

BIOLOGY 130—Introduction to Plant Biology (5 Credits)
Syllabus for Semester II, "Spring" Semester, 2012-2013

Instructor for lecture and lab sections 3, 4, and 5: Ed Gasque
TNR 446, Office Hours TR 12:00-1:00 PM, F 10:00-11:00 AM & by appointment
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Instructor for lab section 6: John Hardy
TNR 155A, Office Hours TR 3:00-4:00 PM & by appointment
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In Biology 130, Introduction to Plant Biology, we will explore the fascinating world of plants in the context of biological principles that unify all forms of life. We will examine characteristics, life cycles, reproduction and evolutionary relationships of bacteria, archaea, protists, fungi, animals and plants. This is an entry-level course, designed primarily as a foundation in biological principles for freshman biology and natural resources majors.

As instructors, we will endeavor to:

- present material in a clear, straightforward and enthusiastic style.
- foster a stimulating and comfortable learning environment in the classroom, one that promotes mutual respect between students and instructor.
- encourage students to ask questions and participate in classroom discussions.
- devise exams and quizzes that are challenging yet fair.

As a student in Biology 130, your goal for the semester is to build a knowledge base for understanding:

- basic principles related to the scientific method, cell structure and function, cell division, plant anatomy, plant water relations, membrane structure and function, transmembrane solute transport, enzyme structure and function, metabolism, cellular respiration, photosynthesis, plant growth regulation, plant genetics and plant ecology, and the application of these principles.
- the diversity of life, in terms of characteristics and evolutionary relationships between the major groups of life—bacteria, archaea, protists, fungi, animals and plants.
- the importance of plants in the biosphere and the relationships between people and plants.

Along the way, you will also learn:

- how the study of bacteria, protists, fungi and plants in the laboratory leads to discoveries about life at the cellular, biochemical, genetic, physiological, organismal, ecological and evolutionary levels.
- how to successfully transition to upper-division courses in areas of specialization such as genetics, cell and molecular biology, microbiology, ecology, plant taxonomy, plant morphology and anatomy, plant physiology, phycology, mycology, and forestry.

By semester's end, students should be able to define key terms, describe processes, explain principles, analyze and interpret observations/data, and apply knowledge pertaining to each of the following topics:

- The scientific method and the testing of hypotheses
- The three domains of life—bacteria, archaea and eukaryotes
- The common and distinguishing features of prokaryotic, eukaryotic, protist, fungal, plant, and animal cells
- How biologists use different types of light and electron microscopes to learn about cells
- The eukaryotic cell cycle, cell cycle control, programmed cell death, and cancer
- The process of mitotic cell division through all of its stages
- The external and internal anatomy of the roots, stems and leaves of plants
- The special properties of water as the universal solvent of living systems
- Mechanisms whereby water and nutrients are transported in the xylem and phloem tissues of plants
- Mineral nutrients required for plant growth
- Consequences of mineral nutrient deficiencies in plants
- Global nutrient cycles—particularly the nitrogen cycle and the carbon cycle
- The structure and function of membranes, including the plasma membrane and organelle membranes

- Mechanisms employed by cells for the transport of solutes across membranes
- Enzymes as biochemical catalysts
- How cells harvest energy from food molecules through cellular respiration
- How plants harvest energy from sunlight to convert carbon dioxide gas into food through photosynthesis
- The different strategies used by organisms to obtain energy—producers vs. consumers vs. decomposers
- How plant growth is regulated by internally by hormones and externally by light, temperature and gravity
- The process of meiotic cell division through all of its stages
- Principles of inheritance, as related to meiosis, gamete formation, segregation of homologous chromosomes, and independent assortment
- Problems in classical genetics—how to set up and analyze problems through the use of Punnett squares
- Predicting genotypes and phenotypes of offspring from the genotypes and phenotypes of parents
- The central dogma of molecular genetics—DNA to RNA to protein
- Molecular genetic processes—DNA replication, RNA transcription and protein synthesis (translation)
- The distinction and relationship between genotypes and phenotypes
- Biotechnology, cloning, and genetic engineering
- Characteristics that distinguish bacteria, archaea, plant-like protists, fungal-like protists, true fungi, mosses, liverworts, ferns, fern allies, gymnosperms and angiosperms
- Evolutionary relationships between bacteria, protists, fungi, animals, and plants
- The three basic life cycle types, and the sexual and asexual life cycles of protists, fungi and plants
- Basic ecological principles, including symbiosis and competition, in light of specific examples

The degree to which students have succeeded in meeting course goals and outcomes will be evaluated by the instructor using the following assessment tools:

- Lecture exams scheduled during evening sessions and the final exam period
- Clicker quizzes given at the start of lecture periods
- Lab quizzes given at the start of selected lab periods
- Lab reports based on selected experiments
- A common plants of Wisconsin identification test

In order to adequately prepare for these assessments, students should study lecture and lab materials on a regular basis and should be able to:

- describe, explain and apply principles, concepts and information conveyed in figures and tables organized into classroom PowerPoint presentations.
- answer chapter-end “Review Questions” and “Applying Concepts” questions assigned by the instructor from the *Plant Biology* text by Graham, Graham and Wilcox, including variations of these questions.
- answer relevant and assigned questions from sample exams posted on the Biology 130 D2L website.
- answer questions based on the instructor’s lab introductions, laboratory work performed in class, questions assigned from the *Essentials of Botany* lab manual, and questions based on lab review documents posted on D2L.
- prepare clearly written lab reports that adhere to the guidelines set forth by the instructor.

Course Mechanics and Policies

- **Lectures** are on Tuesdays, Thursdays and Fridays, from 9:00 to 9:50 AM in TNR 120. Students in all lab sections (3, 4, 5, and 6) attend the same lectures (lecture section 2, as listed in the timetable). Lectures are digitally recorded and posted on the course D2L website for *review purposes only*. Listening to lecture recordings does *not* substitute for regular attendance of lectures. **Clicker quizzes are given in lecture only and cannot be made up.**
- **Attendance in Lecture** is monitored through the use of clickers. For further details regarding the use of clickers to monitor attendance and preparation in this course, refer to the information under **Clicker Quizzes**.
- **Labs** for sections 3, 4, and 5 (taught by Gasque) are on Mondays and Wednesdays in TNR 153. Lab section 3 meets 10:00 to 11:50 AM, lab section 4 meets 13:00 to 14:50 (1:00 to 2:50 PM), and lab section 5 meets 15:00 to 16:50 (3:00 to 4:50 PM), on both Mondays and Wednesdays. Labs for lab section 6 (taught by Hardy) meet from 10:00 to 11:50 AM in TNR 157 on both Tuesdays and Thursdays.

- **Attendance in Lab** is mandatory and is recorded by the instructor for each lab session. Unless a valid and appropriately documented excuse (e.g., field trip for another course, illness, family emergency) is provided, a penalty of 5 points will result for each unexcused absence from lab. *It is entirely the student's responsibility to inform the instructor if an absence from lab is due to illness or other valid reasons; otherwise, it will be assumed that the absence is unexcused and a 5-point penalty will be entered into the course grade book.* In order to avoid such a penalty, arrangements can often be made for a student to attend an alternate lab section, if the student contacts the instructor in a timely manner.

In order to avoid a 5-point penalty for an unexcused lab absence, a student must send an email message to their lab instructor with the subject line "Request for Excused Absence from 130 Lab" no later than 5:00 PM on the same day as the missed lab. The message must include the reason for the absence. The instructor will reply, confirm the excused absence, indicate whether or not further documentation is required, and offer alternatives to make-up the missed lab. Although it is possible for students in one of Gasque's lab sections to attend Hardy's lab section in order to make up a missed lab period, and vice versa, the two lab instructors will be developing their lab quizzes independently.

- The **D2L Website** for this course is located at <http://www.uwsp.edu/d2l/Pages/default.aspx>. Although Biology 130 is *not* an on-line course, important information, including unit guides, chapter outlines, PowerPoint slide sets, information about upcoming exams, lecture and review recordings, sample exams and exam keys, keys for lecture clicker quizzes and lab quizzes, lab review documents, and other relevant course materials are posted on the Biology 130 D2L website.
- The **Text** is *Plant Biology*, 2nd edition by Graham, Graham, and Wilcox (2006, Pearson Prentice Hall). Obtain the text through text rental at the UWSP Bookstore in the Dreyfus University Center. Frequent references to figures, photographs and tables in the textbook will be made in class. These images are organized in PowerPoint slide sets for display in class using a computer and an LCD projector. The PowerPoint files are posted on the D2L website. Please print out the appropriate PowerPoint slide sets as handouts and bring them with you to class. Unit guides, which include chapter outlines, are also posted on D2L; students are responsible for printing out their own unit guides.
- The **Lab Manual** is *Essentials of Botany—Laboratory Manual for Introductory Botany*, Seventh Edition, compiled and written by the UWSP botany faculty and edited by John Hardy and David Hillier. Purchase the manual at the UWSP Bookstore (cost \$22.00) before the lab session on Wednesday, January 23 (for sections 3, 4, and 5) or Thursday, January 24 (for section 6). Bring your lab manual to all lab periods. **Please do not use an older (used) edition of the lab manual.**
- **Students with Learning Disabilities:** If you need special accommodations due to a learning disability, please consult the staff in the Disability and Assistive Technology Center (<http://www.uwsp.edu/disability/Pages/default.aspx>) in LRC 609 in the Learning and Resources Center (715-346-3365; disserv@uwsp.edu). **Inform the instructor(s) regarding necessary accommodations well in advance of the first exam or first lab quiz.**
- **Exam Review Sessions** are scheduled for the following dates and times. Attendance of the exam reviews is recommended but optional. Review sessions will be recorded and posted on the Biology 130 D2L website.
 - Exam 1 Review: Tuesday, February 19, 6:00 to 7:00 PM, in TNR 170
 - Exam 2 Review: Tuesday, March 19, 6:00 to 7:00 PM, in TNR 170
 - Exam 3 Review: Tuesday, April 23, 6:00 to 7:00 PM, in TNR 170
 - Exam 4 Review: Sunday, May 12, 3:00 to 4:00 PM in TNR 120 (tentative)
- **Exams** are scheduled for the following dates and times. There will be four exams, and each will consist of 100 possible points and will contain about 2 to 4 bonus points for a built-in curve. Each exam will cover **lecture materials as well as any lab materials that are integrated into the lectures.** One week prior to each exam, students will be given information regarding the coverage of specific materials. Each exam will consist of two parts: Part A—a multiple-choice, true-false "scantron" portion for which your responses will be marked on a computer-scored sheet; and Part B—a written portion, consisting of short-answer, short-essay, matching, labeling and/or sketching and/or diagramming questions. The point distribution on the exams will be in the general range of 75/25 to 85/15 between Part A/Part B. Two to four bonus points are included in each exam, with bonus questions added to one or both parts of the exam. Alternate exam times are available but very limited for those with sufficient justification such as course, job or family-related conflicts. Exam 4 is given during final exam week and will include 15 points worth of review questions from the three earlier exams, 5 points from each of the three previous exams. **Students are expected to make every effort to take exams during the scheduled days and times specified in the timetable.**

- Exam 1: Thursday, February 21, 6:00 to 8:00 PM, in TNR 170
 - Exam 2: Thursday, March 21, 6:00 to 8:00 PM, in TNR 170
 - Exam 3: Thursday, April 25, 6:00 to 8:00 PM, in TNR 170
 - Exam 4: Monday, May 13, 8:00 to 10:00 AM in TNR 120
- Regarding **Make-up Exams**, all students must take the same four exams that are prepared by the instructor for the Thursday evening exam sessions and the final exam period. If a student fails to take an exam during the scheduled exam session or at a pre-arranged alternative time *without* providing the instructor a valid excuse *in advance* of the scheduled/pre-arranged time, then a score of zero will be recorded for that exam. No separately written make-up exams are prepared by the instructor; no make-up versions of any of the four exams will be available.
 - **Clicker Quizzes** are administered at the start of every lecture session, beginning on Friday, January 25. It is recommended that you obtain your clicker and bring it to class for the first time on Thursday, January 24, at which time the instructor will go over the use of clickers and run an initial test to ascertain whether or not all of the student clickers are properly registered and sending signals correctly to the receiver in the classroom. **After January 24, students should remember to bring their clickers to each and every lecture period.**

You are required to lease a clicker for the semester at a cost of \$8.00. You will need your UWSP Student ID to lease a clicker, and the \$8 fee is automatically added to your UWSP account. Clickers are available through the **Help Desk in LRC Room 025**. Please note that if you fail to return your clicker at the end of the semester, you will receive a late fee and possibly a charge to cover the cost of the clicker (about \$40). A general guide to using your clicker is located at the following web link: <http://www4.uwsp.edu/it/instructionalSupport/tltn/clickers/FirstDayUsingClickers.pdf>.

Each lecture session, starting on Friday, January 25, will begin with an opportunity for students to ask questions, followed immediately by a clicker quiz. Each clicker quiz will consist of four questions based on information from the *previous lecture*. Clicker quizzes are administered only in lecture, not during lab sessions. If a student answers all four questions correctly, he/she receives a “clicker score” of 5; one of the five points is for attendance. If a student answers three, two, or one of the questions correctly, he/she receives a “clicker score” of 4, 3, or 2, respectively (with one point for attendance). If a student does not answer any of the clicker questions correctly but is still present in class and submits clicker responses, he/she receives a “clicker score” of 1 for attendance. If a student is absent from class but provides a valid reason (e.g., illness, required field trip or athletic event) to the instructor, he/she will receive a “clicker score” of 1 for an excused absence. If a student fails to bring his/her clicker to class, he/she can still receive a “clicker score” of 1 for attendance if the instructor is informed at the end of class. If a student is absent from class without a valid reason, or if a student forgets to bring his/her clicker to lecture and fails to inform the instructor at the end of class, he/she will receive a “clicker score” of zero. Clicker quizzes are worth a total of 75 points for the semester. A student’s total clicker quiz points for the course is determined by dividing the sum of all of his/her “clicker scores” by the total possible “clicker score” sum for the semester, multiplying by 75, and then rounding to the nearest 0.1 point. For example, let’s say that there are 40 clicker sessions during the semester. Since a student could earn a maximum “clicker score” of 5 for each session, the total possible “clicker score” sum for the semester is 40 x 5 or 200. Let’s say that, for a particular student, the sum of all of his/her “clicker scores” for the semester is 170. The total clicker points earned by this student for the semester would be calculated as follows: $170/200 \times 75 = 63.8$ points out of 75 points.

- **What to do if you forget your clicker or if your clicker does not work properly during the quiz:** Again, if you forget your clicker on any given lecture day, stop by the instructor’s desk at the end of class and inform him of your presence; a “clicker score” of 1 for attendance will be entered into the clicker report manually. On **no more than one occasion** on which you forget your clicker during the course of the semester, you may submit your handwritten clicker responses on a sheet of paper to the instructor at the end of class. The sheet must include your name and the date, and clicker responses must be clearly indicated by question number (1, 2, 3, 4) and response number for each question (1, 2, 3, 4). Handwritten responses will also be accepted if a student’s clicker is not working properly; however, the instructor reserves the right to inspect the clicker and advise the student whether or not to return the clicker to the IT Help Desk for battery replacement, repair, or replacement. ***If at any point in the semester a student gets a new clicker, he/she must inform the instructor at the start of the first lecture in which it is used so that it is registered properly.***
- **Clicker Quiz Rules** include the following: Students may refer to their own lecture notes only and must answer questions independently. The time allowed to answer each question (20 seconds) assumes that students have thoroughly reviewed material from the previous lecture. If a student is absent from lecture for a valid reason, he/she must send an email message to the lecture instructor with the subject line ***“Request for Excused Absence from 130 Lecture” no later***

than 11:00 AM on the same day as the missed lecture, in order to receive a clicker score of 1 point for attendance. The message must include a valid reason (e.g., illness, personal emergency) for the absence. **Students may not consult one another during a clicker quiz; doing so comes with the risk of receiving a score of zero.**

- **Clicker Reports** are maintained by the instructor for each clicker quiz. Each report lists the clicker quiz questions that were answered correctly and incorrectly by each student. A copy of each report, in which students are listed only by their student ID numbers, is posted on the Biology 130 D2L website. A copy of each clicker quiz given in lecture, with indications of correct answers, is also posted on D2L. These files are typically posted within a few hours after lecture.
- **Lab quizzes** will be administered periodically throughout the semester. **A total of eight (8) lab quizzes will be given. Only the six (6) highest lab quiz scores earned are factored into a student’s final course average.** If a student takes all 8 lab quizzes, then his/her 2 lowest quiz scores are dropped. If a student takes 7 of the 8 quizzes, then his/her single lowest score is dropped. If a student takes 6 of the 8 lab quizzes, then none of his/her quiz scores is/are dropped. If a student takes less than 6 lab quizzes, then only the scores for the quizzes taken are factored into his/her final course average. The dates on which lab quizzes are given appear on the lab schedule provided by your lab instructor. Your lab instructor will also specify the exercises that are covered on each quiz in advance. Resources for review of lab materials include the lab review documents posted periodically on D2L, as well as the Biology 130 lab image website located at <http://www4.uwsp.edu/biology/courses/botlab/default.htm>.
- **Lab reports** are required for two of the exercises performed in lab during the course of the semester—the water potential determination exercise from Lab 9, and the plant breeding exercise from Lab 15. The report on the water potential exercise is worth 10 points, and the report on the plant breeding exercise is worth 25 points. The due dates for these reports are specified in your lab schedule. Further directions and guidelines for writing, printing, and submitting the lab reports will be provided by your lab instructor.
- A **Wisconsin Common Plant Identification Test** worth 50 points will be administered on two occasions during the semester. Refer to your lab schedule for the dates on which the Plant ID Test is administered. Students may take the Plant ID Test on one or both of these occasions. If a student takes the Plant ID test on both occasions, only the greater earned score will count and be permanently recorded in the grade book. There are no make-up dates for taking the Plant ID Test. On this test, you will identify plants by their common names from images found on the Common Plants of Wisconsin website, which is located at <http://www4.uwsp.edu/biology/courses/plantID/index.htm>. Descriptions of these plants, as well as definitions of terms used in these descriptions, are provided on pages 301-318 of the *Essentials of Botany* lab manual. Additional information regarding the plant identification test will be provided in class.
- The breakdown and distribution of **Points** that can be earned in Biology 130 are summarized below.

Lecture/Lab Exams:	400 points (4 exams, 100 points each)
Lecture Clicker Quizzes:	75 points (see information above under Clicker Quizzes)
Lab Quizzes:	240 points (8 quizzes given, 40 points each, 2 lowest scores dropped)
Lab Reports:	35 points (2 reports, one 10-pt report and one 25-point report)
Common Plant ID Test:	50 points (1 test worth 50 points)
Total:	800 points total for the course

Lecture exams and clicker quizzes count for about 59% (475/800 points) of your final average, while lab quizzes, lab reports, and the plant ID test count for approximately 41% (325/800 points) of your final average in the course.

- **No Extra Credit** will be offered or given to any member of the class. Students are encouraged to prepare for and perform to the best of their abilities on those assessments which are used to evaluate all members of the class fairly and equally—lecture exams and clicker quizzes, lab quizzes, lab reports, and the plant ID test. **NO extra credit is available to anyone!**
- Your **Biology 130 Grade** is determined by dividing the total number of points that you earn by 800, then multiplying by 100, and rounding to the nearest 0.1%, and finally by applying the following grading scale strictly and without exception.

91.0-100	A	79.0-79.9	C+		
90.0-90.9	A-	71.0-78.9	C		
89.0-89.9	B+	70.0-70.9	C-		
81.0-88.9	B	69.0-69.9	D+		
80.0-80.9	B-	60.0-68.9	D	00.0-59.9	F

- The **Biology 130 Grade Book** is updated periodically during the semester, as soon after the scores for each of the four exams have been determined as possible. Each grade book update includes exam scores, clicker points, lab quiz scores, lab report scores (when appropriate), total earned points, and current average in the course. A copy of each grade book update, organized by student ID numbers, is posted on D2L. About the time that each grade book update is posted, a **cumulative update of the clicker reports** is also posted on D2L. Each cumulative clicker report update includes the clicker quiz scores, the sum of clicker quiz scores, and the current earned clicker points for each student (identified by student number only). The last grade book update that is posted on D2L is the final grade book for the course and includes the letter grades earned by students in the course.
- Grades of **Incomplete (I)** are *rarely* given, and then only under *extremely extenuating circumstances*. Students are expected to be present in lecture for clicker quizzes, take lecture exams and lab quizzes as scheduled, take the plant ID test during one or both scheduled sessions, and submit lab reports by due dates indicated by the lab instructor. A request for a grade of incomplete must be provided in writing, along with a signed note from a physician (in the case of a medical situation) or a family member (in the case of a family emergency). The instructor reserves the right to deny a grade of incomplete in the absence of sufficient justification.
- According to the U.S. Census Bureau (*Current Population Survey*, March 2005), less than 20% of the U.S. population 25 years or older attained a baccalaureate degree. Upon graduation you will join that select group. The professional responsibilities that come with a college degree include an expectation that you will play a role in upholding high ethical standards in society. Your **responsibilities** in this course include the following:
 - You will adhere to the **Student Academic Standards** outlined in Chapter UWS 14 of the *Wisconsin Administrative Code* (<http://www.uwsp.edu/stuaffairs/Documents/RightsRespons/SRR-2010/rightsChap14.pdf>). **Cheating or plagiarism** related to any of the course assessments will result in a score of zero for that assessment.
 - You will strive to attend class regularly and arrive promptly for the start of class (lecture as well as lab).
 - You will strive to take a good set of notes for each lecture and each lab introduction.
 - You will strive to study course materials on a regular basis. For a course like Biology 130, studying at least an hour every day is highly recommended. Rewriting your notes, thinking about what you are writing as you go, and filling in any gaps in these notes using the text and/or lecture recordings may your mastery of course materials.
 - You will silence the ringer on your cell phone whenever you are in the classroom (lecture and lab). You will not place or answer calls, send or receive text messages, or access voicemail while you are in the classroom (lecture room as well as the laboratory).
 - You will not use your cell phone as a calculator on any exam or quiz.
 - You will not use iPods or other mp3 players while you are in the classroom or while taking exams.
 - You will not use your laptop or tablet computer in the classroom for activities *unrelated* to class.
 - You will not talk excessively in class while the instructor is speaking, unless you are asking a question or participating in class discussions.
 - You will not sleep in class.

Sequence of Units/Chapters in the *Plant Biology* Text (Chapters combined for some units. Chapter 3 covered in selected units)

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|--------------------------------------------------------|-----------------------------------------------------------|
| ◆ Chapter 1: Introduction to Plant Biology | ◆ Chapter 6: DNA and RNA |
| ◆ Chapter 2: Plants and People | ◆ Chapter 15: Genetic Engineering |
| ◆ Chapter 4: Cells | ◆ Chapter 16: Biological Evolution |
| ◆ Chapter 7: Cell Division | ◆ Chapter 17: Naming and Organizing Plants and Microbes |
| ◆ Chapter 8: Plant Structure, Growth, & Development | ◆ Chapter 18: Prokaryotes and the Origin of Life on Earth |
| ◆ Chapter 9: Stems and Materials Transport | ◆ Chapter 19: Protists and the Origin of Eukaryotic Cells |
| ◆ Chapter 10: Roots and Plant Nutrition | ◆ Chapter 20: Fungi and Lichens |
| ◆ Chapter 11: Leaves: Photosynthesis and Transpiration | ◆ Chapter 21: Seedless Plants |
| ◆ Chapter 5: Photosynthesis and Respiration | ◆ Chapter 22: Gymnosperms and the First Seed Plants |
| ◆ Chapter 12: Plant Behavior | ◆ Chapter 23: Angiosperm Diversity and Reproduction |
| ◆ Chapter 13: Reproduction, Meiosis, and Life Cycles | ◆ Chapter 24: Flowering Plant and Animal Coevolution |
| ◆ Chapter 14: Genetics and the Laws of Inheritance | ◆ Chps 25-29: Ecology & Adaptations to Environment |