B I O L O G Y  1  
SJSU  
COURSE INFORMATION  
(Greensheet)

Biology 1 (Plant Biology) is the first course in the lower division core sequence for biology and associated majors: Biology 1, Biology 2 (Animals), Biology 3 (Cells). This course serves to introduce various aspects of plant biology, including plant origins and evolution, structure, function, ecology, and diversity. In addition to typical plants, bacteria, fungi, and algal protists are covered. Also covered are several general biological topics necessary in all fields of biology, including cell structure, water and solute movement, population growth, cell division, Mendelian genetics, evolution, and the scientific method. This course serves as preparation for more in-depth study of those subjects in upper division courses.

Prerequisites: eligible for English 1A (passed English Placement Exam), and some proficiency in Chemistry (completion of Chem 10, a good high school chemistry course, or eligibility for Chem 1A).

Note: A grade of C or better in Bio 1 is required for enrollment in Bio 2 and 3. Students are allowed to repeat Bio 1 only once.

INSTRUCTOR: Dr. Rod Myatt   DH 354 (Herbarium Office)  924 - 4834
Office Hours:    MW 11:00 - 12:00;  W 4:00 - 5:30; or by appointment.
E-mail:   rmyatt@email.sjsu.edu
(I check my email and phone messages at the beginning and end of each day; email is probably the most effective way of getting a response)

LECTURE:   MW 2:30 – 3:45 in Science 142.

LAB: All labs are in Duncan Hall 337. Each section meets once a week for three hours.

TEXTBOOK and LABORATORY MANUAL
(Note: last year’s text, Campbell and Reece, or any other general botany or college biology text would also be satisfactory).
(information on availability will be given during first week of class)

OTHER MATERIALS
Dissecting tools, including microscope slides, coverglasses, forceps, dissecting needles, razor blades, metric ruler. Most of these will be available in the lab, or purchase your own.
Packet of SCANTRON Test Forms # 882. (or 3 individual forms)

LECTURES AND TEXT
Lecture material will be presented to support the current laboratory topic and to introduce other interesting aspects of plants. The text should serve to supplement the lectures, and often give reinforcement to your learning for both lecture and lab. All lecture exams are based on materials covered in lecture and lab; information and topics presented in the text that are not covered in lecture or lab will not be on the exams.
LABS AND LAB MANUAL

The manual, Plant Biology Lab Manual and Study Guide, will direct your laboratory activities. You will be directed to perform some particular tasks, read from available sources, watch a video tape, or visit a table with demonstration materials. This approach is designed to integrate the information that is traditionally separated into lecture, lab, and reading, and also to permit you to proceed in the learning activities somewhat at your own pace. If you are not able to complete the work within your reserved lab time, you may visit one of the other labs if there is space available. You must let the lab instructor of the lab you are visiting know and agree. Lab displays must be dismantled after the week of labs to set up the next week's displays, therefore most materials will not be available after the current week. University regulations prohibit us from allowing students in the lab during hours not regularly assigned to class times, so you will not be able to complete lab activities outside of normal lab hours. You are expected to read the manual and text assignment before coming to lab so that your time there will be used efficiently. You need to bring the manual with you to each lab period, and the text if it is feasible. The illustrations and information within the text are helpful for doing the lab exercises. Your lab instructor is responsible for giving quizzes and grading those and the various lab assignments so you will need to check with her/him about the specifics of these items. I encourage you to talk to your instructors (me and the lab instructors) to clarify any problems encountered in your study. We are all here to help you learn.

EXAMS, QUIZZES, AND ASSIGNMENTS

There will be three lecture exams and one large lab test (see the schedule). Each exam (including the final) will cover material since the previous exam, although some amount of overlap is expected. The exams given in lecture will include information from both lecture and lab, since both venues cover the same basic topics. Each lecture exam will consist of multiple choice and short answer questions. The lab test at the end is of a practical type, testing your knowledge of lab procedures, plant structures seen in lab, and topics specifically covered in lab.

Lecture exams can be made up only if you have a valid excuse (medical, etc.). You should make every effort to contact me before the exam. Make-ups will be essay-type exams and must be done within a week. The likes of “I’ve just been too busy to study”, or “I have a try-out on American Idol” just wont do. Scores on make-up exams may be reduced 5% to partially equalize the extra days advantage. There will be no make-up lab exam! Exam keys will be posted after each exam in the glass case across from the lab (DH 337). Individual copies of the keys cannot be made available to students. After a graded exam is returned, you will be allowed one week to dispute the scoring of that exam.

In addition to the lecture exams, there will be approximately six lecture quizzes/assignments given approximately every other week, and may be unannounced. These will total fifty points (10 pts each), with the lowest score dropped. These cannot be made up if missed.

In lab there will be two short scientific papers and a number of other quizzes and group reports, requiring time management and preparation. A penalty of 2 percentage points per day will be levied in the case of late assignments, amounting to one letter grade per week. This is necessary to ensure fairness to those whose assignments are prompt.

Test and Assignment Values:

<table>
<thead>
<tr>
<th>Test Type</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lecture Exams (3)</td>
<td>100 pts ea.</td>
</tr>
<tr>
<td>Lab Exam</td>
<td>100</td>
</tr>
<tr>
<td>Lecture Quizzes</td>
<td>50</td>
</tr>
<tr>
<td>Lab Quizzes, etc</td>
<td>100</td>
</tr>
</tbody>
</table>

Growth Report       50    Fast Plant Report 40    Lab participation 10

TOTAL POINTS = 650
OBJECTIVES AND STUDY QUESTIONS

This course has several objectives, some general and some more specific. They include:

**Main objective**
To develop skills for scientific investigation while exploring and learning the biology of plants.

**More specific objectives**
To learn skills for doing science: hypothesize, plan experiments, make observation, collect data, analyze and present data, write scientific reports using the accepted format.
To become familiar with major organic molecules present in plant cells.
To differentiate among processes occurring at the molecular, cellular, and organismal levels in plants.
To examine plant cells as basic units for maintaining structure and function in plants.
To become familiar with the basic requirements necessary for early plant growth and development.
To explore chemical and physical processes involved in basic plant metabolism: photosynthesis and respiration.
To investigate the role of hormones and environmental factors in controlling plant growth.
To examine current hypotheses for explaining transport of water and organic molecules in plants.
To understand the differences, similarities, and evolutionary relationships among the major groups of plants.
To understand the principles of inheritance in plants and the basis of molecular and chromosomal genetics.
To understand the factors in the distribution of vegetation types and biomes on the earth, and the specific plant adaptations to various environments.
To recognize and understand the role of plants in the development and maintenance of life on earth.

You should review these objectives throughout the course and check that they are being met. If you have any concerns or questions about them, please see your instructors.

To help guide your study, more specific "objectives" and study questions for the lectures will be given to help you prepare for the lecture exams. There are also questions in the lab manual that you should answer before you leave the lab. Additional objectives may be provided for supplemental activities such as videotapes. Note that the answers to these questions will not normally be provided or checked, unless you request it of us. Note also that you are responsible for all material in the manual and in lecture whether covered by objectives or not. You will not be responsible for material in the text that is not covered specifically in lecture or by an objective in the lab manual.

GRADING
All scores will be combined and converted into a percentage to determine your course grade. Grades will be assigned according to the following approximate percentages, with some modifications based on lab performance and class average adjustments. Pluses and minuses will be assigned to those at the upper and lower ends, respectively, of each grade level. A grade of C or better is required for admittance into any course that requires Biology 1 as a prerequisite.
A = 90% and above (approx. 580 points out of 650)
B = 80 - 89% (approx. 520 - 580 / 650)
C = 65 - 79% (approx. 430 - 520 / 650)
D = 50 - 64% (approx. 325 - 430 / 650)
F = 49% and below

U = any student who has not officially withdrawn from the course and who has not satisfactorily completed a major portion of the course. Equivalent to an F.
I = an incomplete can only be given to a student who has satisfactorily completed most of the course, except for an important requirement such as the final exam or required reports. A valid excuse is required for the missed work.

You need to keep track of your points. Keep a running total so you can determine just where you are grade-wise. If you need help making adjustments to your study or learning procedures, come in and discuss it with me.

UNIVERSITY, COLLEGE, AND DEPARTMENT POLICY INFORMATION

**Cheating**

It should go without saying that cheating will not be tolerated. Plagiarism (submitting someone else's work as your own) is a form of cheating. Students should read the "Policy on Academic Dishonesty" in the University Catalog. Examinations will be proctored closely. If anyone is suspected of cheating, his/her exam or assignment will be examined closely, compared to those of neighboring students, and tested for possible cheating or plagiarism. Depending on the severity of the incident, the student may be given a "0" for the exam or assignment and not be allowed to drop the course, or a failing grade in the course. The academic integrity statement from the Office of Judicial Affairs:

Your own commitment to learning, as evidenced by your enrollment at San Jose State University, and the University’s Academic Integrity Policy requires you to be honest in all your academic course work. Faculty members are required to report all infractions to the Office of Judicial Affairs. The policy on academic integrity can be found at: [http://sa.sjsu.edu/judicial-affairs/index.html](http://sa.sjsu.edu/judicial-affairs/index.html).

You should also check out the on-line course on plagiarism at: [http://tutorials.sjlibrary.org/](http://tutorials.sjlibrary.org/).

**Drop, Add, and Academic Renewal Policies**

February 6 is the last day to drop through touchtone, without instructor consent. If you feel unprepared for the course, or suspect you will not be able to do the work adequately, please drop by that date. After that, withdrawing will not be easy. University and Department guidelines require serious and compelling reason to drop a course. Grades alone do not constitute reason to drop a course. February 13 is the deadline for adding. We will not accept any late adds. Students who received a grade lower than a C (C- or lower) are eligible for academic renewal for a one-time repeat of the course. The do, however, have to be added during the add period, and receive low priority on any waiting list. The url site with information on Academic Renewal is: [http://info.sjsu.edu/web-dbgen/narr/catalog/rec-1987.html](http://info.sjsu.edu/web-dbgen/narr/catalog/rec-1987.html). Information on late drop, probation, disqualification/reinstatement can be found at: [http://www.sjsu.edu.sac/](http://www.sjsu.edu.sac/).
Disabilities Policy

In compliance with the American with Disabilities Act if you need course adaptations or accommodations because of a disability, or if you need special arrangements in case the building must be evacuated, please make an appointment with me as soon as possible, or see me during office hours. Presidential Directive 97-03 requires that students with disabilities requesting accommodations must register with DRC to establish a record of their disability.

The most comprehensive and up-to-date listing of policies relevant to students can be found in the on-line catalog at:  http://info.sjsu.edu/static/catalog/policies.html.

FINAL POINTS

In my experience, the students who have done poorly in this class, in almost all cases, are those who did not attend lecture and lab on a regular basis. If your schedule, work, or home life do not permit you to attend regularly, then you should not take the class. It may seem difficult at times, and unfamiliar to many of you, but it is very basic and assuredly the easiest class you will take of your required major courses. If you do well in this class, then the others will also be easier. If you have a real desire to be a biologist, whatever the subject, and an attitude that learning is fulfilling, then you will do well.

Enjoy your semester in Botany, and learn all you can.

RM
First a few words about readings, assignments, and study. The text indicated here (Purvis, Sadava, Orians, and Heller, 7th ed.) is a reference. That is, you go to it to find information and answer questions that you have. You may have to be selective in what you read and learn from it; it has far more information than we will cover in this class. It complements and supplements what we cover in class (look up those terms if you are unfamiliar with them). To begin with, read, peruse carefully the table of contents of the text. Get a good idea from the sections how the study of biology is divided up. For the typical student it will also be a preview of the courses and areas of study you will be encountering after this course. What parts interest you now?

Parts 1 (Cells), 2 (Heredity), 3 (Development), 4 (Evolution), and 8 (Ecology) are general topics cutting across all fields of biology. You will definitely study these in more detail in later courses, so it will be important to get a good basis now. This course, as an introduction to biology, will touch on all of these topics to give you some of the background you need. However, since it is also about plants, much of Part 5 (Diversity: plants) and all of Part 6 will be emphasized.

As you progress in your career you are told less and less just what to read and learn and are expected more and more to search out information for yourself. By the time you graduate you should be pretty much an independent learner. To succeed in graduate school, and any career in science (or business, etc.) it is a necessity.

In your schedule of topics, which follows, I indicate the chapters in the text (Purvis, et.al.) that are relevant to the topic, but you should be able to select from those pages the information that corresponds to what we cover in lecture and lab. Some of you may even be using other texts (e.g. Campbell and Reece, etc.) in which you will have to find the chapter and page information yourselves. Any relatively up-to-date Biology or Botany text is adequate for this course. Use the contents pages and the index.

Besides being aware that the text covers more topics than we do in class, you will also note that some topics and points covered in class are not in the text; you will need to take good notes. For exam purposes you will be tested on only what is covered in lecture and lab. But you should not rely only on lecture to learn it. Reading the text and lab manual is really important.

Specific readings from Purvis, et. al., corresponding to topics covered in class:

**Outline and Schedule of Topics for Lecture**

<table>
<thead>
<tr>
<th>DATE</th>
<th>TOPIC</th>
<th>Reading Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan 25</td>
<td><strong>Introduction to Plants, Biology, and Science</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Some basic principles and themes in biology and Bio. 1</td>
<td>To the student, Contents,</td>
</tr>
<tr>
<td></td>
<td>Biology, Botany and Science; science and non-science</td>
<td>Chapter 1</td>
</tr>
<tr>
<td></td>
<td>Features of living organisms and the problems plants have to solve</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Needs and requirements of plants as living organisms</td>
<td></td>
</tr>
<tr>
<td>Jan 30</td>
<td><strong>Plant structure and adaptations</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Plant organs and their functions</td>
<td>Chpt. 35</td>
</tr>
<tr>
<td></td>
<td>Leaves, stems, roots</td>
<td>The Plant Body</td>
</tr>
<tr>
<td>Date</td>
<td>Topic</td>
<td>Chapters/References</td>
</tr>
<tr>
<td>-------</td>
<td>-----------------------------------------------------------------------------------------</td>
<td>----------------------------------------------</td>
</tr>
<tr>
<td>Feb  1</td>
<td>Cells, tissues, and growth of organs; meristems</td>
<td>Ch. 4: The Cell</td>
</tr>
<tr>
<td></td>
<td>Cell concept, functional efficiency and division of labor</td>
<td>Ch. 35: Cells, Tissues</td>
</tr>
<tr>
<td></td>
<td>Cell organelles and their functions</td>
<td></td>
</tr>
<tr>
<td></td>
<td>The nucleus and chromosomes; DNA and genes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Prokaryote and eukaryote cells</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cell origins and endosymbiotic theory</td>
<td></td>
</tr>
<tr>
<td>Feb  6</td>
<td>Seeds and seedlings; flowers and fruits</td>
<td>Chpt. 39: pp. 754-755</td>
</tr>
<tr>
<td></td>
<td>Seed structure, dormancy, germination, dispersal</td>
<td>Chpt. 38: 731-733</td>
</tr>
<tr>
<td></td>
<td>Flower and fruit, structure and diversity</td>
<td>Chpt. 30: 594-595</td>
</tr>
<tr>
<td>Feb  8</td>
<td>Cells, tissues, and primary growth; stems, roots</td>
<td>Chpt. 35</td>
</tr>
<tr>
<td></td>
<td>Cell types and their functions: parenchyma, fibers, epidermal, storage, vascular, reproductive, etc.</td>
<td></td>
</tr>
<tr>
<td>Feb 13</td>
<td>Tissues and primary growth: leaves</td>
<td>Chpt. 35</td>
</tr>
<tr>
<td>Feb 15</td>
<td>Secondary growth: wood and bark; annual rings</td>
<td></td>
</tr>
<tr>
<td>Feb 20</td>
<td>Cell division, enlargement, and differentiation</td>
<td>Chpt. 4: The Nucleus</td>
</tr>
<tr>
<td></td>
<td>Mitosis, cell cycle</td>
<td>Chpt. 9: Mitosis</td>
</tr>
<tr>
<td></td>
<td><strong>Plant Growth and Development</strong></td>
<td></td>
</tr>
<tr>
<td>Feb 22</td>
<td>Cell and plant responses to growth factors</td>
<td>Chpt. 38</td>
</tr>
<tr>
<td></td>
<td>Hormones and other internal factors</td>
<td></td>
</tr>
<tr>
<td></td>
<td>History of hormone experiments and the scientific method</td>
<td></td>
</tr>
<tr>
<td>Feb 27</td>
<td><strong>EXAM 1</strong> (Lecture and lab through mitosis)</td>
<td></td>
</tr>
<tr>
<td>Mar  1</td>
<td>Hormones, continued</td>
<td></td>
</tr>
<tr>
<td>Mar  6</td>
<td>External factors</td>
<td>Chpt. 39</td>
</tr>
<tr>
<td></td>
<td>Tropisms</td>
<td></td>
</tr>
<tr>
<td>Mar  8</td>
<td>Other responses: Photoperiodism, nastic, germination, defenses</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Plant Metabolism</strong></td>
<td></td>
</tr>
<tr>
<td>Mar 13</td>
<td>Biochemical reactions</td>
<td>Chpt. 6</td>
</tr>
<tr>
<td></td>
<td>Plant nutrition: assimilation, essential nutrients, digestion, decomposition</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Respiration: energy source and gas exchange</td>
<td>Chpt. 7</td>
</tr>
<tr>
<td></td>
<td>Aerobic and anaerobic; prokaryote (bacterial) and eukaryote</td>
<td></td>
</tr>
<tr>
<td></td>
<td>! (We go over details of this very lightly, but significant principles are needed to be understood. It is a major part of Biology 3)</td>
<td></td>
</tr>
<tr>
<td>Mar 15</td>
<td>Photosynthesis</td>
<td>Ch. 8</td>
</tr>
<tr>
<td></td>
<td>Leaf structure: photosynthesis and gas exchange</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Steps in photosynthesis</td>
<td></td>
</tr>
</tbody>
</table>
**Water Balance in Plants**

Mar 20  Water uptake, transport, and transpiration; review roots  Chpt. 5: passive and active transport  
22  Water, soils and nutrients  Chpt. 36; Chpt. 37

Mar 27 - 31  SPRING BREAK

Apr 3  Ecology  Chpt. 56  
Adaptive features of plants in response to water:  
California oaks and chaparral

Apr 5  Plant distributions, climates, and biomes  Chpt. 56

**Genetics and Evolution**

Apr 10  EXAM 2  (Lecture and lab: hormones through water balance/biomes)

Apr 12  Genetics: sources of variation and passing on of traits  Chpts. 9, 10  
Chromosomes, DNA, and genes; meiosis  Chpt. 11: 217-219  
Genetic principles: Mendel and his peas  Chpt. 3: 54-56

Apr 17  Genetics expanded: complexities beyond Mendel; more meiosis;  
Genetic engineering: then and now

Apr 19  Plant evolution, natural selection, and speciation  Chpt. 1: Biological evolution  
Maintaining vs. changing genetic diversity  Chpt. 22: Defining evolution  
Modes of speciation; Adaptive radiation  Chpt. 23: Genetic variation  
Punctuated equilibrium  Chpt. 24: Speciation

**Diversity of Organisms: evolution of the biological kingdoms**

Apr 24  Biotic evolution and diversity  Chpts. 27, 28  
Prokaryotic and eukaryotic domains  (lightly for overview)  
True plants: overcoming obstacles, life cycles of plants  Chpt. 29  
non-seed plants: bryophytes

Apr 26  Non-seed plants: ferns  Chpt. 29

May 1  Seed plants: gymnosperms  Chpt. 30

May 3  Seed plants: angiosperms  Chpt. 30

May 8  Angiosperms: pollination and evolution of flower types

May 10  Non-plants: algae, fungi  Chpts. 28, 31

May 15  Last lecture: finish up, review, questions

**May 22  FINAL EXAM at 12:15 - 2:30 (1430)**
- on Lecture and Lab from Genetics through last day.
Week of:
Jan 25 - 26 Wednesday and Thursday labs meet for roll-taking;
Tuesday labs meet with instructor at end of Wednesday lecture.

Jan 30 Unit 1. Plant Morphology: external plant structures and organs, campus plants
Plant beans for growth project

Feb 6 Unit 2. Plant Morphology 2: flowers, fruits, seeds, and modified organs
Plant Fast Plants, begin measuring bean plants

Feb 13 Unit 3. Plant Structure 1. Primary cells and tissues of stems and roots

Feb 20 Unit 4. Plant Structure 2. Leaf structure, mitosis, and secondary growth

Feb 27 Unit 5. Regulation of Plant Growth: internal factors (hormones)
Plant seeds for phototropism experiment

Mar 6 Unit 6. Regulation of Plant Growth: external factors (tropisms and phytochromes)

Mar 13 Unit 7. Photosynthesis: ps rates, absorption spectrum, stomatal activity
Turn in Bean Report (all reports are due on your scheduled lab that week)

Mar 20 Unit 8. Uptake and Transport of Water: osmosis, absorption, transport
Sow fern spores

Mar 27 SPRING BREAK

Apr 3 Unit 9. Transpiration: internal and environmental factors
Harvest Fast Plant F2 seeds; plant F2 seeds
Score Fast Plant F2 seedlings

Apr 10 Units 10 and 11. Life Cycles; Genetics I: Mendelian genetics, meiosis
Score Fast Plant F2 seedlings

Apr 17 Unit 11. Genetics II: complex genetics; analysis of fern and FP results;
Score fern sporophytes

Apr 24 Unit 12. Non-seed Plants: Bryophytes, Ferns, and other Lower Vascular plants

May 1 Unit 13. Seed Plants: Gymnosperms and Angiosperms
Turn in Genetics Report

May 8 Lab Exam