8:45 AM – 10:00 AM**	