Spring 2023 

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
Email: mckay@sbcc.edu; **Phone**: (805) 730-5172; **Office**: EBS305
Office hours: Monday 9:00am-12:00; 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?" Do you ever find yourself wanting to know more? 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)
Botany in a Day, 6th edition. 2013. Thomas J. Elpel. The Patterns Method of Plant Identification. ISBN: 978-1892784353

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.

SBCC Email: I will use your SBCC Pipeline email account to communicate with you regularly. You should check your SBCC email account regularly for updates, reminders, or schedule changes.

Class Canvas page: Course-related documents, including the syllabus, as well as lecture notes and/or images, will be published on a Canvas page (accessible via Pipeline). 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).
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 form 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 written exam	50	10%	Friday April 7
End of term written exam	50	10%	Friday May 5
Lab/lecture (400 pts)			
Midterm lab practical - keying	50	10%	Friday April 7
End of term practical - keying	50	10%	Friday May 5
Lab/field notebook	300	60%	Due May 5
Totals	**500 pts**	**100%**	

Final grades for semester:

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

GRADED ACTIVITIES – LECTURE

Lecture exams

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

The midterm written 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 written exam will be formatted as a hybrid of the midterm exam, and 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 exams

Two laboratory practical exam will be given during the semester (consult course schedule for date). During the laboratory practical exams, 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

(changes are nearly certain, and depend upon rain)

Week	Date	Lecture	Lab
1	Jan 27	Course introduction. Overviews: botany, taxonomy, plant structures and vocabulary	Papaveraceae, Ranunculaceae
2	Feb 3	Boraginaceae; Anacardiaceae; Solanaceae; Brassicaceae	Introduction to dichotomous keys and TJM2; keying
3	Feb 10	Polygonaceae, Caryophyllaceae, Aizoacaea, Cactaceae, Chenopodiaceae/Amaranthaceae	Keying
4	Feb 17	Holiday – No Class	Holiday – No Class
5	Feb 24	Rosaceae, Rhamnaceae; Cucurbitaceae; Malvaceae	Keying
6	March 3	Euphorbiaceae, Salicaceae; Fabaceae; Asteraceae; Caprifoliaceae	Keying
7	March 10	Crassulaceae; Geraniaceae; Onagraceae; Poaceae, Cyperaceae, Juncaceae, Typhaceae	Keying
8	March 17	**Field Trip – Plan A** **(Carizzo Plain, Lake Santa Margarita)** Families to cover: Lamiaceae, Scrophulariaceae, Plantaginaceae, Orobanchaceae, Phrymaceae	**Field trip – Carrizo Plain.** **Leave March 17, 8:00am** **Return March 19, 5:00pm** **(SBCC Bus/Vans)**
9	March 24	Lecture at SB Botanic Garden – arrive on time! Liliaceae; Agavaceae, Orchidaceae, Iridaceae; Arecaceae (No SBCC Transportation)	Field Trip – SB Botanic Garden **8:45am-2:00pm**
10	SPRING BREAK – NO CLASS (March 27-31)		
11	April 7	Polemoniaceae, Ericaceae; Apiaceae Field Trip (Location TBD) (SBCC Vans) **Written Midterm Exam**	Field Trip **8:00 am-2:00pm** **Midterm Practical Exam: Keying in the field**
12	April 14	Field Trip (Location TBD) (No SBCC Transportation)	Field Trip **8:00am-3:00pm**
13	April 21	**Field Trip – Plan B** **(Carizzo Plain, Lake Santa Margarita)** **(SBCC Bus/Vans)**	**Field trip – Carrizo Plain.** **Leave April 21, 8:00am** **Return April 23, 5:00pm**
14	April 28	Field Trip (Location TBD) (SBCC vans or Bus 44)	Field Trip **7:00am-5:00pm**
15	May 5	**End of term exams** **- Keying exam ("Lab practical exam")** **- Written exam (format = Midterm Exam)** - **Lab/field notebooks due**	Class Activity – TBD
16	May 12	No Class (hours accomplished on field trips)	

No meeting during the final exam time on the SBCC schedule (course completed)

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
- Botany in a Day, 6th edition. 2013. Thomas J. Elpel. The Patterns Method of Plant Identification. ISBN: 978-1892784353
- California Plant Families: West of the Sierran Crest and Deserts. (2009). Keator, Glenn. UC Press, ISBN: 9780520259249
- A Flora of the Santa Barbara Region, California – 2nd edition. 1998. Clifton Smith. Santa Barbara Botanic Garden & Capra Press. ISBN: 0-88496-436-1
- 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

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 taxonomic and categorical 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. Eventually you might find such guides too simplistic and you

might say to yourself "OK, fine, so that flower is yellow or purple or white, great…but I'll know more about its evolutionary history, floral structure, pollination, similar species, and general biology once I determine the *family* to which it belongs!" For botanists, family is king.

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 (i.e., which families belong to which orders, which orders are closely related, etc.), 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). *Family is king!* We'll discuss this more on the first day of class, and throughout the semester ☺

Order	**Family (-ies)**
Apiales:	Apiaceae
Arecales:	Arecaceae
Asparagales:	Amaryllidaceae, Agavaceae, Orchidaceae, Iridaceae,
Astrales:	Asteraceae
Brassicales:	Brassicaceae
Boraginales	Boraginaceae (BTW: in process of being split into many families, perhaps 11… ☹)
Caryophyllales:	Polygonaceae, Caryophyllaceae, Aizoacaea, 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

SANTA BARBARA CITY COLLEGE

2022-2023 ACADEMIC CALENDAR

Board Approved 5/27/21
Update Board Approved 9/23/21

MAY 2022
14 Spring Semester Ends
16 Summer Session 1 Begins
Varies Last Day to Drop Classes without 'W'
30 Memorial Day, Holiday

JUNE 2022
17 Last Day to Petition for Pass/No Pass Grading
20 Juneteenth, Observed
25 Summer Session I Ends
27 Summer Session II Begins

JULY 2022
Varies Last Day to Drop Classes without 'W'
4 Independence Day, Holiday
29 Last Day to Petition for Pass/No Pass Grading

AUGUST 2022
6 Summer Session II Ends
25-26 Faculty and Staff In-Service Days
29 Fall Semester Begins

SEPTEMBER 2022
5 Labor Day, Holiday
10 Last Day to Drop Classes without 'W' (with Refund)
11 Last Day to Drop Classes without 'W' (without Enrollment/Tuition Refund)*

OCTOBER 2022
28 Last Day to Withdraw from Classes/College

NOVEMBER 2022
11 Veteran's Day, Holiday
24-26 Thanksgiving, Holiday

DECEMBER 2022
9 Last Day to Petition for Pass/No Pass Grading
10 Last Day of Instruction
12-17 Final Exams
17 Fall Semester Ends
19-Jan 22 Winter Vacation
23-31 Christmas, Holiday

JANUARY 2023
2 New Year's Day, Observed
16 Martin Luther King, Jr. Day, Holiday
23 Spring Semester Begins

FEBRUARY 2023
3 Faculty and Staff In-Service (1-5pm)
4 Last Day to Drop Classes without 'W' (with Refund)
5 Last Day to Drop Classes without 'W' (without Enrollment/Tuition Refund)*
17 Lincoln's Birthday, Holiday
20 President's Day, Holiday

MARCH 2023
27-Apr 1 Spring Break (Subject to Change)
31 Last Day to Withdraw from Classes/College

MAY 2023
12 Last Day to Petition for Pass/No Pass Grading*
13 Last Day of Instruction
15-20 Final Exams
19 Commencement
20 Spring Semester Ends
29 Memorial Day, Holiday

JUNE 2023
5 10-Week Summer Term Begins
19 Juneteenth, Holiday

Term Begins | Final Exams | Campus Closed | Spring Break

MAY 2022

SUN	MON	TUE	WED	THU	FRI	SAT
1	2	3	4	5	6	7
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JUNE 2022

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JULY 2022

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AUGUST 2022

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SEPTEMBER 2022

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OCTOBER 2022

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NOVEMBER 2022

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DECEMBER 2022

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JANUARY 2023

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FEBRUARY 2023

SUN	MON	TUE	WED	THU	FRI	SAT
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MARCH 2023

SUN	MON	TUE	WED	THU	FRI	SAT
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APRIL 2023

SUN	MON	TUE	WED	THU	FRI	SAT
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MAY 2023

SUN	MON	TUE	WED	THU	FRI	SAT
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JUNE 2023

SUN	MON	TUE	WED	THU	FRI	SAT
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