NRM 211
INTRODUCTION TO APPLIED PLANT SCIENCE (3 credits)
Fall – 2024

Schedule (two lectures and one 3-hour lab each week):

Lectures:	Monday, Wednesday	9:15AM - 10:15AM	AHRB 183
Labs:	Monday	2:15PM - 5:15 PM	AHRB 1W05

Canvas (https://north.open.uaf.edu/login/) used for lecture notes, handouts and other relevant information.

Zoom link:

Course Description:

Basic principles and requirements for plant growth and development with special attention to the production and management of field and greenhouse grown crops.

Course Objective:

To guide students to an understanding of the physiological processes controlling plant growth and development emphasizing the implications and applications for plant growth and production at high latitudes.

Expected Student Learning Outcomes:

Enable students to apply current scientific knowledge to effectively handle and understand plant growth under various environmental conditions, management procedures and infrastructures. Provide students with the ability to recognize and appreciate opportunities and challenges for efficient plant and crop production under northern conditions.

Instructor:

Dr. Meriam Karlsson, Professor of Horticulture

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Phone:	474-7005
Email:	mgkarlsson@alaska.edu
Office hours:	Tuesdays/Thursdays 10 am – noon, or by appointment

Recommended (not required) Text:

Stern's Introductory Plant Biology, 15th ed. by James E. Bidlack and Shelley H. Jansky, 2021, McGraw Hill, ISBN: 978-1-260-24083-2.

Supplemental Text:

Raven Biology of Plants, 8th ed. by Ray F. Evert and Susan E. Eichhorn, 2013, W.H. Freeman Publishers.

Plant Science: Growth, Development and Utilization of Cultivated Plants (Hartmann's), 6th ed. by Margaret E. McMahon, 2020, Pearson Prentice Hall.

Principles of Field Crop Production, 4th ed. by John H. Martin, Richard P. Waldren and David L. Stamp, 2006, Pearson Prentice Hall.

Evaluation Policy:

Grades will be based on exams, lab and plant identifications, several sets of lab questions, one lab activities report, one literature review, and class participation. The relative importance of each component for the final grade is indicated below:

Exam I		100 (10%)
Exam II		150 (15%)
Final Exam		250 (25%)
Lab		400 (40%)
Lab and Plant ID I	(150 or 15%)	
Lab and Plant ID II	(150 or 15%)	
Several sets of Lab Questions	(50 or 5%)	
Lab Activities Report	(50 or 5%)	
Literature Review		50 (5%)
Class participation		50 (5%)
		1,000 points (= 100%)

Letter grades will be determined using the following scale:

A	90.0	to 100	%
B	80.0	to 89.9	%
C	70.0	to 79.9	%
D	60.0	to 69.9	%
F	Below	59.9	%

No make-up exams will be given unless there is a verifiable emergency or arrangements have been made with the instructor prior to the scheduled due date and time.

The UAF Incomplete Grade Policy will be followed. The letter grade "I" (incomplete) is a temporary grade used to indicate that the students has satisfactory completed (C or better) the majority of work in a course but for personal reasons beyond the student's control, such as sickness, has not been able to complete the course during the regular semester. Negligence or indifference is not an acceptable reason for an "I" grade.

Plant ID and Lab Tests:

The first part of the Lab and plant ID tests on September 30 and October 28 consists of questions from lab exercises. These questions will constitute 20% or 30 points of the 150 possible points. The second part is identification of plants in form of pictures, pressed samples or live plant material. Common names and scientific names (correctly spelled) are required for each plant. The plant ID includes 6 groups of plants (agronomy crops; invasive species commonly referred to as weeds; native Alaska plants for ornamental and revegetation purposes; vegetables; herbaceous ornamentals; fruit and berry crops) for a total of 100 species.

Lab Questions:

In addition to the lab activities report (see below), there are several weekly sets of lab questions. The questions are related to the most important concepts covered in the lab. The answered lab questions are due at the end of the lab period and will be administered for lab I, II, III, IV, VI, VII, VIII, X, XI and XII.

Lab Activities Report:

One lab activities report describing effects of temperature, light and mineral nutrition on plant growth is required. The plants will be growing in the greenhouse throughout the semester with opportunities to make weekly observations and measurements. The report is due (at the latest) on November 13, 2024.

Format for Lab Report on temperature and light (see example on Canvas)

Procedures:

Describe equipment, materials, methods etc.
Describe treatments.
Describe how data were collected.

Results:

Report your observations. The lab report must have actual plant measurements presented in tables and/or graphs.

Discussion and Conclusions:

Summarize in words the data presented under the results.
Discuss the obtained results. Do they differ from expected results?
Make a few concluding remarks.

Literature Review:

One literature review based on a paper from a scientific journal covering a research study related to the development and management of a crop or plant system is required. In addition to the written review, a short presentation of the paper (less than 10 minutes) is expected. The literature review is due (at the latest) November 205 2024, with a short presentation during the lab period.

Format for Literature Review (see example on Canvas)

Title of the article
Author(s)
Journal (name, year, page numbers)
Purpose of experiment
Procedures
Results and conclusions
Are the authors' conclusions valid? Who would benefit from this information? What additional work should be done? What would you have done differently? Any other comments.

Student protections statement: UAF embraces and grows a culture of respect, diversity, inclusion, and caring. Students at this university are protected against sexual harassment and discrimination (Title IX). Faculty members are designated as responsible employees which means they are required to report sexual misconduct. Graduate teaching assistants do not share the same reporting obligations. For more information on your rights as a student and the resources available to you to resolve problems, please go to the following site: https://catalog.uaf.edu/academics-regulations/students-rights-responsibilities/.

Disability services statement: Working with the Office of Disability Services, reasonable accommodation to students with disabilities will be provided.

ASUAF advocacy statement: The Associated Students of the University of Alaska Fairbanks, the student government of UAF, offers advocacy services to students who feel they are facing issues with staff, faculty, and/or other students specifically if these issues are hindering the ability of the student to succeed in their academics or go

about their lives at the university. Students who wish to utilize these services can contact the Student Advocacy Director by visiting the ASUAF office or emailing asuaf.office@alaska.edu.

Student Academic Support:

- Communication Center (907-474-5470, uaf-speakingcenter@alaska.edu, Gruening 507)
- Writing Center (907-474-5314, uaf-writing-center@alaska.edu, Gruening 8th floor)
- UAF Math Services, uaf-traccloud@alaska.edu, Chapman Bldg. (for math fee paying students only)
- Developmental Math Lab, Gruening 406
- The Debbie Moses Learning Center at CTC (907-455-2860, 604 Barnette St, Room 120 https://www.ctc.uaf.edu/student-services/student-success-center/)
- For more information and resources, please see the Academic Advising Resource List (https://www.uaf.edu/advising/students/index.php)

Student Resources:

- Disability Services (907-474-5655, uaf-disability-services@alaska.edu, 110 Eielson Building)
- Student Health & Counseling **[6 free counseling sessions]** (907-474-7043, https://www.uaf.edu/chc/appointments.php, Whitaker Building 2nd floor)
- Office of Rights , Compliance and Accountability (907-474-7300, uaf-orca@alaska.edu, 3rd floor, Constitution Hall)
- Associated Students of the University of Alaska Fairbanks (ASUAF) or ASUAF Student Government (907-474-7355, asuaf.office@alaska.edu, Wood Center 119)

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2. Incidents can be reported to your university's Equity and Compliance office (listed below) or online reporting portal. University of Alaska takes immediate, effective, and appropriate action to respond to reported acts of discrimination and harassment.
3. There are supportive measures available to individuals that may have experienced discrimination.
4. University of Alaska's Board of Regents' Policy & University Regulations (UA BoR P&R) 01.02.020 Nondiscrimination and 01.04 Sex and Gender-Based Discrimination Under Title IX, go to: http://alaska.edu/bor/policy-regulations/.
5. UA BoR P&R apply at all university owned or operated sites, university sanctioned events, clinical sites and during all academic or research related travel that are university sponsored.

For further information on your rights and resources
visit the student placement guidelines page of the equity and compliance site

NRM 211-Fall 2024, tentative schedule (pages Bidlack and Jansky, 2021. Stern's Introductory Plant Biology, **15th ed.**)

M	Aug. 26	Course introduction.	p. 1-10
M	**Aug. 26**	**Lab I: Landgrant universities and experiment stations**	
W	Aug. 28	Origin of cultivated plants	p. 243-245, 447-449
M	Sept. 2	Labor Day – no class or lab	
W	Sept. 4	Plant nomenclature and systematics	p. 123, 275-290, A1-A19
M	Sept. 9	Plant cell and tissue structures	p. 27-42, 51-62
M	**Sept 9**	**Lab II: Greenhouses**	
W	Sept. 11	Plant growth substances (hormones)	p. 187-196
M	Sept. 16	Plant growth substances (hormones)	p. 187-196
M	**Sept 16**	**Lab III: Start mineral nutrition experiment**	
W	Sept. 18	Control of plant growth and development	p. 197-204
M	Sept. 23	Light measurements for plant growth	p. 164-165, 168
M	**Sept. 23**	**Lab IV: Growth regulators**	
W	Sept. 25	Light quality and plant growth	p. 164-165, 206
M	Sept. 30	Light duration (photoperiod) and plant growth	p. 205-206
M	**Sept. 30**	**Lab V: Lab and plant ID Test 1**	
W	Oct. 2	Plant response to photoperiod	
M	Oct. 7	Plant response to photoperiod (continued)	
M	**Oct. 7**	**Lab VI: Light**	
W	Oct. 9	**EXAM I**	
M	Oct. 14	Plant response to daily light duration	
M	**Oct. 14**	**Lab VII: Germination and seedling vigor**	
W	Oct. 16	Photosynthesis and respiration	p. 162-176, 176-186
M	Oct. 21	Physical properties of soils	p. 75-81
M	**Oct. 21**	**Lab VIII: Physical properties of soils**	
W	Oct. 23	Chemical soil properties, mineral nutrition	p. 18, 80
M	Oct. 28	Essential macro- and micronutrients	p. 156-159, 480-483
M	**Oct. 28**	**Lab IX: Lab and plant ID Test 2**	
W	Oct. 30	Essential macro- and micronutrients	p. 156-159, 480-483
M	Nov. 4	Essential macro- and micronutrients	p. 156-159, 480-483
M	**Nov. 4**	**Lab X: Mineral nutrition**	
W	Nov. 6	Temperature and plant growth	p. 207-208, A76
M	Nov. 11	Response to high and low temperatures	p. 179
M	**Nov. 11**	**Lab XI: Temperature**	
W	Nov. 13	Average temperature, day and night temperature **Lab report is due**	
M	Nov. 18	Properties of water	p. 15-17, 480
M	**Nov. 18**	**Lab XII: Marketing Alaska grown products**	
W	Nov. 20	**EXAM 2**	
M	Nov. 25	Water relations in plants	p. 143-155
M	**Nov. 25**	**Lab XIII: Literature reviews are due with a short presentation**	
W	Nov. 27	No class (Thanksgiving break, Nov. 27 - Nov. 30)	
M	Dec. 2	Alaska crop production	
M	**Dec. 2**	Lab XIV: Fruit types (optional)	
W	Dec. 4	**FINAL EXAM** (or follow the Final Exam Schedule for Wed. Dec. 11, 8-10 am)	