

**ETHNOBOTANICAL CHEMISTRY**  
**EBOT 230**  
**Spring, 2021**  
**3 credits**

**Course Information:****Location: Distance Delivery****Instructor:**

Kevin Jernigan

Email: [kjernigan@alaska.edu](mailto:kjernigan@alaska.edu)

Ethnobotany Program

Skype handle: Tree.Kev

**Office Hours:**

email me to arrange a chat, Skype or phone conversation

**Course Calendar:**

This course will be held for 1.5 hours per session, 2 sessions per week. It will meet Monday and Thursday, from 6:50 to 8:20 PM, from January 11<sup>th</sup> to April 26<sup>th</sup>.

**Course prerequisites:**

EBOT 100, Introduction to Ethnobotany (or permission of instructor); and CHEM 103X, Basic General Chemistry or CHEM 105X, General Chemistry I

**Course Description:**

This course will provide the student with a basic understanding of chemical structure and function of medicinally active plant compounds. With this knowledge the student will be able to discern how and why plants produce primary and secondary compounds, learn how humans have made use of these compounds, and be introduced to methods used to isolate and deliver plant-derived compounds. Case studies will be used to illustrate how drugs are derived from plants, and the ethics of bioprospecting will be discussed. Class time will also be devoted to studying medicinal flora of Alaska from a chemical perspective.

**Course Objectives:**

Upon successful completion of this course, the student will:

- Learn basic chemical concepts such as bonding and molecular structure,
- Gain an understanding of primary and secondary metabolic pathways in plants,
- Become familiar with the major groups of active plant compounds,
- Learn more about Alaskan medicinal plants from a chemical perspective,
- Better understand historical uses of plants by indigenous peoples, and present day uses of plant drugs,
- Become aware of the complexities in ethics of ethnobotanical natural products research.

**Resources & Materials,**

**Required Texts:**

Sumner, Judith, 2000. *The Natural History of Medicinal Plants*. Timber Press. Portland, OR.

Hanson, Bryan Abbott. 2005. *Understanding Medicinal Plants: Their Chemistry and Therapeutic Action*. Haworth Herbal Press. New York.

**Optional Texts:**

Garibaldi, Ann, *Medicinal Flora of the Alaska natives: A compilation of knowledge from literary sources of Aleut, Alutiiq, Athabascan, Eyak, Haida, Inupiat, Tlingit, Tsimshian, traditional healing methods using plants*.

available free online at: [https://arctichealth.org/media/pubs/2765/Med\\_Flora\\_AK\\_Natives.pdf](https://arctichealth.org/media/pubs/2765/Med_Flora_AK_Natives.pdf)

Readings from texts and supplementary materials provided by the instructors are to be read as assigned, and completed by the next class period. If reading material raises questions that you have or introduces material that you are especially interested in, we will discuss your questions or interests in more detail during the scheduled class period. **You must do the readings as they provide background for lectures, and because you will need to use the material when you prepare for quizzes, and write the final exam.** From time to time throughout the semester the instructors may assign additional reading material, with these not necessarily listed in the course outline below.

**Instructional Methods:**

Lectures will be distance-delivered. Students taking this class are required to have an email address, basic computer skills, and reliable computer internet access for all class sessions. Windows, MAC or Unix computer (less than 3 years old) with 64 MB RAM and sound card, computer headset (headphones with microphone) are required.

**Course Content:** See Lecture Schedule (page 5)

**Evaluation & Grading: Elements of Grades for EBOT 230:**

Element	Number	Points Each	Total Points	Percent of Grade
Class Participation			60	15%
Homework	5	48	240	60%
Final Exam	1	100	100	25%
Total			400	100%

**Grading Scale** (based upon the percentage of total possible points):

<b>A</b>	90% or higher	Distinguished Achievement
<b>B</b>	80 – 89%	Outstanding Achievement
<b>C</b>	70-79%	Satisfactory Competence (Average Performance)

<b>D</b>	60-69%	Below Average Performance
<b>F</b>	less than 60%	Failure to satisfactorily meet course requirements
<b>I</b>	Incomplete	(the university has policies that govern incomplete grades)

### **Policies & Procedures:**

**Time Commitment:** College level science courses customarily require at least 2 to 3 hours of time outside of class (for reading, study, and preparation) for each hour spent in class. Students whose schedules cannot accommodate this level of commitment, for whatever reason (work, family obligations, etc.), are unlikely to be successful in this class.

**Attendance:** Student attendance and participation are necessary to learning the material in this course. Each student is expected to attend each class session, to be on time, and to remain for the entire session. Late arrivals and early departures are disruptive and unfair to other students.

**Exams and quizzes missed because of an excused absence, must be taken within one week after a student's return to school.** Because of logistical difficulties, some sessions and assignments may be difficult to make up, so be sure and talk with the instructor when you know that you will have to miss class(es).

Should school or class be officially canceled (because of inclement weather, etc.), **exams, quizzes, or assignments due during that cancellation will be given or due the next scheduled class session.**

Assignments submitted late without an authorized excuse will be subject to a 10% grade reduction for each class period that the submission is delayed. **Any make up work not completed by the last day of class will receive a grade of zero (0) and this will be factored into your final grade.**

**Reading:** Students are expected to have read the material listed in the attached Lecture Schedule prior to class, and to be prepared to participate in class discussions and activities with comments, questions, and observations. Your participation is both required and highly valued, and will count as part of the final grade.

**Disability Services:** The Office of Disability Services implements the Americans with Disabilities Act (ADA), and insures that UAF students have equal access to the campus and course materials. State that you will work with the Office of Disabilities Services (203 WHIT-7043) to provide reasonable accommodation to students with disabilities:

### **UAF Disability Services for Distance Students:**

UAF has a Disability Services office that operates in conjunction with the College of Rural Alaska's (CRA) campuses and UAF Center for Distance Education (CDE). Disability Services, a part of UAF's Center for Health and Counseling, provides academic accommodations to enrolled students who are identified as being eligible for these services.

If you believe you are eligible, please visit <http://www.uaf.edu/chc/disability.html> on the web or contact a student affairs staff person at your nearest local campus. You can also contact Disability Services on the Fairbanks Campus at (907) 474-7043, [fydso@uaf.edu](mailto:fydso@uaf.edu).

- General Information -

**Policies of the College of Rural and Community Development (CRCD) are summarized in the Schedule of Courses. Policies of the University of Alaska Fairbanks (UAF) are summarized in the Catalog.**

**Student Behavior:** Students at this institution are expected to contribute to the maintenance of an environment that is conducive to learning and respectful of others. Consequently, they are required to behave in accordance with acknowledged societal norms and are prohibited from engaging in behavior that is distracting to themselves or to others. Inappropriate behavior will result minimally in being asked to leave class immediately. Refrain from talking or making noise during lectures, laboratory sessions, and exams, although all contributions to and with the class are encouraged, with participation highly valued as part of your final grade.

**Study Skills:** This class requires good reading and study skills. If a student feels that he or she is falling behind, he or she should contact the instructor **immediately and we will work with you directly**. Issues of this type seldom resolve unless specific measures are taken in a timely fashion.

**Harassment:** CRA and UAF have specific policies regarding harassment, and harassment will not be tolerated. Anthropology students address subjects that are considered to be delicate by many individuals and cultures. Both students and faculty are expected to act and speak with sensitivity and respect.

**Use of College Equipment:** Students are expected to use their utmost care to assure the continued availability of campus resources.

**Drop/Withdrawal/Incomplete:** Ceasing attendance does not activate the drop, withdrawal, or incomplete grade process. The student must submit the appropriate forms for each of these processes by the published deadlines to end enrolment in this class. Failure to complete and submit the appropriate forms may result in a failing grade for this course on the student's permanent transcript. Deadlines for drop and withdrawal are listed below. **All paperwork must be completed and submitted by these dates.** Be aware that the college has specific policies and procedures for the assignment of incomplete grades ([http://www.uaf.edu/catalog/catalog\\_08-09/academics/regs1.html](http://www.uaf.edu/catalog/catalog_08-09/academics/regs1.html)).

**Safety: Any accidents or injuries are to be reported to the instructor immediately.**

## COURSE OUTLINE: LECTURE TOPICS BY WEEK

**Nota Bene: Readings are assigned to be read by the following class period**

### WEEK 1

**Session 1 (1/11):** Introduction, purpose, and objectives of this course.

Historical perspective on medicinal botany

Read: *The Natural History of Medicinal Plants*, Chapter 1 and 2

**Session 2 (1/14):** Acquiring knowledge of medicinal plants

Read: *The Natural History of Medicinal Plants*, Chapter 3

### WEEK 2

**Session 1 (1/18):** ACR day – no class

**Session 2 (1/21):** Medicinal plants in nature. Introduction to herbivory and allelopathy

Read: *The Natural History of Medicinal Plants*, Chapter 4, 5

### WEEK 3

**Session 1 (1/25):** Medicinal plants in nature. Pollination.

Read: *Understanding Medicinal Plants*, Chapter 2

**Session 2 (1/28):** Review of chemical structures

**HW 1 Assigned**

Read: *Understanding Medicinal Plants*, Chapter 3

### WEEK 4

**Session 1 (2/1):** Review of bonding and molecular properties

Read: *Understanding Medicinal Plants*, Chapter 4

**Session 2 (2/4):** Plant chemistry as defense: more on herbivory and allelopathy

Read: *Understanding Medicinal Plants*, Chapter 4 (pages 69-82)

**HW 1 Due**

### WEEK 5

**Session 1 (2/8):** Important chemical families in plants: Primary metabolism

Read: *Understanding Medicinal Plants*, Chapter 4 (pages 83-118)

**HW 2 Assigned**

**Session 2 (2/11):** Important chemical families in plants: Primary metabolism, continued

Read: *Understanding Medicinal Plants*, Chapter 4 (pages 83-118)

**WEEK 6**

**Session 1 (2/15):** Important chemical families in plants: Secondary metabolites. alkaloids, cyanogenic glycosides

Read: *The Natural History of Medicinal Plants, Chapter 6*

**HW 2 Due**

**Session 2 (2/18):** Important chemical families in plants: Secondary metabolites, continued. terpenes, saponins, tannins

**HW 3 Assigned**

Read: *The Natural History of Medicinal Plants, Chapter 6*

**WEEK 7**

**Session 1 (2/22):** Begin significant discoveries of useful plant chemistry

**Session 2 (2/25):** Significant discoveries of useful plant chemistry, continued.

Read: *Understanding Medicinal Plants, Chapter 5 (pages 146-174)*

**HW 3 Due**

**WEEK 8**

**Session 1 (3/1):** Behavior of medicinal molecules: isolation and analysis

Read: *Understanding Medicinal Plants, Chapter 6 (pages 175-188)*, “The Importance of Pharmacological Synergy in Psychoactive Herbal Medicines”

**Session 2 (3/4):** Behavior of medicinal molecules: antioxidants

Read: *Understanding Medicinal Plants, Chapter 6 (pages 175-188)*, “The Importance of Pharmacological Synergy in Psychoactive Herbal Medicines”

**HW 4 Assigned**

**WEEK 9**

**March 8<sup>th</sup>-12<sup>th</sup> : Spring Break - no class**

**WEEK 10**

**Session 1 (3/15):** Begin Drug delivery and action: targets

Read: *Understanding Medicinal Plants, Chapter 6 (pages 189-198)*

**HW 4 Due**

**Session 2 (3/18):** Drug delivery and action: action at molecular level

Read: *Understanding Medicinal Plants, Chapter 6 (pages 189-198)*

**HW 5 Assigned**

**WEEK 11**

**Session 1 (3/22):** Drug delivery and action: action at molecular level, continued.

Read: *Understanding Medicinal Plants*, Chapter 7 (pages 199-229)

**Session 2 (3/25):** Case studies: ayahuasca and ginkgo

Read: *Understanding Medicinal Plants*, Chapter 7 (pages 230-246)

**HW 5 Due**

### **WEEK 12**

**Session 1 (3/29):** Case studies: cancer treatments.

Read: Readings on Blackboard

**Session 2 (4/1):** Begin Alaskan medicinal plants

Read: *The Natural History of Medicinal Plants*, Chapter 8

### **WEEK 13**

**Session 1 (4/5):** Alaskan medicinal plants, continued.

Read: *The Natural History of Medicinal Plants*, Chapter 8

**Session 2 (4/8):** Begin bioprospecting for new medicines

Read: *The Natural History of Medicinal Plants*, Chapter 9

### **WEEK 14**

**Session 1 (4/12):** Bioprospecting for new medicines, continued

Read: *The Natural History of Medicinal Plants*, Chapter 9

**Session 2 (4/15):** Protecting medicinal biodiversity and knowledge

**ASSIGN FINAL TAKE HOME EXAM**

### **WEEK 15**

**Session 1 (4/19):** Protecting medicinal biodiversity and knowledge, continued

**Session 2 (4/22):** Extra time for catch-up

### **WEEK 16**

**Session 1 (4/26): FINAL EXAM DUE**