BIOL 2230; Section A (CRN 81086) ***Fall 2010***

GENERAL BOTANY (3-3-4 credit hours); Biology Department, College of Arts and Sciences, VSU

Lecture (BC 1025): **TR:** **2:00 – 3:15 p.m.**

Laboratory (BC 2040): **M:** **12:00 noon – 2:50 p.m.**

Instructor: Dr. Russ Goddard, BC 2090 (**Office Hours**: TR 3:30 p.m. – 4:30 p.m.)
email: rgoddard@valdosta.edu **Phone**: 249-2642 **WEB materials:** http://www.valdosta.edu/~rgoddard/

Course Catalog Description: BIOL 2230 General Botany 3-3-**4**
Prerequisite: BIOL 2010 with a grade of "C" or higher or consent of the instructor. Survey of plants, emphasizing evolution, homologous variation, and reproductive cycles of the major groups and development, structure, and function as represented by the seed plants.

Required Materials: ***Students are responsible for bringing their textbook and lab manual to each scheduled laboratory period.***

Textbook: Raven, P.H., R.F. Evert, and S.E. Eichhorn. 2005. *Biology of Plants*, 7th ed. W.H. Freeman and Company, New York

Lab Manual: *General Botany Laboratory Exercises* by R. Carter, 2005. Available as a handout courtesy of Dr. Richard Carter.

General Objectives: This course provides an introduction to basic principles of plant biology. The course includes a general survey of the plant kingdom to demonstrate evolutionary significance in the development of form and function. Emphasis is placed on the structure and function of vascular plants in this course. The instructor's goal in teaching this course is to give students a greater appreciation of the plant world we depend on and to stimulate student learning of basic concepts in plant and biological science. Specific course learning objectives aligned with Department and University learning objectives are listed at the end of this syllabus.

Grading and Exams:

There are several components that I will consider when computing your final grade. Your final grade is based on the percent value of the total points you receive out of a total of 700 points. The breakdown of the graded components of the course is:

Three Lecture Exams, each counting 100 points towards your final grade.	300 points
Laboratory grade based on all attendance, in-lab assignments, write-ups, notebooks with drawings and diagrams, quizzes, and other homework and assignments.	100 points
Mid-Term Laboratory Practical	100 points
Final Comprehensive Laboratory Practical	200 points
Total=	**700 points**

Final Grade: Students should note that a grade of "A" in this course represents exemplary command of the material covered. A grade of "C" is evaluated as satisfactory command of the subject material in the course. To obtain a grade of excellence (A or B), it is recommended that students study daily clarifying any problems encountered regarding course information with the professor. Cramming for exams is not recommended because the volume of information presented in this course precludes efficient study by this method.

Guaranteed grade distribution is as follows:

A = 90-100% (>630 points)
B = 80-89.9% (560 - 629 points)
C = 70-79.9% (490 - 559 points)
D = 60-69.9% (420 - 489 points)
F = ≤ 59% (≤ 419 points)

***TENTATIVE* LECTURE EXAM SCHEDULE:**

Exam 1 (100 points)	Thursday, Sept. 16, 2010
Exam 2 (100 points)	Thursday, Oct. 28, 2010
Exam 3 (100 points)	Thursday, Dec. 2, 2010

All exams will stress the material covered since the last exam but each can test the student's cumulative knowledge of the information in this course.

***TENTATIVE* LABORATORY PRACTICAL SCHEDULE:**

Midterm (100 points)
Final (200 points) **Wednesday, December 8, 2010** 2:45pm-4:45pm *in the Lecture Room (BC 1025)*

Important Note: ALL ASSIGNMENTS COUNT; NO MAKE-UP EXAMS ARE POSSIBLE FOR LAB PRACTICALS; NO ASSIGNMENTS CAN BE DROPPED!

Laboratory Grade [~14% of final grade (100 out of 700 pts); see above]

1. Students are assessed on attendance in the laboratories (10 points each lab)
2. In class assignments (sometimes multiple assignments) are given for most laboratories (Variable point values for each assignment)
3. In class lab quizzes are given on an unscheduled basis but can be any or every week (Variable values)
4. Some group assignments, including research experiments and papers/laboratory write-ups may be assigned (20 to 50 pts each).
5. Laboratory Notebook: It is recommended but not required, that students maintain an organized notebook dedicated to the laboratory in this course. This notebook should include drawings and diagrams (see Appendix A of the lab manual) of all of the specimens observed and any notes that help you understand the material such as cross references to diagrams in the textbook.
6. Final laboratory grade (out of 100) is determined by the number of points earned divided by the total points available from lab at the end of the semester.

MAKE-UP EXAMS: It is my general policy NOT to offer make-up exams for frivolous reasons. The exam schedule is posted in this syllabus and this has been given to you on the first day of class. The exams are scheduled during class time and YOUR schedule must accommodate this. For rare legitimate reasons, make-up exams can be scheduled, but ONLY if you contact the professor BEFORE the exam. Valid reasons DO NOT include other exams scheduled on the same day as your botany exam, regularly scheduled Dr.'s appts., etc. In all cases the instructor will determine the validity of an excuse as acceptable or not acceptable.

Attendance: Attendance and punctuality are required in this class. Most of the exam material comes from my lectures (some comes from labs and the text also!) and students generally do considerably better when they attend all of my lectures. **Laboratories in particular should not be missed. Attendance may be taken at the beginning and end of laboratory.** ***ANY CLASS TIME AND MATERIAL MISSED IS THE RESPONSIBILITY OF THE STUDENT REGARDLESS OF THE REASON FOR ABSENCE*.**

University Attendance Policy (from the undergraduate catalog):

ABSENCE REGULATIONS

The University expects that all students shall attend all regularly scheduled class meetings held for instruction or examination. Although independent study is encouraged at Valdosta State University, regular attendance at class is expected. Instructors are required to maintain records of class attendance. The unexcused absence or "cut" is not regarded as a student privilege. It is recognized that class attendance is essentially a matter between students and their instructors. Instructors must explain their absence policy in the course syllabus. All students are held responsible for knowing the specific attendance requirements as prescribed by their instructors and for the satisfactory make-up of work missed by absences. When students are compelled for any reason to be absent from class, they should immediately contact the instructor.

A student who misses more than 20% of the scheduled classes of a course will be subject to receiving a failing grade in the course. Absence problems which cannot be resolved between the instructor and student should be referred immediately to the department head responsible for the course. Discontinuance of class attendance without officially withdrawing from a course is sufficient cause for receiving a failing grade in the course. It is assumed that students will consult with their instructor in a given course before initiating procedures for withdrawing from that course. Students officially withdrawing from a course prior to midterm will receive a "W" for the course. After midterm, in cases of hardship, students may complete a Petition for Withdrawal form which is available in the Office of the Registrar. If the petition is approved, it is the instructor who determines whether the grade awarded is "W" (withdrew passing) or "WF" (withdrew failing). **The grade of "WF" is equivalent to an "F" and is calculated in the grade point average as "F".** Off-campus activities, appropriately supervised and sponsored by faculty members, which appear to justify a student's absence from scheduled classes, must be approved by the academic dean or director responsible for the activity. Such activities must be justifiable on grounds consistent with the educational program of the University as interpreted by the Vice President for Academic Affairs. Instructors determine if a student is excused from class to participate in sanctioned activities, either off-campus or on-campus.

Access to Laboratory: Students will be granted access to the Botany Laboratory (BC 2040) after hours and during weekends for studying and completing extended lab assignments/projects. *Access to the laboratory after hours is a **privilege;** it is **not** a right.* If problems occur with regard to safety, security, neatness, or general order in the laboratory, then this privilege will be revoked. It is up to each student to see that materials, slides, microscopes, etc. are properly cared for and replaced for proper storage.

Food and Drink in the Laboratory and Lecture Rooms: No food or drinks are allowed in any classroom of the science center. Restrict consumption of food and beverage to the atrium and outdoor areas. Safety factors in the laboratory are of prime concern to the instructor. Any food or beverage found in the laboratory, wherever it is located, will be considered contaminated and will be discarded by the instructor into the nearest trash receptacle.

Disruptive behavior: No disruptive behavior of any kind will be tolerated in this course. Entering a classroom late is discouraged, particularly from the front of the room, because it is disruptive, as is leaving early. Students should arrive to class early and should not disturb the class by entering after the class has started. In the unusual event that a student is tardy, that student should enter by the rear door to the lecture hall and sit or stand in the rear of the lecture hall so as not to disturb the concentration of other students and the instructor.

Talking during lectures is disruptive due to the nature of the acoustic design of the room. Students should restrict talking and discussion to pertinent questions and discussion related to course material and these questions should be directed toward the instructor.

Use of cellular telephones, pagers, or any similar remote communication device is prohibited during scheduled lectures, laboratories, or examinations. If students bring cellular telephones or similar devices to lecture, it is their responsibility to switch them off prior to the beginning of the lecture period. Ringing, buzzing, or any other sounds emitted from such devices will be treated as disruptive behavior on the part of the owner/possessor, and the owner/possessor will be asked to leave lecture immediately.

Any student disrupting lectures will be required to leave the classroom. In the event a disruption occurs during an exam, the student will forfeit any chance of answering remaining questions on their exam, and the student will be required to leave the room and the exam will be graded as is. No return is allowed as this too is disruptive to other students.

Academic Integrity: Any behavior suggestive of academic dishonesty will lead to a reprimand, failure of an

assignment, or failure of the course at the discretion of the instructor, but based on the severity of the infraction(s). Cooperative learning and group interactions are common and necessary to scientists and this activity is encouraged in the form of laboratory work and discussions about data and information. However, on assignments designed to assess individual learning of material in the class, work must be completed totally independently. Behavior contrary to this principle constitutes cheating. Students should fully understand that plagiarism is not tolerated in this department or by the instructor and full appreciation for the intellectual property of others should be respected completely.

Plagiarism is the representation of someone else's work as your own. You may not blatantly copy phrases, paragraphs, or ideas from another's work. You cannot paraphrase someone else's ideas and use them as your own. You must analyze all data and work by others and then integrate this information with new data and conclusions that you independently synthesize, properly citing past work that supports your conclusions.

Students should read and be familiar with the Biology Department policy on plagiarism: http://www.valdosta.edu/biology/documents/biologyplagiarism.doc and read and understand the University policy on Academic Integrity: http://www.valdosta.edu/academic/AcademicHonestyPoliciesandProcedures.shtml

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 over the telephone, as positive identification can not be made by this manner.

Students with Disabilities: Students requesting classroom accommodations or modifications because of a documented disability must contact the Access Office for Students with Disabilities located in room 1115 Nevins Hall. The phone numbers are 245-2498 (voice) and 219-1348 (tty).

BIO 2230 - General Botany, Fall 2009

Tentative Lecture and Laboratory Schedules

Lecture:		**Laboratory:**	
Week of / Date:	***Topics covered: Assigned Reading:(Chapter:pages)***	**Date:**	**Laboratory Exercise:**
Aug. 16	**Introduction** (**1**:1-13) Characteristics of plants, Evolution **11**:198-217, Phylogeny and Taxonomy: Nomenclature and Classification **12**:219-225; Domains (**12**:227-228) **;** Origin of Eukaryotes (**12**:229-231)	Aug. 16	Introduction to the Laboratory **Appendix A**: ***General Lab Practice***; **Lab 1:** ***Laboratory Technique and the Microscope***;
Aug. 23	**Intro. (cont'd)** Origin of Eukaryotes (**12**:229-231)	Aug. 23	**Lab 2:** ***Introduction to the Vegetative Plant Body*** **Lab 4:** ***Early Development of the Seed Plant***
Aug. 30	Early Development of the Plant Body **22**:497-509	Aug. 30	**Lab 10:** ***The Bryophytes*** ***Start C-Fern***
Sept. 6	Life History Strategies; Origin of Plant Phyla – Cyanobacteria and Algae **12**:231-237; **13**:238-259; **15**:296-344	Sept. 6	**Labor Day; No Lab**
Sept. 13	The Bryophytes **16**:345-367	Sept. 13	**Lab 11:** ***Seedless Vascular Plants (Ferns and fern allies)***
Sept. 16	**Exam I**		
Sept. 20	Pteridophytes	Sept. 20	**Lab 12:** ***The Gymnosperms***
Sept. 27	The Seed Plants; Gymnosperms (**18**:408-433)	Sept. 27	**Lab 13:** ***Angiosperms I (The Flower) + Microsporogenesis***
Oct. 4	Angiosperms (**19**:434-451)	Oct. 4	**Mid-Term Practical**
Oct 7	**Midterm**: last day to drop without penalty	Oct. 7	**Midterm**:
Oct. 11	Evolution of Flowering Plants **20**:452-474	Oct. 11	**Lab 14:** ***Angiosperms II*** **(Megasporogenesis and the Fruit).**
Oct. 18-19	Fall Break Holiday, Oct. 18-19; No class	Oct. 18	Fall Break; No Class
Oct. 25	Review: The Plant Cell & Cell Reproduction (**3**:35-70; Organic Molecules (**2**:15-34);Review: Diffusion, Osmosis, and Membrane Transport **4**:71-87	Oct. 25	**Lab 3:** ***The Plant Cell and Water Relationsl***;
Oct. 28	**Exam II**		
Nov. 1	Cells and Tissues **23**: 510-527	Nov. 1	**Lab 5:** ***Cell Types & Tissues***
Nov. 8	Root Structure and Development **24**:528-546	Nov. 8	**Lab 6:** ***The Root***
Nov. 15	Shoot Primary Structure and Development **25**:547-579	Nov. 15	**Lab 7:** ***The Herbaceous Stem***
Nov. 22	Secondary Growth in Stems **26**:580-601	Nov. 22	**Lab 8:** ***The Woody Stem***
Nov. 24-26	Thanksgiving Holidays	Nov. 24-26	Thanksgiving Holidays
Nov. 29	**28**:622-644 Medicinal Botany; Economic Botany Movement of Water and Solutes in Plants **30**:667-686 Plant Nutrition and Soils **29:** 645-666		**Lab 9:** ***The Leaf***
Dec. 2	**Exam III;** Last Lecture Class day;	Dec. 6	
Dec. 8	Final Lab Practical; **Wednesday,** 2:45pm-4:45pm *in Lecture Room (BC 1025)*		

VSU administration has required that certain elements be included in all class syllabi. One of these requirements

is that relevant course learning outcomes must be linked to the VSU General Educational Outcomes at http://www.valdosta.edu/academic/VSUGeneralEducationOutcomes.shtml and to the Biology Department educational outcomes listed on page 108 of the current undergraduate catalog. Students should be aware that the Biology department learning outcomes are extremely general and a more appropriate detailed outline of the learning outcomes we expect are represented by the ETS Biology Major Fields Test that we require seniors to complete and pass with a minimally acceptable score before graduating (see: http://www.ets.org/Media/Tests/MFT/pdf/mft_testdesc_biology_4bmf.pdf)

Course learning outcomes

Each Student will

- demonstrate understanding of geologic time and the origin of life, particularly with respect to photosynthetic cells and the evolution of plants and algae. [VSU 5,7; BIOL 2]
- demonstrate understanding of cell theory. [BIOL 3]
- demonstrate understanding of typical plant cell structure and function including the role of basic atomic components (chemistry) necessary for life processes . [BIOL 3]
- demonstrate understanding of the mechanisms for procurement of mineral ions by plants and mineral nutrition and the role these minerals play in organic molecule synthesis and use. [BIOL 4]
- demonstrate understanding of the organization of plants from the level of cells through tissues, tissue systems, and organs. [BIOL 3]
- demonstrate understanding of developmental patterns and processes of plants. [BIOL 4]
- demonstrate understanding of the major effects and physiological mechanisms of growth regulators (hormones) in plants. [BIOL 4]
- demonstrate understanding of the physiological mechanisms involved in the uptake and transport of water and the translocation of food by plants. [BIOL 4]
- demonstrate understanding of the basic principles of systematics and the inference of evolutionary patterns from data. [BIOL 2]
- demonstrate understanding of evolutionary processes and patterns in the major plant groups. [BIOL 2]
- demonstrate understanding of life histories, reproductive cycles, and ecological relationships of the major plant groups. [BIOL 2, 5]
- demonstrate understanding of the relationships between plants and humans across cultures. [VSU 2]
- demonstrate understanding of the interrelationships among plants, micro-organisms, and animals in the functioning of ecosystems. [BIOL 5]
- demonstrate understanding of the fundamental roles of plants in ecosystems, including their roles in the production of food energy and replenishment of oxygen. [BIOL 5]
- demonstrate understanding of spatial and temporal variation in plant community structure, including the concepts of community, biome, and succession, and the determinants of such patterns. [BIOL 5]
- formulate hypotheses, collect and analyze data, and present results in the standard format of a scientific paper. [BIOL 1]
- demonstrate the ability to work and use basic equipment effectively in the laboratory. [BIOL 1, VSU 5]
- demonstrate the ability to handle materials safely and analyze data in the laboratory. [BIOL 1, VSU 5, 7]
- demonstrate the ability use proper methods and procedures for insuring safety in the laboratory. [VSU 5]
- demonstrate comprehension of basic concepts and the ability to use scientific terminology accurately through effective oral and written communication. [BIOL 1, VSU 4, 5, 7]
- demonstrate the ability to follow oral and written instructions effectively. [VSU 7]
- demonstrate the ability to complete assignments and examinations ethically. [VSU 8]

BIOL = Biology Department Educational Outcomes
VSU = VSU General Education Outcomes

VSU General Education Outcomes

1. Students will demonstrate understanding of the society of the United States and its ideals. They will possess the requisite knowledge of the society of the United States, its ideals, and its functions to enable them to become informed and responsible citizens. They will understand the connections between the individual and society and the roles of social institutions. They will understand the structure and operational principles of the United States government and economic system. They will understand United States history and both the historical and present role of the United States in the world.
2. Students will demonstrate cross-cultural perspectives and knowledge of other societies. They will possess sufficient knowledge of various aspects of another culture, including the language, social and religious customs, aesthetic expression, geography, and intellectual and political history, to enable them to interact with individuals within that society from an informed perspective. They will possess an international viewpoint that will allow them to examine critically the culture of their own nation and to participate in global society.
3. Students will use computer and information technology when appropriate. They will demonstrate knowledge of computer concepts and terminology. They will possess basic working knowledge of a computer operating system. They will be able to use at least two software tools, such as word processors, spreadsheets, database management systems, or statistical packages. They will be able to find information using computer searching tools.
4. Students will express themselves clearly, logically. and precisely in writing and in speaking, and they will demonstrate competence in reading and listening. They will display the ability to write coherently in standard English; to speak well; to read, to understand, and to interpret the content of written materials in various disciplines; and to listen effectively and to understand different modes of communication.
5. Students will demonstrate knowledge of scientific and mathematical principles and proficiency in laboratory practices. They will understand the basic concepts and principles underlying scientific methodology and be able to collect, analyze, and interpret data. They will learn a body of scientific knowledge and be able to judge the merits of arguments about scientific issues. They will be able to perform basic algebraic manipulations and to use fundamental algebraic concepts to solve word problems and equations. They will be able to use basic knowledge of statistics to interpret and to analyze data. They will be able to evaluate arguments based on quantitative data.
6. ~~Students will demonstrate knowledge of diverse cultural heritages in the arts, the humanities, and the social sciences. They will develop understanding of the relationships among the visual and performing arts, literature and languages, and history and the social sciences. Students will be versed in approaches appropriate to the study of those disciplines; they will identify and respond to a variety of aesthetic experiences and engage in critical thinking about diverse issues. They will be able to identify the components of and respond to aesthetic experiences in the visual and performing arts. They will develop knowledge of world literature within its historical and cultural frameworks. They will understand modem issues within a historical context and the role of the individual in various forms of societies and governments.~~*
7. Students will demonstrate the ability to analyze, to evaluate, and to make inferences from oral, written. and visual materials. They will be skilled in inquiry, logical reasoning, and critical analysis. They will be able to acquire and evaluate relevant information, analyze arguments, synthesize facts and information, and offer logical arguments leading to creative solutions to problems.
8. Students will demonstrate knowledge of principles of ethics and their employment in the analysis and resolution of moral problems. They will recognize and understand issues in applied ethics. They will understand their own value systems in relation to other value systems. They will judge values and practices in a variety of disciplines.

*. Mission statement not addressed in BIOL 2230.

Biology Department Educational Outcomes

The undergraduate curriculum in biology should stimulate and encourage active learning, conceptual learning, critical thinking, scientific reasoning, and analysis skills of all students. The curriculum should provide students with a basic, integrative understanding and familiarity of biology across all levels of organismal complexity, providing students with the necessary knowledge and skills for their further career development. The biology curriculum should also instill a sense of ethical attitudes and values to be a successful professional in the diverse areas of biology.

The Bachelor of Science in Biology is designed such that individuals receiving this degree will possess the ability to:

1. Develop and test hypotheses, analyze data, and present the results and conclusions in both written and oral formats corresponding to those used in peer-reviewed journals and at scientific meetings.
2. Describe the evolutionary processes responsible for biological diversity, explain the phylogenetic relationships between the major taxa of the three domains of life, and provide examples from local flora and fauna to illustrate this.
3. Demonstrate an understanding of the cellular basis of life.
4. Relate the structure and function of DNA/RNA to the development, functioning and reproduction of living organisms.
5. Interpret ecological data pertaining to population dynamics, behavior, ecosystems, and human impact on the natural environment.

Biology Major Field Test:

The Major Field Test in Biology contains the following topical information that all Biology majors must pass to graduate.

General Areas:

1) Cell Biology (20%)
2) Molecular Biology and Genetics (21%)
3) Organismal Biology (31%)
4) Population Biology, Evolution, and Ecology (28%)
5) Analytical Skills (10 – 12 % of questions in above areas)

Specific content areas addressed in BIOL 2230 include the following subsections of the MFT:

1) Cell Biology (20%)
2) Molecular Biology and Genetics (21%)
3) Organismal Biology (31%)
   A. Diversity of Organisms (9%)
      - Phylogenetic relationships, classification, morphology, life histories, and general biology of
        - bacteria and archaea
        - protists
        - fungi
        - plants
      - Origin of life and endosymbiotic theory
      - Fossil record
      - Systematics and molecular phylogeny
      - Adaptations of organisms to habitats

   D. Plant organ systems (seed plants and nonseed plants): comparative structure, function, and organization
      - Roots, stems, leaves
      - Plant energetics
      - Water relations
      - Mineral nutrition
      - Translocation and storage
      - Hormones, photoperiods, and tropisms
      - Nonphotosynthetic strategies

   E. Plant reproduction, development, and growth
      - Reproductive structures, gametogenesis, and sporogenesis
      - Fertilization and alternation of generations
      - Embryogeny and germination

- Meristems and growth

4) Population Biology, Evolution, and Ecology (28%)

B. Patterns of evolution
- Convergence, divergence, and adaptive radiation
- Extinction
- Evolution of higher taxa
- Evidence for evolution
- Coevolution

C. Environmental factors
- Biogeographic and temporal patterns
- Biomes
- Climate

D. Population ecology
- Habitat selection, tolerances, limiting factors, and resource acquisition

E. Community ecology
- Competition, predation, parasitism, and symbiosis
- Change and succession
- Introduced species

F. Ecosystems
- Energy flow, biogeochemical cycling, and decomposition
- Productivity
- Food webs

G. Human impacts
- Resource depletion and pollution
- Economic botany
- Habitat modification and effects on organisms

5) Analytical Skills (10 – 12 % of questions in above areas)

A. Science as a way of knowing
- Understanding quantitative aspects and limitations of science
- Understanding the place of hypotheses and theories in biology
- Identification and testing of hypotheses

B. Experimental design
- Identification of variables and establishing experimental controls
- Ensuring that measured parameters are affected by phenomenon being studied

C. Interpretation, data analysis, inductive reasoning, and drawing conclusions from data
- Application of information to solve a problem or make a predication
- Demonstration of profiency with quantitative concepts and familiarity with units of measure
- Demonstration of an understanding of probability theory and statistics
- Interpretation of data, graphs, tables, and statistical analyses.