

**Cacti & Succulents of the Southwest**  
**BIOL 5301, Spring 2017**  
**Sul Ross State University**

**Instructor:** Dr. Martin Terry

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**Office hours:** T 3:00–5:00 p.m., W 2:00–5:00 p.m., or by appointment.

If you feel lucky, drop by at random; if I'm in the office, you're welcome.

**Lecture time and venue:** MW 8:00–8:50 a.m., WSB 204.

**Lab time and venue:** M 2:00–3:50 p.m., WSB 204.

**Required Textbook:** Powell AM, Weedon JF. 2004. *Cacti of the Trans-Pecos & Adjacent Areas*. Texas Tech University Press, Lubbock.

Also useful, but not required, is the less technical field-guide version of the book:

Powell AM, Weedon JF and Powell SA. 2008. *Cacti of Texas: A Field Guide*.

Texas Tech University Press, Lubbock.

**Student projects done mostly during lab:**

1. Each student will (with guidance from the instructor) germinate seeds of one or more species of cacti in the greenhouse and monitor the seedlings until the end of the semester, keeping records of growth, morphological development, and any mortality and the conditions associated with it.

2. Each student will choose a cactus species currently growing in cultivation in the Sul Ross cactus collection in front of Lawrence Hall or, if feasible, in a wild population in the Alpine area at an accessible location of your choice – consult with the instructor about likely possibilities. By frequent observation (at least twice a week at first, and daily when flowering appears likely to begin), collect quantitative temporal data on the phenology and fruiting of the selected species. Turn in a report summarizing your observations at the end of the semester.

3. Each student will present to the class a 10-minute summary of the succulent plants in one family other than the Cactaceae, with a concise handout summarizing the key points of the presentation.

## **Tentative Lecture Schedule**

<b>Date</b>	<b>Lecture Topic</b>
JAN 18	Introduction <b>Get textbook ASAP!!</b>
JAN 23	Origin & evolution of cacti
JAN 25	West Texas as habitat for cacti
JAN 30	Taxonomy & nomenclature – a preliminary assessment and some broad issues
FEB 1	Morphology, anatomy, and corresponding terminology
FEB 6	Morphology, anatomy, and corresponding terminology
FEB 8	Conservation Issues, Endangered Species Act, and CITES
FEB 13	Physiology: morphological-anatomical influences
FEB 15	<b>FIRST EXAM</b>
FEB 20	Physiology: C <sub>3</sub> , C <sub>4</sub> and CAM -- carbon metabolism and water-use efficiency
FEB 22	Physiology: thermoperiodicity, frost resistance, rainfall, and salt resistance
FEB 27	Ethnobotany of cacti
MAR 1	Secondary metabolites: betalains, flavonoids, and alkaloids
MAR 6	Secondary metabolites: some specific cactus alkaloids of note
MAR 8	Other aspects of cactus biochemistry: saponins, terpenes, latex, calcium oxalate
MAR 13–18	<b>Spring Break, No Classes</b>
MAR 20	Ecology
MAR 22	<b>SECOND EXAM</b>
MAR 27	Chromosomal evolution & hybridization; horticulture
MAR 29	Biogeography. Term paper topics due.
APR 3	Pollination biology & breeding systems
APR 5	Archaeobotany of cacti (useful isotopes of carbon)
APR 10	Subfamily Pereskioideae; Subfamily Opuntioideae
APR 12	Subfamily Cactoideae
APR 17	More Cactoideae
APR 19	For a few Cactoideae more.
APR 24	Origin & evolution of cacti revisited
APR 26	Ethnobotany of select cacti
MAY 1	<b>THIRD EXAM</b>
MAY 3	Review.
<b>Final Exam</b>	Monday, May 8, at 8:00 a.m. (subject to rescheduling)

**Attendance** is required in both lecture and lab. Students will be dropped with an F for excessive absences, defined as absences that exceed 20% of the course (e.g., 6 lectures or 3 labs or proportional combinations of lectures & labs in this course).

**Educational outcomes:**

- Analyze the origin, biogeography, and evolution of cacti.
- Acquire the capacity to use appropriate terminology for describing cacti.
- Develop an understanding of controversies in the taxonomy and systematics of cacti.
- Recognize and distinguish genera and species of cacti native to the Trans-Pecos.
- Demonstrate knowledge of the ethnobotany and archaeobotany of cacti.
- Discern the differences and similarities in cacti vs. other plants in terms of their modes of photosynthesis and carbon metabolism (C<sub>3</sub>, C<sub>4</sub> and CAM).
- Examine the phytochemistry of select genera of cacti, with emphasis on alkaloids.
- Understand the diversity of reproductive biology and diversity of cacti.
- Analyze current socioeconomic and regulatory issues in the conservation of cacti.
- Interpret the diversity of non-cactus succulents in various plant families.
- Acquire and/or apply knowledge of conventional structure, formats and modes of citation in scientific papers by writing a term paper on some aspect of cacti or succulents.

**Field trips:**

There will be field trips (the number of them will be limited by time and budgetary constraints) to local cactus habitats during the semester, to be scheduled at times when a maximum number of students can participate. Field trips to nearby destinations will be done during scheduled lab periods, but trips to destinations such as Big Bend National Park or the Big Bend Ranch State Park are unavoidably more time-consuming and are therefore almost inevitably relegated to a weekend day, so participation in any such field trips is optional.

**Grades:**

Three hour exams (each worth 100) points will determine a total of 66.7% of the grade.

The final exam (worth 150 points), will determine 33.3% of the grade.

**DISABILITIES INFORMATION:** It is Sul Ross State University policy to provide reasonable accommodation to students with disabilities. Qualified students with disabilities needing academic or other accommodations to ensure full participation in the programs, services and activities at Sul Ross State University should contact the Counseling and Accessibility Center, Ferguson Hall 112, Box 122, Alpine, TX 79832 (phone 432-837-8203).