

**NRM 211**  
**INTRODUCTION TO APPLIED PLANT SCIENCE**  
**Fall – 2017**

**Schedule:**

<i>Lectures:</i>	Monday, Wednesday	9:15AM - 10:15AM	AHRB 183
<i>Labs:</i>	Monday	2:15PM - 5:00 PM	AHRB 1W05

**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 Outcome:**

Enable students to apply current scientific knowledge to effectively handle and understand plant growth under existing 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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**WEB:** Blackboard <https://classes.alaska.edu/>

**Recommended (not required) Text:**

Stern's Introductory Plant Biology, 14th ed. by James E. Bidlack and Shelley H. Jansky, 2018, McGraw Hill, ISBN: 9780073369440 (list price new \$277.75, rent digital \$163.75).

**Supplemental Text:**

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

Hartmann's Plant Science: Growth, Development and Utilization of Cultivated Plants, 5th ed. by Margaret E. McMahon, Anthony M. Kofranek and Vincent E. Rubatzky, 2010, Pearson Prentice Hall.

The Biology of Horticulture, An Introductory Textbook, 2nd ed. by John E. Preece and Paul E. Read, 2005, Wiley & Sons.

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, 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	<u>50 (5%)</u>
	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 %

Borderline grades may be curved based on class participation, attendance and student progress during the semester. 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 exam time.

**Student Code of Conduct:**

1. As with all members of the university community, the university requires students to conduct themselves honestly and responsibly and to respect the rights of others. Students may not engage in behavior that disrupts the learning environment, violates the rights of others or otherwise violates the Student Code of Conduct (Code), university rules, regulations, or procedures. Students and student organizations will be responsible for ensuring that they and their guests comply with the Code while on property owned or controlled by the university or at activities authorized or sponsored by the university.
2. The university may initiate disciplinary action and impose sanctions on any student or student organization found responsible for committing, attempting to commit, or intentionally assisting in the commission of any of the following prohibited forms of conduct:
  - a) cheating, plagiarism or other forms of academic dishonesty; b) forgery, falsification, alteration or misuse of documents, funds, property or electronic records; c) damage or destruction of property; d) theft of property or services; e) harassment; f) discrimination; g) hazing; h) endangerment, assault or infliction of physical harm; i) gender-based or sexual misconduct; j) disruptive or obstructive actions; k) mistreatment of animals; l) misuse of firearms, explosives, weapons, dangerous devices or dangerous chemicals; m) failure to comply with university directives; n) misuse of alcohol; o) misuse of drugs or other intoxicants; p) violation of regents' policy, university regulation, rules or procedures; or q) any other actions that result in unreasonable interference with the learning environment or the rights of others.
3. Examples of actions that constitute these prohibitions will be described in the university regulation and MAU rules and procedures.
4. This policy and university regulation and MAU rules and procedures are not intended to define prohibited conduct in exhaustive terms, but rather to set forth examples to serve as guidelines for acceptable and unacceptable behavior.

The university has established procedures for enforcing the UA code of conduct. Each student at the university shall be afforded due process in all disciplinary matters. For a complete guide to these procedures, please refer to [Board of Regents Policy and University Regulation 09.02](#) (PDF).

For additional information and details about the Student Code of Conduct, please visit <http://www.uaf.edu/deanofstudents/>.

### **Plant ID and Lab Tests:**

The first part of the Lab and plant ID tests on October 2 and November 6 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, IX, 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 15, 2017.

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

#### **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 27, 2017, with a short presentation during the lab period.

*Format for Literature Review* (see example on Blackboard)

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.

**NRM 211-Fall 2017, tentative schedule** (pages Bidlack and Jansky, 2017. Stern's Introductory Plant Biology, **14th ed.**)

M	Aug. 28	Course introduction.	p. 2-12
M	<b>Aug. 28</b>	<b>Lab I: Field production</b>	
W	Aug. 30	Origin of cultivated plants	p. 250-252, 458-459
M	Sept. 4	Labor Day – no class or lab	
W	Sept. 6	Plant nomenclature and systematics	p. 128, 282-297, (A1-A19)
M	Sept. 11	Plant cell and tissue structures	p. 30-44, 53-64
M	<b>Sept. 11</b>	<b>Lab II: Greenhouses</b>	
W	Sept. 13	Plant growth substances (hormones)	p. 191-200
M	Sept. 18	Plant growth substances (hormones)	p. 191-200
M	<b>Sept 18</b>	<b>Lab III: Start mineral nutrition experiment</b>	
W	Sept. 20	Control of plant growth and development	p. 201-209
M	Sept. 25	Light measurements for plant growth	p. 168-169, 172
M	<b>Sept. 25</b>	<b>Lab IV: Growth regulators</b>	
W	Sept. 27	Light quality and plant growth	p. 169-170, 210-212
M	Oct. 2	Light duration (photoperiod) and plant growth	p. 209-212
M	<b>Oct. 2</b>	<b>Lab V: Lab and plant ID I</b>	
W	Oct. 4	Plant response to photoperiod	
M	Oct. 9	Plant response to photoperiod (continued)	
M	<b>Oct. 9</b>	<b>Lab VI: Light</b>	
W	Oct. 11	<b>EXAM I</b>	
M	Oct. 16	Plant response to daily light duration	
M	<b>Oct. 16</b>	<b>Lab VII: Germination and seedling vigor</b>	
W	Oct. 18	Photosynthesis and respiration	p. 166-180, 180-190
M	Oct. 23	Temperature and plant growth	p. 212-213, A76
M	<b>Oct. 23</b>	<b>Lab VIII: Temperature</b>	
W	Oct. 25	Response to high and low temperatures	p. 183
M	Oct. 30	Average temperature, day and night temperatures	
M	<b>Oct. 30</b>	<b>Lab IX: Physical properties of soils</b>	
W	Nov. 1	Physical properties of soils	p. 78-82
M	Nov. 6	Chemical soil properties, mineral nutrition	p. 20, 82
M	<b>Nov. 6</b>	<b>Lab X: Lab and plant ID II</b>	
W	Nov. 8	Essential macro- and micronutrients	p. 159-163, 491-493
M	Nov. 13	Essential macro- and micronutrients	p. 159-163, 491-493
M	<b>Nov. 13</b>	<b>Lab XI: Marketing Alaska grown products</b>	
W	Nov. 15	Essential macro- and micronutrients	p. 159-163, 491-493
		<b>Lab report is due</b>	
M	Nov. 20	Properties of water	p. 17-20, 490
M	<b>Nov. 20</b>	<b>Lab XII: Mineral nutrition</b>	
W	Nov. 22	<b>EXAM II</b> (Thanksgiving, Nov. 23-26)	
M	Nov. 27	Water relations in plants	p. 148-159
M	<b>Nov. 27</b>	<b>Lab XIII: Literature reviews are due with a short presentation</b>	
W	Nov. 29	Soil water	p. 82
M	Dec. 4	Alaska crop production	
M	Dec. 4	<b>Lab XIV: Fruit types</b>	
W	Dec. 6	<b>FINAL EXAM</b> (or follow the Final Exam Schedule for Wednesday Dec 13, 8-10 am)	