

1. General Information

Lecture times: Tuesdays and Thursdays, 9:30 - 10:45 am

Lab times: Tuesday or Thursday, 2:00 pm to 5:00 pm

modality: in person

Location: Bannister 110

Course Instructors:

Dr. Valerie Trouet, Professor of Dendrochronology

Office: Bannister 321

Phone: 626-8004

Office hours: by appointment

Email: trouet@arizona.edu

Dr. David Frank, Professor of Dendrochronology

Office: Bannister 401

Phone: 621-2112

Office hours: by appointment

Email: davidcfrank@arizona.edu

Laboratory Instructor: **Matt Meko**

Email: meko@arizona.edu

2. Course Goals & expected learning outcomes

In this course students will learn the scientific basis, techniques, and applications of dendrochronology. We will review the historical development and key discoveries of the field. We will study the biological basis of tree-ring research and the central principles of dendrochronology. After studying fundamental concepts students will learn about applications of dendrochronology in different disciplines, including archaeology, ecology, and climatology, via lectures and discussions with leading dendrochronologists at the Laboratory of Tree-Ring Research. During intensive, weekly laboratory sessions, students will learn the practical skills of specimen collection, preparation, observation, and the most important method and principle of dendrochronology — crossdating. At the end of the course, students will be able to prepare and

date tree-ring samples and build a chronology. Finally, students will be able to evaluate dendrochronological analyses and interpret their own data for specific research issues.

Expected Learning Outcomes

Students will understand and be able to explain the main concepts (including wood anatomy, intra-annual tree growth, growth limiting factors), measurement techniques (including crossdating, densitometry, isotopes), and applications (including archeology, climatology, ecology, hydrology) of tree-ring research. Students will be able to contribute meaningfully to dendrochronological fieldwork and to prepare and crossdate entry-level tree-ring samples.

3. Required Readings

The textbook for the course is **Tree Story: The History of the World Written in Rings** (Valerie Trouet; Johns Hopkins University Press, ISBN 13: 978-1-4214-3777-4). Hard copies or e-copies of the textbook can be ordered at a reduced price by contacting the instructors (trouet@arizona.edu or davidcfrank@arizona.edu).

The textbook is complemented by required readings that are available on the D2L site.

A full listing of the chapter and publication readings is available in the class schedule.

Readings should be completed before the class on that particular topic. It would also be a good idea for all students to browse the LTRR web site at <http://www.ltrr.arizona.edu>, and especially the link to online bibliography, software and other dendrochronology information resources at <http://www.ltrr.arizona.edu/resources.html>.

4. Laboratory

The Lab constitutes a very important part of the course and of your grade.

Lab learning objectives:

The goal of the lab is to learn the procedure to accurately determine the year of annual ring formation of tree-ring samples (i.e., crossdating). Topics covered in the lab include the practical aspects of crossdating, sample preparation and mounting, chronology building and interpretation, and the interpretation of different types of dendrochronological samples.

General laboratory format:

Lab Meetings

We will meet as a group once a week to discuss completed and upcoming lab exercises, and to introduce new topics. Laboratory meeting times (Tuesdays or Thursdays) will be arranged on the first day of class.

Lab Exercises

Weekly exercises will be assigned to be completed by the student before the following weekly

lab meeting. The exercises are designed to provide practical experience in crossdating and chronology building based on wood specimens from a site in the Zuni Mountains of northwestern New Mexico. The material is ordered so that the experience gained is cumulative - solving the first exercise helps with the second, etc.

Lab Exam

Students will apply their accumulated knowledge of Zuni site crossdating in a practical exam, held at the end of the semester.

Field trip

We are in the process of planning a 1-day field trip during which students will learn the practice of dendrochronological fieldwork (including sampling, metadata collection, best practices, etc.). This field trip will take place on a Saturday during the month of September in surroundings of Tucson. More details will be shared in class. Due to COVID circumstances, the field trip for this class will be optional.

5. Evaluation and Grading

For undergraduate students, participation in each lecture will be graded (4 points per lecture * 25 lectures). It is expected that you will complete the participation and discussion activities in class, however, we are providing the option to turn in your discussion up to one week after class. Undergraduate students will take two exams, a mid-term and a final exam, covering the lecture materials. Graduate students will only take the mid-term exam. Mid-Term and Final Exams are a combination of questions requiring short answers (a word, phrase or single sentence) and questions requiring longer answers (a paragraph or more).

For all students there will also be a practical Lab exam covering the information and skills learned in the Lab. The exams will constitute approximately one-fourth to one-third of the student grade. Finally, graduate students are required to (a) submit both electronically and as hard copy one annotated bibliography of the dendrochronological literature that includes at least 10 references relevant to their research project (see schedule for due dates), and (b) conduct and report on a research project specific to their area of interest (see below). The result should be in the form of a publishable paper or section of a thesis, dissertation, or proposal, and is due prior to their presentations (December 2, 2021). Topics must be agreed with the instructors prior to submission. Graduate students will also prepare a ~20 minute presentation based on their research paper and present their results in person for the whole class on December 2, 2021.

No incompletes will be given in this course, except under extraordinary circumstances.

There is no extra credit.

Course components and points for undergraduates and graduates respectively:

Undergraduate students:

- 25 participation grades: $4 \times 25 = 100$ points

- mid-term exam: 200 points
- final exam: 250 points
- lab exercises: 180 points
- lab exam: 70 points

TOTAL: 800 points

Graduate students:

- mid-term exam : 200 points
- lab exercises: 180 points
- lab exam: 70 points
- graduate paper:
 - annotated bibliography: 100 points
 - graduate paper: 200 points
 - paper presentation: 50 points

TOTAL: 800 points

GRADES:

A	720 points
B	640 points
C	540 points
D	460 points
E	<460 points

6. Important Dates

Date	Event
Tu September 28	Grad paper provisional topic due
Tu October 7	Mid-Term Exam (during class time)
Th October 21	Annotated Bibliography due (Grad students)
Th December 2	Grad Student paper due & Grad student presentations

Tu December 7, 1-4pm Lab Practical Final Exam

Tu December 14, 8-10am Final Exam (Undergrad students)

7. Graduate Student Annotated Bibliography

Graduate students are required to prepare an annotated bibliography of scientific literature relating to dendrochronology and specifically to the research project they are planning to conduct later in the semester. These may be thematic reviews of the literature, involving one or a few related topics, or they may be more general, crosscutting multiple aspects of the field. At least 10 separate papers, book chapters, reports, monographs, etc. must be included. The required class readings can be included in this bibliography, but they do not count toward the minimum 10 papers. In addition to a full citation for the work, a succinct summary of the most important points of the paper should be provided, along with your own assessment and judgment of the findings and values of the paper. These summary statements should not simply be condensed versions of the paper's abstract, but should clearly show your own evaluation of the paper.

8. Graduate Student Papers

The Graduate Student Paper should be a 10-15 page report (minimum type size 11 point, double spaced, 1 inch margins) on some original research, a pertinent literature review, or a proposal soliciting funding for a specific project. Depending on the type of project you choose, your paper should include (at a minimum) introduction, background research/discussion of the problem, field and lab methods, results, discussion, conclusion, and references cited sections. (A literature review is somewhat different--see the course instructors if you have questions).

The paper should be formatted in the style used by a major journal in your field (i.e. American Antiquity for archaeologists, The Holocene or International Journal of Climatology for paleoclimatologists, etc.). References, figures, and tables are included in the 15-20 page limit. Figures and tables should be legible, but we do not require that they be publication quality. The paper will be assessed both in terms of its content and in terms of the quality of the writing and presentation. Grammar, spelling, punctuation, style, and layout all count!

We encourage you to write something that fits precisely the requirements of this class, but that also serves some other purpose, for example a chapter of your thesis or dissertation, a paper for publication, or a proposal. This economy of effort, however, does not extend to using the same paper for two or more classes.

9. Compliance with COVID-19 mitigation guidelines

As we enter the Fall semester, your and our health and safety remain the university's highest priority. To protect the health of everyone in this class, students are required to follow the university guidelines on COVID-19 mitigation. Please visit www.covid19.arizona.edu.

10. Attendance

- If you feel sick, or may have been in contact with someone who is infectious, stay home. Except for seeking medical care, avoid contact with others and do not travel.
- Notify your instructor(s) if you will be missing a course meeting or an assignment deadline.
- Non-attendance for any reason does **not** guarantee an automatic extension of due date or rescheduling of examinations/assessments.
 - Please communicate and coordinate any request directly with your instructor.
- If you must miss the equivalent of more than one week of class, you should contact the Dean of Students Office DOS-deanofstudents@email.arizona.edu to share documentation about the challenges you are facing.
- Voluntary, free, and convenient [COVID-19 testing](#) is available for students on Main Campus.
- If you test positive for COVID-19 and you are participating in on-campus activities, you must report your results to Campus Health. To learn more about the process for reporting a positive test, visit the [Case Notification Protocol](#).
- COVID-19 vaccine is available for all students at [Campus Health](#).
- Visit the [UArizona COVID-19](#) page for regular updates.

11. Rules of conduct

- Students are expected to adhere to the ABOR code of conduct and the [UA Code of Academic Integrity](#) and the [UA Student Code of Conduct](#). (Click on highlighted text to see further information on these rules and policies.)
- Attendance at all lectures and lab sessions is important and is expected, but is not included in grade calculation. All holidays or special events observed by organized religions will be honored for those students who show affiliation with that particular religion.
- Absences pre-approved by the UA Dean of Students (or Dean's designee) will be honored. Excessive absences may be grounds for dropping a student from the course. It is, however, the student's responsibility to drop the course officially; failure to do so will result in a grade of E or I, at the instructor's discretion.
- Discrimination on the basis of race, religion, ethnicity, gender, sexual orientation, physical disability [is prohibited by UA and other policies](#). Violence will not be tolerated in the classroom. This prohibition includes, but is not limited to, verbal, written, or internet activities. Anyone observed using any racist or derogatory language, writing offensive materials, or downloading pornography or other objectionable materials will be required to leave the class and may be administratively dropped from the course at the Instructor's discretion.
- Cheating will not be tolerated and is grounds for expulsion from the course; cheating includes, but is not limited to: copying work of others during exams or homework; turning in any work of others as your own, including work of students from past semesters; plagiarism on papers. [Click here for definitions and discussion of plagiarism](#).

- Students found cheating on any assigned work will receive a score of 0 for that assignment and will be reported to the Dean of Students. A second violation is grounds for expulsion from the course.

Special Provisions

- In compliance with Title III of the Americans With Disabilities Act (1990), students who require special assistance will be suitably accommodated. Students must be registered with the University and a minimum of 5 days notice for such accommodations is requested.
- If the schedule conflicts with major religious observances, please let the professor know.
- If English is not your native language and you believe that you must use a translation dictionary during exams, please contact the professor.
- Students requiring accommodation in testing or note taking: Please notify the professor and provide the [Disability Resource Center](#) letter within the first few days of the course.
- Student athletes and others who need signatures periodically: Please notify the professor that you'll be needing signatures generally, and please alert the professor before a particular signing period is due so that your most up-to-date grade can be calculated.
- Honors College students: An Honors Contract is allowable. See the instructor to arrange those details

Nondiscrimination and Anti-harassment Policy

The University of Arizona is committed to creating and maintaining an environment free of discrimination. In support of this commitment, the University prohibits discrimination, including harassment and retaliation, based on a protected classification, including race, color, religion, sex, national origin, age, disability, veteran status, sexual orientation, gender identity, or genetic information. For more information, including how to report a concern, please see: <http://policy.arizona.edu/human-resources/nondiscrimination-and-anti-harassment-policy>

University Policies

All university policies are available at: <https://academicaffairs.arizona.edu/syllabus-policies>.

Important Note:

Information contained in this course syllabus, other than the grade, absence and other UA policies, may be subject to change with reasonable advance notice, as deemed appropriate by the instructor.

Graduate Student Resources

You can find the University of Arizona's Basic Needs Resources page here:

<http://basicneeds.arizona.edu/index.html>

Life challenges

If you are experiencing unexpected barriers to your success in your courses, please note the Dean of Students Office is a central support resource for all students and may be helpful.

The [Dean of Students Office](#) can be reached at (520) 621-2057 or DOS-deanofstudents@email.arizona.edu.

Physical and mental-health challenges

If you are facing physical or mental health challenges this semester, please note that Campus Health provides quality medical and mental health care. For medical appointments, call (520) 621-9202. For After Hours care, call (520) 570-7898. For the Counseling & Psych Services (CAPS) 24/7 hotline, call (520) 621-3334.