

## **Biology 324**

### **Botany**

**Fall 2005**

**Dr. Daniel (Max) Taub**

**Lecture: MWF 10:00-10:50, FJSH 118**

**Lab: TH 2:30-5:30. FJSH 212 or other locations TBA**

**Instructor:** Dr. Daniel (Max) Taub, Dept. of Biology

Office: Fondren-Jones 140

Office hours Wed, Fri 11-12, Tues 9:30-11. You are also welcome to drop by anytime. I am often available, although the best way to be sure that I can meet with you is to schedule an appointment- otherwise you might find that there are others already meeting with me, or that I've had to step out of the office for a moment.

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**Course content and goals:** This course is a survey of the biology of plants, including aspects of plant diversity, morphology, physiology and ecology. While doing this we will also practice skills in reading, analyzing and communicating scientific information and idea.

Goals for the course include:

- Improved understanding of the structure, functioning, life histories and diversity of plants.
- Development of personal perception of plants in the environment.
- Development of ability to read scientific literature, to analyze and assess the content of scientific discourse and to synthesize information from a variety of sources.
- Development of ability to research topics in a scientific manner, including both literature searches and the design and implementation of experiments.
- Development of writing ability, particularly on scientific topics.

**Course format:** This course will meet three times a week for lecture/discussion and once a week in a laboratory session. Lecture/ discussion sections will be a mix of lecture and of

discussion, involving a large amount of student participation. It is critical to keep up with assignments. If you have not done the assigned reading prior to class, you will have a very hard time participating meaningfully. On days that we are discussing papers, bringing these papers to class is required.

Students will be required to attend one-on-two sessions (meetings of two students with the professor). These will meet in the instructor's office, approximately every three weeks and will principally consist of the students answering questions about the material studied in class. The goal of these sessions is to provide a more individualized learning environment than is found in the classroom. Students will be responsible for completing a written assignment prior to these sessions.

Laboratory sessions will include both laboratory projects and field plant identification practice. The laboratory projects will include several short, guided laboratory experiences as well as conducting a substantial experiment.

For days when we have scheduled field sessions, please come prepared for the prevailing weather conditions. We will be out in the blazing sun and in the drenching rain, depending on what we encounter. Clothes should be ones you don't mind getting dirty, and wear suitable shoes for off-trail hiking. Bring plenty of water, sunblock and suitable headgear for protection from the sun, and anything else you need to be comfortable and safe in the field. Please bring the field guide book to lab classes.

If you have allergies or other conditions that may require special consideration in the field, please inform the instructor prior to the first laboratory period.

**Accommodations for disabilities:**

Appropriate accommodations will be made for students with disabilities in accordance with University policy. All students requesting such accommodations must consult with the

Office of Academic Services. For special accommodations for exams, students must make arrangements with Academic Services at least three weeks prior to the exam.

### **Readings:**

Readings are in two course packets. One packet is available at the bookstore, and is a required purchase, as you will not find this material elsewhere. The second packet is available at the bookstore, on demand (they will print one to order) if you would prefer to obtain these readings as a bound volume. The readings in this packet are also available on reserve in the library, both as paper copies, and electronically. Access to the electronic reserves is through <http://eres.southwestern.edu/eres> and the course password is “Quercus” (do not type the quotation marks). There may be additional readings on reserve as the semester develops. There is also a required field plant identification book: Lone Star Field Guide to Wildflowers, Trees, and Shrubs of Texas (Lone Star Field Guides) by Delena Tull, George Oxford Miller; Lone Star Books.

**Grading summary:** Grades will be based upon performance in all aspects of the course according to the following schedule:

#### **Factual knowledge (including plant identification):**

4 written exams, each 8% of the final grade	32%
Field quizzes and practical exam	10%

#### **Analysis and synthesis of readings and written communication**

Summaries of journal articles (percent depends on particular assignment)	16%
Research report	12%

#### **Literature search and synthesis**

Literature question assignments (percentage will vary with the assignment)	14%
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#### **Class involvement**

Contributions to class discussions and atmosphere, including during one-on-two sessions	10%
Participation in laboratory studies, including conducting experiments	6%

Letter grades will be based on the calculated percentage for all components of the course, according to the table below:

Percent	Grade
97-100	A+
93-96.99	A
90-92.99	A-
87-89.99	B+
83-86.99	B
80-82.99	B-
77-79.99	C+
73-76.99	C
70-72.99	C-
67-69.99	D+
63-66.99	D
60-62.99	D-
<60	F

### **More on grading:**

#### Factual knowledge (including plant identification):

The written exams will principally cover material from the lecture portions of the course. The field quizzes and practical exam will test identification skills and knowledge of plant morphology.

#### Analysis, synthesis and writing

Development of abilities in analyzing and synthesizing scientific materials and developing written communication skills are both explicit goals of this course. There will be a number of short written assignments. Several will involve summarizing and analyzing a journal article.

Each student will also be responsible for preparing a research report presenting and interpreting data collected during the laboratory sessions, using standard formats of scientific presentation.

Evaluation of all writing assignments will be based not only on content and understanding of the material, but also on clarity and organization, and such factors as diction and grammar.

### Literature search skills

We will spend a portion of the semester using the scientific literature to investigate a question (or questions) about plant biology. You will have several graded assignments that will involve searching for relevant literature and reading and evaluating literature pertaining to these questions. Your grade on these assignments will reflect the quality and thoroughness of your efforts to locate and evaluate potential sources of information, and the quality of your final report on this project. Late assignments will not be accepted, as this work must be done on time so that we can discuss our progress in addressing these questions and move forward as a class.

### Class involvement

#### Contributions to class discussions

The class will engage in many discussions based on the readings and on questions posed by the instructor during class. Grading will be based on the quality and quantity of each student's participation in all these discussions and will include such factors as understanding of the material, creativity, resourcefulness, inquisitiveness, insight, imagination and intellectual engagement.

### Participation in laboratory studies

This portion of the grade will be based on the instructor's perception of each student's performance in conducting experiments. Showing up for all labs, being on time, performing all work carefully, thoroughly, and in a timely manner and working cooperatively will all contribute to this portion of the grade.

### One-on-two sessions

Coming to a one-on-two session unprepared (assignment not completed, or performed in a perfunctory fashion) or missing a session will result in a deduction from the final grade of 0.5% or 1%, respectively.

### **Attendance**

Attendance is required for all lecture and laboratory meetings. If exceptional circumstances require absence from class, arrangements must be made with the instructor ahead of time. Absence during class discussions or laboratory experiments will count against the grade for participation in these activities.

### **Honor system**

All work is covered under the honor code. All suspected violations will be taken seriously and dealt with under the approved procedures as found in the Student Handbook. It will be considered a violation of the honor code to lie about the reasons for being absent from class.

Reading assignments: Items with their names underlined in the schedule below are available both in course packet 2, and as library reserves (both paper and electronic). Items with their names in Bold are in course packet 1. Items neither in Bold nor underlined are available only on reserve.

Date	Topic	Reading	Assignment
8/29	Introduction		
8/31	Evolution, adaptation, fitness	<u>Silvertown and Lovett-Doust 1-14</u>	
9/1	Plant Kingdom, Gross morphology 1	<u>Judd et al. 45-55</u>	
9/2	Photosynthesis	<b>Nabors 177-187</b>	
9/5	Labor Day, No Class		
9/7	Water use and xylem function	<u>Larcher 219-220</u> , <b>Raven 576-579, 692-693, 750-760</b>	
9/8	C <sub>4</sub> photosynthesis, Kranz anatomy,	<b>Nabors, 187-192</b>	
9/9	Discuss C <sub>4</sub> paper	<b>UNK paper #1</b>	<b>Paper Assignment</b>
9/12	Mineral nutrition	<b>Raven 726-735</b> , <u>Fitter 51-68</u>	
9/14	Discuss Water Stress paper	<b>UNK Paper #2</b>	<b>Paper Assignment</b>
9/15	Stomata, mono vs dicots/ Pair meetings		
9/16	Pair meetings		
9/19	What is research?		
9/21	Plant Life Histories	Crawley 73-74, 80-101	
9/22	Intro to Field ID .Field ID/Pair meetings		
9/23	Pair meetings		
9/25	<b>Exam I: Plant resources</b>		
9/27	Plant reproduction and seeds	<b>Rost et al 197-202</b> , <b>Raven 562-563</b> , <u>Bewly 199-215,230-237,257-265</u>	

9/29	Field ID		
9/30	Pollination, Seed dispersal	<b>Raven et al. 530-549</b> <u>Howe and Westley 262-270</u>	
10/3	Plant breeding systems	<u>Crawley 156-173</u>	
10/5	Discuss paper(s) relevant to experiment	Paper(s) relevant to experiment	<b>Assignment</b>
10/6	Field ID/ Pair meetings		
10/7	Pair meetings		
10/10	Light regulation of growth	<b>Raven 709-714</b>	
10/12	Discuss question search		Question Search Assignment
10/13	Field ID/ Pair meetings		
10/14	Pair meetings		
10/17	Break, No class		
10/19	Plant Interactions	Competition (Raven <b>776-777</b> ), allelopathy (Barbour et al 141-144, <b>FIEE 2:436-443</b> ), nurse plants ( <u>Barbour et al 153-157</u> )	
10/20	Experiment		
10/21	<b>Exam 1I: Growth and Reproduction</b>		
10/24	Herbivory and defense	<u>Barbour et al,167-175</u>	
10/26	Paper on Herbivory	UNK # 3	Paper Assignment
10/27	Experiment		
10/28	Temperature stress	<b>Taiz and Zeiger 735-745, Long et al, 633-637, 640-641, <u>Lambers et al 40-41</u></b>	
10/31	Arctic/desert biomes	<b>Raven 807-810,819-820</b>	
11/2	Salinity	<u>Larcher 396-406, Conacher</u>	
11/3	<b>Field ID practical/</b> Pair meetings		
11/4	Pair meetings		

11/7	Discuss Question Search		<b>Question Search Assignment</b>
11/9	Crop plant evolution	<b>Gepts 328-341</b>	
11/10	Experiment/ Pair meetings		
11/11	Pair meetings		
11/14	Two important crop families	<b>Simpson and Ogorzaly 107-154, <u>Bewley and Black 378-382</u></b>	
11/16	<b>Exam III: Stress</b>		
11/17	To be announced		
11/18	To be announced		
11/21	Discuss Question Search		<b>Question Search Assignment</b>
11/23	No class, Thanksgiving		
11/24	No class		
11/25	No class		
11/28	Plants and CO <sub>2</sub>	<b>Medlyn and McMurtrie 441-451</b>	
11/30	Genetic modification	<u>Halford 10-36</u>	
12/1	Experiment-Final		
12/2	Discuss CO <sub>2</sub> paper	<b>Poorter and Navas</b>	<b>Paper Assignment</b>
12/5	Pair meetings		
12/7	Pair meetings		
12/8	Lab presentations/ Pair meetings		
12/9	Pair meetings		
12/14 8:30AM	Final Exam		

**The information in this syllabus is provisional, subject to change as needed.**