



BOTANY 122: Flowering Plant Identification

This course: 1) does satisfy SBCC IGETC transfer requirement for the Biol. Sciences (area 5B; p.98 2013-14 SBCC Cat.); 2) is transferable to UC & CSU as a GE lab Biol. Science course; 3) does not satisfy the SBCC GE requirement in Natural Sciences (p.82 2013-14 SBCC Cat.); 4) does not apply toward SBCC bio. major.

Instructor: Dr. Matt Kay

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Office hours: M, W 12:30-2:30; T 10:30-12:30 in EBS 307; or email for appointment

Lecture (CRN 60994): Friday, 9:00-11:00, EBS 201

Lab (CRN 60994): Friday, 11:10-2:05, EBS 201

(NOTE: CRN 60994 pertains to the lecture and lab section of this course. Students must attend the weekly lab and lecture in order to receive credit and earn a passing grade).

Welcome to Botany 122!

Have you ever wandered into a field of wildflowers, and wanted to be able to identify what you are seeing? Do you make a habit of stopping to inspect flowers when you are out hiking with friends and wondered “what’s this”? If so, you have enrolled in the right class! In this course we will explore flowering plant diversity and identification in California and beyond. We will have three general goals this semester:

- Become comfortable using *The Jepson Manual, 2nd Edition* (detail below), and other references useful for plant identification.
- Achieve familiarity with many common and “important” (ecologically and economically) plant families in California (which are also common/important worldwide).
- Have fun and put our skills to the test in a series of field trips later in the semester!

The Jepson Manual (TJM) is one of the more intimidating biological field guides/keys that you are likely to encounter. Competent use of this tool requires that we develop a moderately sophisticated vocabulary and familiarity of plant features. *Take a deep breath...it’s going to be OK...and fun!* Lab sections will focus on using *The Jepson Manual, 2nd Edition* (TJM2). Lecture periods will provide an opportunity to build vocabulary and knowledge base we’ll need to use the manual, but also gain an appreciation for the plant families we’ll be identifying.

Required textbook

The Jepson Manual, Higher Plants of California. Second Edition (2012). Baldwin et al. (Eds.) UC Press, ISBN: 978052025312-4.

Recommended textbook (see p. 6 of this syllabus)

California Plant Families: West of the Sierran Crest and Deserts. (2009). Keator, Glenn. UC Press, ISBN: 9780520259249

Required attitude: *positive!* If you wish to sit passively and collect a grade, you are in the wrong class. During the lab and field portions of the course, you will work actively to learn how to identify plants using *The Jepson Manual, 2nd Edition* (TJM2). In many cases, you will benefit from working collaboratively in small groups (2-4 students) to accurately ‘key out’ material.



Pipeline: I will use Pipeline to communicate with you via email, so you should check Pipeline regularly for updates, reminders, or schedule changes. To log into Pipeline: Go to the SBCC homepage (www.sbcc.edu) and click on “Pipeline”. If you have difficulty accessing or using Pipeline, technical support is available at <http://www.sbcc.edu/support/contact/> or via phone (805 965-0581 x2949).

Class website: Course-related documents, including the syllabus, lecture outlines and quiz and exam keys will be posted on my course website at: <http://www.biosbcc.net/kay/> This will be an indispensable resource for you during this course – visit it frequently!!

Course Requirements and Expectations

You are required to enroll in *and attend* both the lecture and lab portions of this course to receive course credit. If you have a habit of skipping class you will NOT succeed in this course. I expect you to be present at all lectures and labs. If you cannot attend a lecture or lab, it is your responsibility to let me know *in advance*, and subsequently seek out a fellow student (or me) and get notes or other materials.

Disruptive behavior will not be tolerated in lecture or lab. I expect you to behave as an adult – if that is confusing here are some firm ground rules:

- No cell phones, ipods...ipads...or whatever new electronic device will be invented and mass marketed to you between now and the end of the semester. Whatever it is, turn it off (unless taking notes on a laptop...).
- Arrive on time and work diligently – this includes field trips!
- Do not talk while the instructor or other presenters (it will be you at some point this semester...) are addressing the class...unless of course you have a question for the class.

Academic Honesty

Academic dishonesty will not be tolerated in this course. SBCC has a strict policy on academic honesty and I have zero tolerance for any act of academic dishonesty. Academic dishonesty includes but is not limited to: (1) Cheating on an exam or quiz (e.g. looking at or copying from somebody else’s exam, talking during an exam, using cell phones or texting, bringing prepared “cheat sheets”, using translators or dictionaries); (2) Copying someone else’s work or answers on any assignment; (3) Plagiarism (failing to properly cite material produced by others, or intentionally turning in work that is characterized as one’s own).

DSPS Students

Accommodations for Students with Disabilities:

Disabled Student Programs and Services (DSPS) coordinates all academic accommodations for students with documented disabilities at Santa Barbara City College. If you have, or think you might have, a disability that impacts your educational experience in this class please contact DSPS to determine your eligibility for accommodations. DSPS is located in the Student Services (SS) Building, Room 162. Their phone number is 805-730-4164.

If you are already registered with DSPS please submit your accommodation requests via the ‘DSPS Online Services Student Portal’ as soon as possible. Once submitted and confirmed please visit with me about your specific accommodations.

Please complete this process in a timely manner to allow adequate time to provide accommodation.



ASSIGNMENTS AND GRADING

Activity	Points	% of final grade	Comments
Lecture (100 pts)			
Midterm exam	50	10%	Friday March 25, in lecture
End of term exam	50	10%	Friday May 6
Lab/lecture (400 pts)			
Midterm lab practical	50	10%	Friday March 25, in lab
Lab/field notebook	350	70%	Due May 6
Totals	500 pts	100%	

Final grades for semester:

93-100% A; 90-92% A-; 87-89% B+; 84-86% B; 80-83% B-; 77-79% C+; 70-76% C; 60-69% D; 0-59% F

GRADED ACTIVITIES – LECTURE

Lecture exams

Your grade in this course will be determined (in part) by two exams: one midterm exam and one “end of term exam”.

The midterm exam will only contain material presented during the lecture portion of the course. This exam will primarily test your knowledge of the characteristics possessed by the families we will cover in lecture (which we will also see in lab). Prior to the exam, I will provide a sample exam so that students understand the format, and I will provide a detailed study guide.

The “end of term exam” will be formatted as a hybrid of the midterm exam and the laboratory practical exam (see below). I will also show slides of plants and ask students to identify: 1) the family to which each plant belongs, and/or; 2) the names or definitions of important structures on the plant. A comprehensive study guide will be provided in advance.

I will not collect your lecture notebook, but you should keep impeccable notes of lecture content. If you miss a lecture – get the notes from a fellow student. I will draw directly from this material when writing exam. If you attend regularly, take good notes, participate, and study the review guides, then you should succeed on exams.

GRADED ACTIVITIES – LAB

Laboratory practical exam

One laboratory practical exam will be given during the semester (consult course schedule for date). During the laboratory practical exam, students will be presented with plant material which they will need to identify (to family) using dichotomous keys in the *The Jepson Manual, 2nd Ed* (TJM2). This exam will be closed-note and students will work individually (no group work allowed). Further details will be provided.

Laboratory/field notebook

Making a reliable record of observations and events is an essential skill in science, as well as most other professions. I will collect and grade your lab/field notebook. Note (no pun intended!) that you will keep two notebooks for this class – a lecture notebook and a lab notebook. Lecture notebooks will not be collected. Only lab/field notebooks will be collected and graded, they need to be bound, NOT perforated, and measure ~7½” by ~10” (we’ll discuss why).



Criteria for grading lab/field notebook

Each week in lab I will present you with 3-6 “unknown” plant specimens. You will be asked to identify them using TJM2. In addition to keying out these specimens, you will be asked to make a sketch of them. Drawing specimens can be challenging (especially true of flowers...), and I will not deduct for artistic inability unless the work is blatantly sloppy. However, I expect you to apply yourself and improve over the course of the semester. The following four pieces of information should be present for each weekly “unknown” specimen:

- 1) A drawing of each weekly unknown – showing and/or noting the following structures/features:
 - Flower symmetry (radial vs. bilateral)
 - Petals & sepals (present/absent, number, fused/unfused, color, etc.)
 - Bisexual vs unisexual flowers
 - Stamens (number, any unique features of attachment, shape, etc)
 - Pistil (ovary position, number of pistils, number of stigmas and styles)
 - Leaves (margins, shape, phyllotaxy)
 - Woody or herbaceous?
 - Fruit type or description (if present!)
- 2) Key steps (in TJM2) for weekly unknown plants are clearly listed – we will discuss this.
- 3) The family of each weekly unknown is determined.
- 4) At the conclusion of each lab, I will reveal the identity of each unknown. These need to be included in your notebooks.

Thus, a carefully maintained lab notebook will provide an illustration of each unknown, list the key steps followed in TJM2 that identify it to the family level (correctly!), and the identity (including full Latin name) of each unknown. Writing this information over the course of the semester will make you a better botanist!

On field trips, we will use TJM2 to identify plants using the skills we develop in lab. Additionally, we will “sight identify” certain plants and assign them to their proper family, genus, and species. You will be responsible for maintaining detailed notes of our field adventures! We will work together in the field ensure that your notebooks contain appropriate information.

Official SBCC course content and objectives for Botany 122

Student learning outcomes: Students who successfully complete this course will be able to:

1. Use *The Jepson Manual, 2nd Edition* (TJM2) to key unknown plant specimens to the level of family (or, if possible, genus and/or species!)
2. Be familiar with, appreciate the importance of, and visually recognize characteristics of ~40 plant families common to California and the world.

Course Content and Scope:

- Biological classification (taxonomy and systematics)
- Techniques to identify flowering plants using keys
- Collecting appropriate plant material for identification
- Develop vocabulary and working knowledge of plant structures
- Sight identify (to family level) plants that belong to any of the ~40 plant families that will be covered
- Economic and ecological importance of the plant families discussed



COURSE SCHEDULE

Week	Date	Lecture	Lab
1	Jan 20	Course introduction, botany overview, taxonomy, plant structures and vocabulary	Papaveraceae, Ranunculaceae
2	Jan 27	Boraginaceae; Anacardiaceae; Solanaceae; Brassicaceae	Introduction to dichotomous keys and TJM2; keying
3	Feb 3	Polygonaceae, Caryophyllaceae, Aizoaceae, Cactaceae, Chenopodiaceae/Amaranthaceae	Keying
4	Feb 10	Rosaceae, Rhamnaceae; Cucurbitaceae; Malvaceae	Keying
5	Feb 17	Holiday – No Class Optional Field Trip – Paradise Road (transportation TBD, extra credit, weather permitting!)	Holiday – No Class
6	Feb 24	Euphorbiaceae, Salicaceae; Fabaceae; Asteraceae; Caprifoliaceae	Keying
7	Mar 3	Crassulaceae; Geraniaceae; Onagraceae; Poaceae, Cyperaceae, Juncaceae, Typhaceae	Keying
8	Mar 10	Lamiaceae, Scrophulariaceae, Plantaginaceae, Orobanchaceae, Phrymaceae	Keying
9	Mar 17	Polemoniaceae, Ericaceae; Apiaceae	Keying Campus Field Trip
10	Mar 24	Field Trip (Location TBD / Figueroa Mtn.) (Transportation TBD) Midterm Exam	Field Trip Lab practical exam
11	SPRING BREAK – NO CLASS (March 27-31)		
12	Apr 7	Field trip – (Location TBD / Paradise Rd) (Transportation TBD)	Field Trip
13	Apr 14	<u>Lecture at SB Botanic Garden – arrive on time!</u> Liliaceae; Agavaceae, Orchidaceae, Iridaceae; Arecaceae	Field Trip – SB Botanic Garden
14	Apr 21	Field Trip – Figueroa Mountain (SBCC van transportation)	Field Trip
15	Apr 28	Field Trip – Paradise Road (transportation TBD)	Field Trip
16	May 5	End of term exams - Keying exam (“Lab practical exam”) - Written exam (format = Midterm Exam) - Lab/field notebooks due	Class Activity – TBD

Final Exam meeting (optional) – Friday May 12; 8:00am-10:00am (EBS 201)



Additional resources

Although we will focus on family-level identification using TJM2 this semester, it is often useful (and enjoyable!) to have additional tools at one's disposal. The following books and websites are useful tools for identification of native & naturalized plants in our area (and/or throughout CA).

Books

- Introduction to the Plant Life of Southern California. 2005. Philip Rundel and Robert Gustafson. UC Press ISBN: 978-0-520-24199-2
- Flowering Plants: The Santa Monica Mountains, Coastal & Chaparral Regions of Southern California – 2nd edition. 2000. Nancy Dale. California Native Plant Society. ISBN: 0-943460-40-9
- A Flora of the Santa Barbara Region, California – 2nd edition. 1998. Clifton Smith. Santa Barbara Botanic Garden & Capra Press. ISBN: 0-88496-436-1

Websites

<http://www.calflora.org/> (links to: <http://calphotos.berkeley.edu/>)

<http://www.smmflowers.org/>

<http://santabarbarahikes.com/flowers/>

<http://ucjeps.berkeley.edu//interchange.html>

<http://www.environment.gov.au/biodiversity/abrs/online-resources/glossaries/index.html>

A note about taxonomy – why study angiosperms at the taxonomic level of family?

In our first lecture, we define(d) the taxonomic levels as defined by Carl Linnaeus: kingdom, phylum, class, order, family, genus, and species. In this course, we will focus upon the characteristics of plant families. Why is this so? Well, because that is what most botanists do! OK, “but why?”...you might be asking. In other words, what is so useful about studying plants at the level of family, as opposed to order, genus, etc.?

The most sensible answer to this question addresses the following: at the family level the structural characteristics (i.e., evolutionarily-based morphological differences) of different angiosperm families are clearly and consistently distinguishable, and there are few enough families (~400 worldwide) that the endeavor of learning these differences and using them in an ID key such as TJM2 is not impossible (though it may initially appear as such!). These two points are critically important! Consider: there are >300,000 species of angiosperms in >12,000 genera. Memorizing the characteristics of many thousands of genera is not practical (except for very advanced botanists). In contrast, learning the characteristics of a few hundred families is quite attainable. Even more feasible is our mission in this class, during which we will learn ~40 large families!

Embrace the concept of family – every effective botanist must do so! After this course (or perhaps prior to it), you will appreciate that many plant ID texts are organized at the level of family. This is a very intuitive and efficient level of organization for botanists. Some wildflower books are organized differently (most often by color of flowers). This organization is aimed at an audience that does not have your level of training, and as you advance your plant ID skills you will find this less and less helpful, and you'll ask yourself “OK, that flower is yellow or purple or white, but I'll know more about it once I determine the *family* to which it belongs!”

**A note about taxonomy and the course schedule for Bot122**

Biology courses that survey the diversity of a particular group of organisms (e.g., flowering plants, animals, vertebrate animals, etc...) are traditionally organized in some taxonomic sequence. Most typically, such courses begin with the oldest species/taxa (i.e., those that evolved first), and then progress through subsequent taxa in the order in which they evolved. This is a very logical and intuitive structure. In our case, however, it is inappropriate! A course schedule that is based upon taxonomy alone is inappropriate for Bot122 for a number of reasons:

- The evolutionary relationships (as understood by humans) among families (and other taxonomic levels, such as class or order) of angiosperms are in many cases unresolved and/or frequently redefined! Additionally, while the evolution of flower structure over long evolutionary time scales does have some general patterns (which we will discuss!), many (most?) patterns of change are not as sequentially apparent or “tidy” as in some organisms (e.g., vertebrates, invertebrates, the Kingdom Plantae more broadly).
- The time of year at which plant species (i.e., representatives of certain families) flower does not follow any taxonomic sequence.
- Every year is different. Some species/families flower at different times depending upon weather conditions in a given year. For this reason we must expect deviations from the schedule on page 5 - we will profit by being somewhat flexible!
- Learning the characteristics of dissimilar families, and doing early in the semester and out of “evolutionary sequence”, will accelerate learning to ID specimens using TJM2.

Continued on next page...



Although our schedule and approach will not emphasize taxonomic relationships among families and orders, when we encounter multiple families that belong to a single order we will cover them on a single day. Listed here are all the families we'll cover (same as those listed in the course schedule), grouped by the order to which they belong. You do not need to know these orders - most botanists really do think and speak at the family level and seldom (if ever) organize or report species according to order (either in their own minds or written documents).

Order	Family (-ies)
Apiales:	Apiaceae
Arecales:	Areaceae
Asparagales:	Amaryllidaceae, Agavaceae, Orchidaceae, Iridaceae,
Astrales:	Asteraceae
Brassicales:	Brassicaceae
Caryophyllales:	Polygonaceae, Caryophyllaceae, Aizoaceae, Cactaceae, Chenopodiaceae/Amaranthaceae
Cucurbitales:	Cucurbitaceae
Dipsacales:	Caprifoliaceae
Ericales:	Polemoniaceae, Ericaceae
Fabales:	Fabaceae
Geraniales:	Geraniaceae
Lamiales:	Lamiaceae, Scrophulariaceae, Plantaginaceae, Orobanchaceae, Phrymaceae
Liliales:	Liliaceae
Malpighiales:	Euphorbiaceae, Salicaceae
Malves:	Malvaceae
Myrtales:	Onagraceae
Poales:	Poaceae, Cyperaceae, Juncaceae, Typhaceae
Ranunculales:	Ranunculaceae, Papaveraceae
Rosales:	Rosaceae, Rhamnaceae
Sapindales:	Anacardiaceae, Sapindaceae
Saxifragales:	Crassulaceae
Solanales:	Solanaceae
Uncertain:	Boraginaceae (BTW: soon to be split into many families, perhaps 11... ☹)



SANTA BARBARA CITY COLLEGE 2016-2017 Academic Calendar

May 2016						
S	M	Tu	W	Th	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

June 2016						
S	M	Tu	W	Th	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

July 2016						
S	M	Tu	W	Th	F	S
					1	2
3	4	5	6	7	8	9
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17	18	19	20	21	22	23
24	25	26	27	28	29	30

August 2016						
S	M	Tu	W	Th	F	S
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7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

September 2016						
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October 2016						
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23	24	25	26	27	28	29

November 2016						
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		1	2	3	4	5
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13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

MAY 2016

- 16 Summer Session 1 Begins
- Varies Last Day to Drop Classes without 'W'
- 30 Memorial Day, Holiday

JUNE 2016

- 25 Summer Session 1 Ends
- 27 Summer Session 2 Begins
- Varies Last Day to Drop Classes without 'W'

JULY 2016

- 4 Independence Day, Holiday

AUGUST 2016

- 6 Summer Session 2 Ends
- 18-19 Scheduled Faculty Flex Days
- 22 Fall Semester Begins

SEPTEMBER 2016

- 3 Last Day to Drop Classes without 'W'
- 5 Labor Day, Holiday

OCTOBER 2016

- 21 Last Day to Withdraw from Classes/College

NOVEMBER 2016

- 11 Veterans Day, Holiday
- 24-26 Thanksgiving Vacation

DECEMBER 2016

- 3 Last Day of Instruction
- 5-10 Final Exams
- 10 Fall Semester Ends
- 12 - Jan 11 Winter Vacation
- 26 Christmas, Observance

JANUARY 2017

- 2 New Year's Day, Observance
- 12-13 Scheduled Faculty Flex Days
- 16 Martin Luther King, Jr. Day, Holiday
- 17 Spring Semester Begins
- 28 Last Day to Drop Classes without 'W'

FEBRUARY 2017

- 17 Lincoln's Birthday, Observance
- 20 Washington's Birthday, Holiday

MARCH 2017

- 17 Last Day to Withdraw from Classes/College
- 27 - April 1 Spring Break

MAY 2017

- 6 Last Day of Instruction
- 8-13 Final Exams
- 12 Commencement
- 13 Spring Semester Ends
- 29 Memorial Day, Holiday

- Blue Days = Term Begins
- Yellow Days = Final Exams
- Green Days = Campus Closed
- Orange Days = Spring Break

Revised 8/31/15
Board approved 12/3/15

December 2016						
S	M	Tu	W	Th	F	S
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January 2017						
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28	29	30	31			

February 2017						
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25	26	27	28			

March 2017						
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26	27	28	29	30	31	

April 2017						
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23	24	25	26	27	28	29

May 2017						
S	M	Tu	W	Th	F	S
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14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

June 2017						
S	M	Tu	W	Th	F	S
				1	2	3
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11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	