CORE CURRICULUM COMPONENT APPLICATION
Sam Houston State University

Revised October, 2012

PART I – Course Information

Course Type
☒ Existing/Restructured
☐ New Course Proposed Fall 2013
If new, have you submitted a Form B to the SHSU Curriculum Committee? ☐ Yes ☐ No

Course Prefix & Number: BIOL 1311

Texas Common Course Number (TCCN Matrix)**:** BIOL 1311

Course Title: General Botany

Course Catalog Description (Copy and paste from online catalog for existing courses): General principles of botany are presented. Emphasis is placed on morphology, taxonomy, genetics, physiology, and ecology of plants in an evolutionary and ecological context. Students may begin sequence with either BIO 161 <BIOL 1311> or BIO 162 <BIOL 1313>. Credit for BIO 161 <BIOL 1311> as a laboratory science is contingent on completion of BIO 111 <BIOL 1111>. Fall, Spring, Summer. Credit 3.

Course Prerequisites: None

Available Online?
☒ Yes, currently developed in online delivery mode
☐ Anticipated development in online delivery mode (Semester, Year:)
☐ No

Number of Sections to be Offered per Academic Year: 9

Estimated Enrollment per Section: 30-150

Course Level (freshman, sophomore): Freshman

Designated Contact Person (for follow-up communication purposes): Christopher P. Randle

E-Mail Address: randle@shsu.edu

Phone: 936-294-1554

Approvals

Department Chair:	Signature	22 OCT 2012 Date
Academic Dean:	Signature	10/22/2012 Date

Submit completed, signed form to Core Curriculum Committee - Box 2478 or Fax 4-1271

PART II – THECB Foundational Component Areas

See Appendix for full description of each component area.

Select Component Area: III. Life and Physical Sciences

In one paragraph, describe how the proposed course will fulfill the core and skill objectives of the component area: This course focuses on explaining, describing, and predicting natural phenomena associated with plants using the scientific method. A backbone concept of this course is the recognition of emergent properties, or complexity that arises from the interaction of the components of a system. The course also emphasizes the impact of scientific discovery on human lives. Given the impact that plants have in producing free oxygen, food, fuel, and structural materials (such as wood), many examples are available to demonstrate the importance in understanding the biology of plants. To allow better assessment of objectives and skill requirements: 1) All lecture and laboratory sections use the same text, Biology of Plants (Evert and Eichorn). This text provides foundational knowledge, explores the historical context of botanical discoveries, and provides relevant examples of the impact that such discoveries have made on human progress. 2) The Evert and Eichorn text has been integrated as the foundational background of laboratory exercises and experiments designed to engage critical thinking and active learning through observation of living and curated plants, the creation of hypotheses to explain phenomena, experimental design and procedure, and quantitative analysis and presentation of experimental results. The Evert and Eichorn text serves as a companion to the laboratory manual, and each of the twelve laboratory units are integrated with text readings and images. 3) General Botany will be converted from a 3 hour course with a separate 1 hour lab into a single 4 hour course incorporating both lecture and laboratory. This curriculum design will allow uniform assessment of objectives and skills through pre- and post-laboratory surveys across lecture sections.

PART III – Course Objectives & Student Learning Outcomes (SLO)

Insert the applicable course objectives stated as student learning outcomes (e.g., Students completing the course will be able to...) that support the core component area objectives. Please reference the component rubric for additional information on core component area objectives.

Objective/SLO 1: Identify emergent properties as the basis of biological complexity

How will the objective be addressed (including strategies and techniques)?
Each lecture and laboratory topic builds on the complexity introduced in the previous topic by introducing novel interactions of components resulting in systems of increasing complexity. The course focus begins with the molecular basis of life, and procedes to the organellar basis of cells, the cellular basis of tissues, the arrangement of tissues in plant organs, the interaction of plant components in energy managemant and replication, the genetic and evolutionary processes that produce diversity of plant life, and finishes with an examination of the historical and spatial interactions of plant communities to create dynamic and complex biomes.

-In this course, natural complex phenomena (such as photosynthesis, global climate change, Mendelian evolution, and cell theory) are described, explained and predicted based on knowledge of simpler components.
-This course involves the understanding of interactions among natural phenomena. As we have explained plant life represents a complex phenomenon, which can be understood only when the behavior and interaction of components is examined.
-This course involves the understanding of the implications of scientific principles on the physical world and on human experiences. Experimental evidence that elucidated complex processes (such as the dark reactions of photosynthesis, or cellular abiogenesis) are presented and discussed.

Describe how the objective will be assessed: To a great extent lecture and laboratory exams and quizzes are designed to assess understanding for this and other objectives. Pre- and post-unit quizzes occur before and after each laboratory unit is completed. The General Botany Objectives Assessment (GBOA) is an exam of fifty questions covering each of the proposed objectives. The GBOA will be administered electronically to all students in the first and last week of each semester, allowing assessment of how each student has improved over the course of the semester in meeting objectives. We have provided an example of the kinds of questions that will be administered in Appendix B. Objective 1 assessment is achieved in this document by questions 1-3.

Objective/SLO 2: Gain foundational knowledge of plant anatomy, morphology, and physiology, including special terminology applicable to these aspects of plants.
-This objective serves to describe, explain, and predict phenomena that are fundamental to plant sciences, by not only presenting these structures, but by explaining their function and diversity. Laboratory incorporates experiments that aim to explore function using rigorus controls and hypothesis testing.
-Because emergent properties are a key learning component, the interaction between plant structures in providing complementary function is examined. For example, we discuss the movement of water through a plant which is achieved by the coordinated actions of roots and leaves.
-Economically useful plant products are byproducts of structures and processes that were functional in the survival, growth and reproduction of the plant that bore them. For example, through understanding the development of secondary vascular tissue, students gain an appreciation not only for the structural qualities of wood, but for the vast carbon sink that forests represent.

How will the objective be addressed (including strategies and techniques)?
While lectures focus on introducing terms and concepts important for understanding these aspects of plants, laboratory provides the opportunity to interact with living and curated specimens. Students are encouraged to note the general similarities among homologous plant structures across the plant kingdom, but also to recognize the diversity of these structures resulting from adaptation to a broad range of ecological conditions. For example, three lab units address the general structure of cells and tissues in plant vegetative organs (roots, stems, and leaves), each lab also includes living and curated eamples of modifications of these structures that serve non-basic functions. Another example includes examination of the kranz anatomy of C4 plants, with discussion of how this anatomy is used to overcome photorespiration in plants growing in warm climates and with high ambient concentrations of oxygen.

Describe how the objective will be assessed: Examples from GBOA addressing objective 2 are included in Appendix B, questions 4-6.

Objective/SLO 3: Apply Mendelian principles of inheritance toward understanding the basis of plant diversity.

How will the objective be addressed (including strategies and techniques)?
Logical and empirical justifications for the Principles of Segregation and Independent Assortment are revealed through exploration of Mendel's experiments with the pea plant. These principles are then used to predict genotype and phenotype frequencies in experimental crosses, and to design experiments to evaluate parental genotype from offspring phenotypic ratios alone. These principles also predict the chromosomal theory of inheritance resulting from meiosis and sexual recombination, which are explained in light of Mendel's findings. Laboratory exercises require students to understand the meiotic basis of segregation and independent assortment (as well as violations of these principles) to work through a series of thought experiments.
-While describing and explaining Mendelian phenomena is necessary, these principles allow statistical predictions of genetic outcomes that are amenable to test.
-This course involves the understanding of interactions among natural phenomena, namely the interaction of genes and chromosomes to produce phenotype.
-This course involves the understanding of the implications of Mendelian principles on the physical world and on human experiences, primarily through exploration of plant breeding, crop improvement, and the discussion of the impacts of genetically modified organisms.

Describe how the objective will be assessed: Examples from GBOA addressing objective 3 are included in Appendix B, questions 7-9.

Objective/SLO 4: Understand the evolutionary theory as an explanation for both the process and pattern of plant diversification.
-There is a focus on describing, explaining, and predicting plant diversity using the principles of evolutionary theory.
-This course involves the understanding of interactions among organisms in a population, organisms and their environment, and organisms in a community, and how these ineractions produce variation over time.
-This course involves the understanding of the implications of plant diversity on atmospheric phenomena (such as carbon and oxygen content) and as the basis of stable terrestrial ecosystems.

How will the objective be addressed (including strategies and techniques)?
While the scientific method is stressed throughout the course, the theoretical framework of evolutionary biology is often misunderstood by the general public, and is therefore emphasized. Evolution itself, descent with modification, is presented as a fact in need of explanation. Evolutionary theory is offered as an explanation of this fact, including its most basic processes, mutation, genetic drift, and natural selection, and how these processes working together promote population divergence, and ultimately speciation. It is emphasized that this process is also what unifies all living things. The Evert and Eichorn text takes an explictly phylogenetic approach to addressing the evolutionary causes for the divergence of major plant lineages, and the origins of traits which mark these divergences and are diagnostic of those lineages. Theory is addressed primarily in lecture, while laboratories are used to explore the diversity of major lineages in an explicitly phylogenetic context, with each lineage characterized by synapomorphy.

Describe how the objective will be assessed: Examples from GBOA addressing objective 4 are included in Appendix B, questions 10-12.

Objective/SLO 5: Relate ecological principles to aspects of plant populations and communities, including reproductive biology, herbivory avoidance, symbiotic relationships and demographic and successional dynamics that create and stabilize plant populations and communites.
-There is a focus on describing, explaining, and predicting strategies that allow plant survival in a diversity of natural habitats.
-This course involves the understanding of interactions required to build food webs, that allow for reproductive success in pollen and seed dispersal, and that bulid and maintain abiotic environmental components such as soil, canopy habitats for animals, and fossil fuels.
-This course involves the understanding of the implications of ecological principles through the maintenance of ecosystems beneficial to human survival, the ecological recycling of nutrients, and the sustainability of agrosystems.

How will the objective be addressed (including strategies and techniques)?
Plant-plant, plant-fungus, and plant-animal interactions are presented in terms of competition, symbiosis, and predation. On a large scale, such interactions are presented as responsible for the formation of soils, atmospheric composition, global climate, major hydrological and geological features, and perhaps most relevantly, the carrying capacity that any terrestrial environment provides for heterotrophs, including humans. While large-scale ecological experiments are not feasible given our current enrollment, ecological aspects of plant biology are emphasized throughout the course of the laboratory, namely in examining the effects that ecological traits (such as CAM or C4 photosynthesis, xerophytism, breeding systems, aquatic adaptations etc.) have on the anatomy and morphology of specimens available in lab. Form is demonstrated to follow function, while function is connected to environmental contingency.

Describe how the objective will be assessed: Examples from GBOA (addressing objective 5 are included in Appendix B, questions 13-15.

PART IV – THECB Skill Objectives

Address each of the THECB skill objectives required within the component area. Explain how the skill is addressed, including specific strategies to address the skill(s). *Address ALL skill objectives associated with the selected Component Area. (See Appendix)*

1. Critical Thinking Skills: to include creative thinking, innovation, inquiry, and analysis, evaluation and synthesis of information

How will the skill be addressed (including specific strategies, activities, and techniques)?
As an introductory class in a science, General Botany stresses the use of the scientific method in evaluating explanations of botanical phenomena. Because the scientific method does not encompass critical thought, but rather was borne of it, the philosophical justifications for the scientific method are examined early in the course including broader issues of critical thinking such as the problem of induction, and the principle of parsimony. While many laboratory experiments focus on interpretation of results, several exercises stress the creation of new hypotheses to explain preliminary data, and logical deductions to make predictions about what other phenomena are consistent with these new hypotheses, and which would serve as falsifiers.

2. Communication Skills: to include effective development, interpretation and expression of ideas through written, oral and visual communication

How will the skill be addressed (including specific strategies, activities, and techniques)? Experimental results from laboratory exercises are presented both in the form of laboratory reports and group presentations. While group presentations are useful venues to explore effective use of visual communication (such as charts and graphs), the lab also emphasizes drawing and labeling of structures from living and curated material. While these drawings are not made for the purpose of presentation, they are used to hone observational skills following the German botanical adage "Nur was man gezeichnet, hat man gesehen" or "Only what one has drawn, has one seen".

3. Empirical and Quantitative Skills: to include the manipulation and analysis of numerical data or observable facts resulting in informed conclusions

How will the skill be addressed (including specific strategies, activities, and techniques)? Lecture presentation of foundational concepts is based on the experiments that produced them, including the discovery of plant hormones by Darwin, the elucidation of the dark reactions of photosynthesis by Calvin, and the formulation of probabilistic rules of inheritance by Mendel, among others. Each presentation emphasizes practices of rigorous empirical inference such as appropriate control of external variables, replication, identification of null hypotheses, and quantification of results. However, lecture is no substitute for practice. Laboratories emphasize the complete scientific method, allowing students to design and implement controls, and use simple statistical analyses to test null hypotheses from data collected by lab teams and pooled across lab sections.

4. Teamwork: to include the ability to consider different points of view and to work effectively with others to support a shared purpose or goal

How will the skill be addressed (including specific strategies, activities, and techniques)? Laboratory exercises emphasize teamwork, not only in performing and completing experiments, but also in sharing observations of lab material, in discussions of results and identifying methodological errors, in formulating hypothesis, in presenting results to the section as a whole, and in answering pre-laboratory quiz questions. Teams are formed by random assignment on the first day of lab, and all exercises are completed by the team.

5. Personal Responsibility: to include the ability to connect choices, actions and consequences to ethical decision-making

How will the skill be addressed (including specific strategies, activities, and techniques)?

6. Social Responsibility: to include intercultural competence, knowledge of civic responsibility, and the ability to engage effectively in regional, national, and global communities

How will the skill be addressed (including specific strategies, activities, and techniques)?

PART V – SHSU Core Curriculum Committee Requirements

1. Using a 15-week class schedule, identify the topics to be covered during each week of the semester. Provide sufficient detail to allow readers to understand the scope and sequence of topics covered.

Week 1	The Scientific Method as a Process of Discovery
Week 2	Building the Plant Cell and the Cell Cycle
Week 3	Cells and Tissues of the Plant Body
Week 4	Primary Growth and the Development and Function of Organs
Week 5	Secondary Growth in Roots and Stems
Week 6	The Flow of Energy in Plants and Communities
Week 7	Photosynthesis and Aerobic Respiration
Week 8	Sexual Reproduction and Heredity
Week 9	The Process of Evolution
Week 10	Systematics: The Science of Diversity
Week 11	Plant Origins
Week 12	Non-Vascular and Vascular Seedless Plants
Week 13	The Origins of Seed Plants and Flowering Plants
Week 14	The Diversity of Flowering Plants
Week 15	Ecology and the Biome

2. Attachments (Syllabus Required)

Syllabus Attached? ☒ Yes ☐ No

Other Attached? ☒ Yes ☐ No If yes, specify: Appendix B: General Botany Objectives Assessment (example instrument).

Appendix: THECB Component Area Descriptions and Skill Requirements

I. Communication (Courses in this category focus on developing ideas and expressing them clearly, considering the effect of the message, fostering understanding, and building the skills needed to communicate persuasively. Courses involve the command of oral, aural, written, and visual literacy skills that enable people to exchange messages appropriate to the subject, occasion, and audience.)

II. Mathematics (Courses in this category focus on quantitative literacy in logic, patterns, and relationships. Courses involve the understanding of key mathematical concepts and the application of appropriate quantitative tools to everyday experience.)

III. Life and Physical Sciences (Courses in this category focus on describing, explaining, and predicting natural phenomena using the scientific method. Courses involve the understanding of interactions among natural phenomena and the implications of scientific principles on the physical world and on human experiences.)

IV. Language, Philosophy, and Culture (Courses in this category focus on how ideas, values, beliefs, and other aspects of culture express and affect human experience. Courses involve the exploration of ideas that foster aesthetic and intellectual creation in order to understand the human condition across cultures.)

V. Creative Arts (Courses in this category focus on the appreciation and analysis of creative artifacts and works of the human imagination. Courses involve the synthesis and interpretation of artistic expression and enable critical, creative, and innovative communication about works of art.)

VI. American History (Courses in this category focus on the consideration of past events and ideas relative to the United States, with the option of including Texas History for a portion of this component area. Courses involve the interaction among individuals, communities, states, the nation, and the world, considering how these interactions have contributed to the development of the United States and its global role.)

VII. Government/ Political Science (Courses in this category focus on consideration of the Constitution of the United States and the constitutions of the states, with special emphasis on that of Texas. Courses involve the analysis of governmental institutions, political behavior, civic engagement, and their political and philosophical foundations.)

VIII. Social and Behavioral Sciences (Courses in this category focus on the application of empirical and scientific methods that contribute to the understanding of what makes us human.
Courses involve the exploration of behavior and interactions among individuals, groups, institutions, and events, examining their impact on the individual, society, and culture.)

Required Skill Objectives

Foundational Component Areas	Skill Objectives					
	Critical Thinking	Communication	Empirical & Quantitative	Team Work	Social Responsibility	Personal Responsibility
Communication	✓	✓		✓		✓
Mathematics	✓	✓	✓			
Life and Physical Sciences	✓	✓	✓	✓		
Language, Philosophy & Culture	✓	✓			✓	✓
Creative Arts	✓	✓		✓	✓	
American History	✓	✓			✓	✓
Government/Political Science	✓	✓			✓	✓
Social and Behavioral Sciences	✓	✓	✓		✓	

Submit completed, signed form to Core Curriculum Committee - Box 2478 or Fax 4-1271

SAM HOUSTON STATE UNIVERSITY
Department of Biological Sciences
Spring 2014 Semester

COURSE SYLLABUS
BIOL 1131-03 General Botany

Time & Location:	Lecture M,W,F 2:00-2:50pm LDB 214; Laboratory section as assigned.
Instructor:	Christopher Randle
Office/Lab:	Lee Drain Building 141/135
Office Hours[1]:	M,W,F 10:30am-12:00pm or by appointment
Phone:	294-1554
Email:	randle@shsu.edu

Course Objectives: All life on the planet depends on plants for the production of food and oxygen through photosynthesis. It is not surprising that plants are the basis of all terrestrial biological communities. This course is intended to provide a broad understanding of the many ways in which plants affect our lives and their importance in evolutionary history and in current global phenomena. Many aspects of botany will be investigated from the anatomy and morphology of plants to the function and inheritance of genetic traits, to the evolution of major plant lineages.

Textbook: *Biology of Plants* eighth edition by R. Evert and S. Eichhorn
This is an excellent source of information and *completion of assigned reading material is mandatory*. Reading assignments will be given in class and posted on Blackboard.

Laboratory Manual: The laboratory manual for general botany consists of 12 laboratory modules, tailored to this course. It can only be purchased in the Lowman Student Center Bookstore. You must bring it to every scheduled laboratory meeting except for the midterm and final.

Grading: Laboratory integration: 75% of your final grade will be determined by lecture performance and an additional 25% by laboratory performance.

General Botany Lecture:
Grades will be determined from four exams (non-cumulative) and a final exam (cumulative), and from 12 online "Study Buddy" quizzes. The lowest of all exam grades including the final will be dropped from the final tally.

Lecture Grades		
Weekly Online Study Buddy (12 weeks x 5 pts)		60 pts
Lecture Exam 1: Friday, Feb 10*		100 pts
Lecture Exam 2: Wednesday, March 7	100 pts	
Lecture Exam 3: Wednesday, April 11*	100 pts	
Lecture Exam 4: Friday, May 4*		100 pts
Final: Monday, May 7; 5:00-7:00pm	100 pts	
Total (- lowest exam score)		**460 pts**

*Dates are subject to change.

Final grades will be determined by the percentage of total points earned for the lecture portion of the course. 90-100% = A, 80-89% = B, 70-79% = C, 60-69% = D, < 60% = F. A curve may be

[1] I may be in my laboratory: LDB 135. Enter through room 136.

applied if the class average is below 70% and attendance is higher than the class average. No grade will be decreased due to any curve.

Lecture Exams: Exams will be in a multiple choice format. Each student will be required to bring a Scantron 882-E form and two #2 pencils to exams. Use of any electronic device (cell-phone, calculator, etc.) during the examination period will result in the automatic assignment of a "0" on the exam. Students will be expected to arrive to exams on time. Entry to exams will be allowed until the first student has turned in a completed exam. THERE WILL ME NO MAKE-UP LECTURE EXAMS OFFERED.

Study Buddy Online Exams: Each week (see schedule below), an online quiz will be posted in the "Assignments" folder of Blackboard. This quiz will consist of multiple choice, multiple answer, matching, true and false, and fill in the blank questions over materials from the previous week. You will be allowed to use your class notes, textbook, and any information that I post on Blackboard to answer the questions. I ask only that you work alone. Each quiz will be posted on Friday before midnight and will be removed the following Friday at midnight. Each Study Buddy Quiz will be worth 5 points, for a total of 60 points.

Schedule
Study Buddy 1: Jan 27-Feb 3
Study Buddy 2: Feb 3-10
Study Buddy 3: Feb 10-17
Study Buddy 4: Feb 17-24
Study Buddy 5: Feb 24-March 2
Study Buddy 6: March 2-9
Study Buddy 7: March 9-23 (Covers Spring Break)
Study Buddy 8: March 23-30
Study Buddy 9: March 30-April 6
Study Buddy 10: April 6-13
Study Buddy 11: April 13-20
Study Buddy 12: April 20-27

Attendance: The University requires that roll be taken.

General Botany Laboratory:

Responsibilities of the Lab Student

Preparation. *Before* your lab period, read the laboratory exercise thoroughly. Underline items of procedure and terms which are not clear to you. Careful reading of the assignment prior to the laboratory is like studying a road map before making a trip; it helps to know where one is going.

Use and Care of Equipment Understand the directions for proper use of equipment prior to turning knobs or flipping switches. The life and usefulness of even the simplest item of equipment is lengthened by observing proper care and respect.

Work Area Keep your work area neat and clean. Paper, specimens, and used chemicals are to be disposed of in the receptacles indicated by your instructor. Do not leave your lab table cluttered. Do not dump trash items in the sinks or broken glass containers! Before leaving the laboratory be certain that your lab table is clean, all equipment and lab materials are returned to the designated storage areas, and you lab stool is pushed back in place at the table.

Laboratory Safety Use care and respect in handling all chemicals. Clothing can be damaged by spills, and injury to the skin can occur. When a caustic chemical comes in contact with the skin or in the eyes, immediately flood the affected area with copious amounts of water. The eye wash station is located at one of the sinks in the laboratory. Flushing the affected area for at least 15 minutes is recommended. Clothing that is contaminated should be removed and washed before being worn again. The handling and heating of chemicals should be done with care. Use protective goggles to prevent eye injury. First aid kits are in each lab room as are fire extinguishers.

Laboratory Attendance Policies

This course abides by University Policy and Regulations concerning attendance (See the Undergraduate Catalog). Accordingly, "regular and punctual attendance is expected of each student at Sam Houston State University. In a course such as this, in which group effort is such a significant part of the grade, students genuinely need to come to class so that they can contribute to their group's success. Those who are prepared and contribute positively will be highly valued by their group! In short, attendance matters; so, please take advantage of the opportunity to learn, to help your group, and to excel by coming to all classes.

It is almost impossible to "make-up" a lab. Your work is done with your group! The one individual quiz grade, one group quiz grade and one group lab exercise grade that is dropped is your only reliable means of covering an absence.

1. In addition to the required attendance policy, it is important that you please come to class on time. Also, please do not leave the class room early unless you are sick or have cleared it with the lab instructor before class begins.

2. Make-up exams are only allowed based on the lab coordinator's approval. **In order for an exam to be made up, some form of documentation MUST be provided, such as a doctor's note, a legal notice, a note from the SHSU athletic/orchestra/choir/band director, etc.**

Proper Course Behavior: All of these rules are standard and are based on common courtesy, respect, and honesty.

1) Students will refrain from behavior in the classroom that intentionally or unintentionally disrupts the learning process and, thus, impedes the mission of the university. ***Cellular telephones, pagers and ALL other electronic equipment must be turned off before class begins.*** **Students are prohibited from eating or drinking in class, using tobacco products,** making offensive remarks, reading newspapers, sleeping, talking at inappropriate times, wearing inappropriate clothing, or engaging in any other form of distraction. Inappropriate behavior in the classroom shall result in a directive to leave class. Students who are especially disruptive also may be reported to the Dean of Students for disciplinary action in accordance with university policy.

2) Please come to class on time—there is no reason to be late to class on a frequent basis. If you arrive late, you may miss the quiz and not be allowed to make up the missed quiz or work.

3) Please remain in class until it is finished. **Leaving early will count as an absence unless it is an emergency.**

4) ***Due to Safety Requirement:*** *Do not* bring food or drink into the lab. *Do wear* enclosed shoes to lab. Please *do not wear* sandals or any other type of open shoe in the lab room.

5) Hats must be removed and put away during lab.

6) During lab and especially during quizzes and exams, cell phones and any other equipment capable of receiving, recording and/or transmitting information, must be put away in a book bag or purse. In short, it must not be readily accessible or accessed during an exam. ***The use of such devices during a quiz or exam will result in a zero for that test and possibly the lab course.*** Chatting on the phone during lab (even in the hallway) is a waste of your lab time as well as your group's time.

Laboratory Grading Policies
Lab grades will be determined as follows:

30% = Average of daily individual pre-lab quiz
15% = Average of daily group lab quiz X peer evaluation grade
15% = Average of daily group lab work grade X peer evaluation grade
20% = Mid-Term Exam (this is an individual grade)
20% = Final Exam (this is an individual grade)

DROP GRADE POLICY
Students with ***no absences*** will be allowed to drop their lowest individual lab quiz and lowest group lab quiz grade and lowest group lab exercise score earned. ***If a student misses a lab*** during the semester and does not (or cannot ***for whatever reason***) make it up the same week, that set of zeroes will be the student's one and only drop grade set. Use this set of drop grades judiciously, save it for an emergency!

Cooperative Learning and Peer Evaluation:
In this class, students will be divided into teams by the instructor in such a way as to ensure maximum diversity in the team and to prevent cliques from forming in the class. Each team will consist of about 6 students which will work together throughout the semester on lab exercises. As you will see, **team scores are usually better than individual scores, and so this process normally *improves* an individual's grade.** In addition, *team effort helps everyone learn the material better because everyone is involved in teaching one another.* So, when individuals participate appropriately in this process, individuals normally do better on tests as a result.
Many students are initially uneasy about the idea of working in teams because it is often the case that some members of the team end up doing all or most of the work, while others do little or nothing. This will **not be a problem** in this course because of both the peer evaluation process described below, as well as the importance of the evaluation to a student's grade. The procedures for performing peer evaluations are as follows:

Peer Evaluation Process
If your team consists of 6 members, you will be given 50 points at the end of the semester to distribute among the *other* members of the team. *You do not give points to yourself.* (If you are in a team of 5 members, you will be given 40 points, etc...) If you believe that everyone contributed equally to the team work, then you would give everyone 10 points. If everyone in the team feels the same way, then everyone receives a total of 50 points, which is an average of 10 points (50 points/5 = 10 points). You must be fair in your assessments, but if someone in your team did not contribute adequately, then you should give them fewer points. Of course, if someone worked harder than the rest, then give that person more than 10 points. **The individual's score is equal to the average of the points he/she received from their peers. This score is then used to determine what proportion of the team's final score will be awarded to the individual at the end of the semester.** Anyone that receives an average of 10 or more points receives 100% or more of the team score. If he or she receives an average of 9, then that person will receive 90% of the team score, and so on.
You must also use the following criteria when assigning points:

1) Don't give anyone a grade they do not deserve.

2) You cannot give anyone on your team more than 15 points. (This prevents people from giving their friends an unfairly large amount of points, which would necessarily hurt other members of the team.)

3) You do not have to assign all of your points. (This means that you do not have to give your remaining points to someone who you feel does not deserve the points.)

This evaluation process will be completed twice during the semester. The first will be completed the week after the mid-term exam as a "check-point" so that any team member not doing well can be advised to increase their effort. The second time (the one that actually impacts the grades) will be completed at the end of the semester. **Each time the evaluation is completed, it should be done in private and kept confidential. Do not discuss the evaluation with your team members or complete it in their presence.** Either submit your peer evaluation form confidentially through email or place it in an envelope to turn in to your lab instructor during lab.

The Individual Pre-Lab Quiz (30% of your overall lab grade) are quizzes that cover the reading material upon which the lab is based. So, by reviewing relevant reading material in the lab manual, one can readily prepare for these quizzes. These quizzes are generally multiple choice (scantron 815-E) but may include an occasional short answer essay question. *The pre-lab quizzes are completed by individuals at the beginning of the lab period.*

Individual Work to Be Completed and Checked Off by the lab instructor at the *beginning* of the lab period will include many of the "Check Your Progress" questions and the "Questions for Review" for each chapter to be covered. Starting the second week of lab your lab instructor will check your lab manual when you arrive in lab to determine if you have completed the assigned pre-lab work. Each week is worth 5 points towards a total of 45 points; the percentage you earn will be worth one individual quiz grade to average into your total. Example: you come to eight of the nine lab weeks with your pre-lab assignment completed; that will equal 5 x 8 = 40, 40/45 = 88.8% as one of your weekly quiz grades.

Pre-Mid-Term and Pre-Final Exam Taxonomy Quiz, multiple choice (scantron 882) quizzes. One quiz will be given the week before the mid-term exam and can be used to replace a low existing individual quiz grade. The second quiz will be given the week before the final exam and can be used to replace a low individual quiz score from the last half of the semester.

The Group Post-Lab-Quiz (15% of your overall lab grade) are quizzes that cover the reading material upon which the lab is based and anything covered in lab. These quizzes are fill-in-the-blank and short answer essay quizzes. *The post-lab quizzes are completed by your learning TEAMS during the next lab period; the average of your group post-lab quizzes will be multiplied by your peer evaluation score to determine your fair share of the grade.* **Only the team members present for the quiz will receive credit for that quiz!**

The Group Post-Lab-Quiz (15% of your overall lab grade) are quizzes that cover the reading material upon which the lab is based and anything covered in lab. These quizzes are fill-in-the-blank and short answer essay quizzes. *The post-lab quizzes are completed by your learning TEAMS during the next lab period; the average of your group post-lab quizzes will be multiplied by your peer evaluation score to determine your fair share of the grade.* **Only the team members present for the quiz will receive credit for that quiz!**

The lab activities and corresponding worksheet (15% of your overall lab grade) are also completed as a team. Every individual team member present MUST complete the lab exercise in their own lab manual BEFORE the lab instructor will accept the group answer sheet. The average of your group lab exercise score will be multiplied by your peer evaluation score to determine your fair share of the grade. **Only team members present (with a completed lab manual) will receive credit for the lab exercise that day.**

Mid-Term & Final Exam (a total of 40% of your overall lab grade) These will review the material covered in lab. Questions may be worded in a fashion very similar to those seen on the weekly quizzes and will include numerous fill-in-the-blank (possibly some multiple choice) practical questions. There will be ***approximately*** 100-150 questions. You must take these exams with your regularly scheduled lab section. If you cannot make that time you must take it during the scheduled make-up exam time seen on the first two pages of your syllabus. ***These will be taken and scored as Individuals!***

Any student taking a "make-up" mid-term or final exam *must* present appropriate documentation for their totally unavoidable absence from their regularly scheduled major exam.
Example: doctor's note requiring an absence from class, obituary, court summons, proof of incarceration during exam time, etc. **These students must also present a photo ID when attending the "make-up" exam.** If a student misses their regular exam and the make-up exam time stated on the syllabus, they will either not be allowed to make-up the exam, or they will be required to complete an essay exam pending presentation of appropriate documentation. No student will be allowed to complete a make-up exam without appropriate documentation. No Exceptions! If you are sick enough to miss a major exam, then you really need to see a doctor! Inappropriate reasons for missing an exam include, but are not limited to: "I forgot," "I didn't know it was this week," "My alarm clock didn't go off," "I couldn't find a parking space," "I had/have another test the same day," "I'm going on vacation," etc.

Schedule of topics

Topic	Assigned Reading
The Scientific Method as a Process of Discovery	none
The Plant Cell and the Cell Cycle (Mitosis): Emergent Properties 1	Ch. 3
Cells and Tissues of the Plant Body: Emergent Properties 2	Ch.23
The Root: Structure and Development	Ch.24
The Parasitic Plant Revolution: Notes from the Underground	none
The Shoot: Primary Structure and Development	Ch.25
Secondary Growth in Roots and Stems	Ch. 23, 26
Plant Hormones	Ch.27
External Factors and Plant Growth	Ch.28
The Flow of Energy	Ch. 5
Photosynthesis	Ch. 7
Respiration	Ch. 6
The Carbon Cycle and Global Climate Change	none
A Frank and Open Discussion: Sexual Reproduction and Heredity	Ch. 8
The Process of Evolution	Ch. 9
Systematics: The Science of Biological Diversity	Ch. 10
Plant Origins	none
Non-vascular Plants	Ch.16
Seedless Vascular Plants	Ch.17
Seed Plants: The Gymnosperms	Ch.18
Seed Plants: The Angiosperms	Ch.19
The Abominable Mystery	Ch.20

Holidays/Important Dates

Thursday, February 2: Last day to drop without a "Q" and receive 100% refund.
March 12-16 Spring break. No Class.
Friday, April 6 Good Friday. No Class.
Friday, May 4. Last Class Day. Last day to resign. Last day to drop courses by 5:00 PM.
Monday, May 7 Final exam, 5:00-7:00pm, LDB 214

See http://www.shsu.edu/syllabus/ for additional documentation.

ACADEMIC DISHONESTY:

All students are expected to engage in all academic pursuits in a manner that is above reproach. Students are expected to maintain honesty and integrity in the academic experiences both in and out of the classroom. Any student found guilty of dishonesty in any phase of academic work will be subject to disciplinary action. The University and its official representatives may initiate disciplinary proceedings against a student accused of any form of academic dishonesty including but not limited to, cheating on an examination or other academic work which is to be submitted, plagiarism, collusion and the abuse of resource materials. For a complete listing of the university policy, see:

http://www.shsu.edu/~slo_www/

STUDENT ABSENCES ON RELIGIOUS HOLY DAYS POLICY:

Section 51.911(b) of the Texas Education Code requires that an institution of higher education excuse a student from attending classes or other required activities, including examinations, for the observance of a religious holy day, including travel for that purpose. Section 51.911 (a) (2) defines a religious holy day as: "a holy day observed by a religion whose places of worship are exempt from property taxation under Section 11.20...." A student whose absence is excused under this subsection may not be penalized for that absence and shall be allowed to take an examination or complete an assignment from which the student is excused within a reasonable time after the absence.

University policy 861001 provides the procedures to be followed by the student and instructor. A student desiring to absent himself/herself from a scheduled class in order to observe (a) religious holy day(s) shall present to each instructor involved a written statement concerning the religious holy day(s). The instructor will complete a form notifying the student of a reasonable timeframe in which the missed assignments and/or examinations are to be completed. For a complete listing of the university policy, see:

http://www.shsu.edu/~vaf_www/aps/documents/861001.pdf

STUDENTS WITH DISABILITIES POLICY:

It is the policy of Sam Houston State University that individuals otherwise qualified shall not be excluded, solely by reason of their disability, from participation in any academic program of the university. Further, they shall not be denied the benefits of these programs nor shall they be subjected to discrimination. Students with disabilities that might affect their academic performance are expected to visit with the Office of Services for Students with Disabilities located in the Counseling Center. They should then make arrangements with their individual instructors so that appropriate strategies can be considered and helpful procedures can be developed to ensure that participation and achievement opportunities are not impaired.

SHSU adheres to all applicable federal, state, and local laws, regulations, and guidelines with respect to providing reasonable accommodations for students with disabilities. If you have a disability that may affect adversely your work in this class, then I encourage you to register with the SHSU Counseling Center and to talk with me about how I can best help you. All disclosures of disabilities will be kept strictly confidential. NOTE: No accommodation can be made until you register with the Counseling Center. For a complete listing of the university policy, see:

http://www.shsu.edu/~vaf_www/aps/811006.pdf

VISITORS IN THE CLASSROOM:

Only registered students may attend class. Exceptions can be made on a case-by-case basis by the professor. In all cases, visitors must not present a disruption to the class by their attendance. Students wishing to audit a class must apply to do so through the Registrar's Office.

Appendix B

BIOL 1311
General Botany
Core Objectives and Skills Assessment: Sample Questions

The General Botany Objectives Assessment (GBOA) is an exam of fifty questions covering each of the five main objectives of the course. The GBOA will be administered electronically to all students in the first and last week of each semester, allowing assessment of how each student has improved over the course of the semester in meeting objectives. We have provided an example of the kinds of questions that will be administered below.

Objective 1: Identify emergent properties as the basis of biological complexity

1. Selective permeability is a function of the cell membrane resulting from the interaction of which of these macromolecules?
   - DNA
   - Transfer RNA
   - Messenger RNA
   - Transmembrane proteins ✓
   - Phospholipids✓
   - Lignin
   - Suberin
   - Sugar side-chains✓

2. Which tissue systems must be present in every plant organ?
   - Endocrine
   - Vascular✓
   - Reproductive
   - Ground✓
   - Photosynthetic
   - Dermal✓
   - Woody

3. Phenotypic variation arises from which of the following processes?
   - Mutation✓
   - Meiotic Recombination✓
   - Sexual Recombination✓
   - Environmental interactions✓

Objective 2: Gain foundational knowledge of plant anatomy, morphology, and function, including special terminology applicable to these aspects of plants.

4. A _____ always subtends a _____.
   - Leaf, axillary bud ✓
   - Axillary bud, leaf
   - Leaf, flower
   - Petiole, leaf

5. Which tissue of the root vascular cylinder palys an active role in determining the rate of water flow in a plant?
   - Pith
   - Xylem
   - Phloem
   - Pericycle
   - Endodermis ✓
   - Apoplast
   - Epidermis

6. A leaf that has been modified into a hard, needle-like protrusion is a
   - Thorn
   - Prickle
   - Spine✓
   - Trichome
   - Cladophyll

Objective 3: Apply Mendelian principles of inheritance toward understanding the basis of plant diversity.

7. What feature of the pea plant allowed Mendel insight into the mechanism of heredity?
   - Mendel observed the movements of chromosomes in meiosis.
   - Mendel observed phenotypes of the offspring of controlled crosses. ✓
   - Mendel never observed a pea plant himself, but stole data from others.
   - Mendel observed genotypes directly, because pea plants exhibit incomplete dominance.

8. If purple flowers are a dominant trait and white flowers are a recessive trait, is it possible for a white flowered and purple flowered individual to produce white flowered offspring?

Yes, because white flowered plants always give rise to white flowering offspring regardless of the genotype of the other parent.

Yes, because a heterozygous plant would have purple flowers, but could still donate a recessive allele to an offspring. ✓

No, because purple flowered plants only give rise to purple flowered offspring, regardless of the genotype of the other parent.

No, because a purple flowering plant can only donate a dominant allele to an offspring.

9. When the phenotypic ratios of a controlled cross involving two traits do not assort independently, the explanation is

The genes encoding the traits of interest lie close together on the same chromosome

The genes share an epistatic relationship.

The genes do not recombine freely during meiosis

All of these are good explanations. ✓

Objective 4: Understand the evolutionary theory as an explanation for both the process and pattern of plant diversification.

10. Which of the following is/are **not** a component(s) of Darwin's theory of Natural Selection?

Eventually, species become perfectly suited to their habitats. ✓

Organisms produce more offspring than can be sustained by the environment.

During their lifetimes, organisms acquire traits that allow them to survive and pass these traits to their offspring. ✓

Populations do not expand continuously.

Variation exists within populations.

Much of this variation that exists in populations is heritable.

Allele frequencies and therefore phenotypic means in small populations will change randomly due to genetic drift. ✓

11. Which of the following represent examples of reproductive isolating mechanisms?

Adaptations to different microhabitat by maples occurring in overlapping geographical distributions. ✓

The separation of the mesic forest populations of eastern North America and eastern Asia due to changes in climate and sea-level. ✓

Local adaptation of a few populations of *Agrostis tenuis* to high copper soils. ✓

Differences in flowering time exhibited by *Silene virginica* and *Silene rotundifolia*. ✓

12. Which of the following traits are synapomorphies for the flowering plants?
   Flowers✓
   Ovules enclosed in carpels ✓
   Seeds
   Vascular Tissue
   Eustele
   Fruits✓
   Double fertilization✓
   Embryo maintained within the female parent
   Leaves with parallel veins
   Vessel elements in the xylem✓

Objective 5: Relate ecological principles to aspects of plant populations and communities, including reproductive biology, herbivory avoidance, symbiotic relationships and demographic and successional dynamics that create and stabilize plant populations and communities.

13. Perennial plants of prairie ecosystems often have root systems that are much deeper than the aboveground height of the plant. This is because
   Prairies are seasonally dry ecosystems and deep roots are needed to reach water. ✓
   It prevents plants from being blown away in tornados.
   Soil of the prairie ecosystem is especially rich.
   Herds of bison may damage shallow roots with their hooves.

14. Which of the following increase the concentration of carbon dioxide in the atmsophere?
   Burning of fossil fuels ✓
   Deforestation ✓
   Respiration ✓
   Production of concrete from lime deposits ✓
   An decrease in oceanic temperature

15. Why is the relative biomass of autotrophs in an ecosystem always greater than that of heterotrophs?
   Autotrophs reproduce more rapidly than heteroptrophs
   Heterotrophs are rarely as long lived or as large as autotrophs
   Heteroptrophic lineages have evolved much more recently than autotrophic lineages
   At each level of consumption, some of the stored energy is converted to entropy, resulting in decreasing gains✓