

NRM 212
GREENHOUSE MANAGEMENT
Spring – 2023

Schedule

Monday 2:15 PM - 5:15 PM, Arctic Health Research Building room 1W05

Course Objective:

To guide students to an understanding of greenhouses and other controlled environment production systems with emphases on use, applications, management and operation.

Expected Student Outcome:

Students should understand major design and construction requirements for a greenhouse to function as an efficient growing environment for various crops. Students should also understand environmental control systems and management practices such as media, irrigation, fertilization, crop production systems and pest management. Students should have ability to recognize and appreciate opportunities and challenges for efficient greenhouse use under northern conditions.

Instructor:

Dr. Meriam Karlsson, Professor of Horticulture

Office: 1W04 Arctic Health Research Bldg., 474-7005, mgkarlsson@alaska.edu

Office hours: Tuesday and Thursday 10 am - 12 noon or by appointment

WEB:

Canvas <https://north.open.uaf.edu/login/>

Blackboard <https://classes.alaska.edu/>

Virtual Grower 3

<http://www.ars.usda.gov/services/software/download.htm?softwareid=309>

Recommended Text:

Greenhouse Operation and Management, 7th ed., by Paul V. Nelson, 2012, Prentice Hall, Pearson Higher Education, ISBN 9780132439367
(list price new ~ \$318.50).

Supplemental Text:

Greenhouse Engineering, 3rd revision, by R.A. Aldrich and J.W. Bartok Jr., 1994, NRAES-33, Ithaca, NY. (<https://ecommons.cornell.edu/bitstream/handle/1813/69429/NRAES-033.pdf?sequence=1&isAllowed=y>)

Greenhouse Technology and Management, 2nd ed., by N. Castilla, 2012, CABI, Boston.

[https://www.agrifs.ir/sites/default/files/Greenhouse%20Technology%20and%20Management%207BNicolas%20Castilla%7D%20%5B9781780641034%5D%20\(2013\)_0.pdf](https://www.agrifs.ir/sites/default/files/Greenhouse%20Technology%20and%20Management%207BNicolas%20Castilla%7D%20%5B9781780641034%5D%20(2013)_0.pdf)

Greenhouse Management: a guide to greenhouse technology and operations, by T. Goldhammer, 2019, Apex Publishers, Centerville, Virginia - (list price new ~ \$70).

Evaluation Policy:

Grades will be based on exams, one literature review, the greenhouse design project and class participation. The relative importance of each component for the final grade is indicated below:

Exam I	200 (20%)
Exam II	200 (20%)
Final Exam	300 (30%)
Greenhouse Design Project	200 (20%)
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 %

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.

Literature Review:

One literature review based on a paper from a scientific journal covering a research study related to the construction, management or environmental conditions of a greenhouse or other controlled environment 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) March 20 with the presentation March 27, 2023.

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.

Greenhouse Design Project:

Here you will have the opportunity to develop a design plan for a greenhouse that will be useful to you. The design and report should be comprehensive starting with the purpose and goals for your greenhouse. Other expected components besides the design and construction specifics such as size, location and type of greenhouse, include the purpose and use, management, business versus recreational, heating, cooling and irrigation approach, environmental controls, annual crop production plan, labor requirements, logistics and marketing methods (if applicable).

An outline for the design project is posted on Blackboard under the heading Greenhouse Design Project. Many of the expected components are covered in the publication *Creating a Master Plan for Greenhouse Operations* by A.J. Both (<http://njaes.rutgers.edu/pubs/publication.asp?pid=E221>).

The Greenhouse Design Project is due on April 24 with a short presentation on May 1, 2023 (last day of instruction).

COVID-19 statement: Students should keep up-to-date on the university's policies, practices, and mandates related to COVID-19 by regularly checking this website <https://sites.google.com/alaska.edu/coronavirus/uaf?authuser=0>. Further, students are expected to adhere to the university's policies, practices, and mandates and are subject to disciplinary actions if they do not comply.

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:

- Speaking 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/lr/SKM_364e19011717281.pdf)

Student Resources:

- Disability Services (907-474-5655, uaf-disability-services@alaska.edu, Whitaker 208)
- Student Health & Counseling [**6 free counseling sessions**] (907-474-7043 <https://www.uaf.edu/chc/appointments.php>, Gruening 215)
- Center for Student Rights and Responsibilities (907-474-7317, uaf-studentrights@alaska.edu, Eielson 110)
- Associated Students of the University of Alaska Fairbanks (ASUAF) or ASUAF Student Government (907-474-7355, asuaf.office@alaska.edu, Wood Center 119)

Nondiscrimination statement: The University of Alaska is an affirmative action/equal opportunity employer and educational institution. The University of Alaska does not discriminate on the basis of race, religion, color, national origin, citizenship, age, sex, physical or mental disability, status as a protected veteran, marital status, changes in marital status, pregnancy, childbirth or related medical conditions, parenthood, sexual orientation, gender identity, political affiliation or belief, genetic information, or other legally protected status. The University's commitment to nondiscrimination, including against sex discrimination, applies to students, employees, and applicants for admission and employment. Contact information, applicable laws, and complaint procedures are included on UA's statement of nondiscrimination available at www.alaska.edu/nondiscrimination. For more information, contact: UAF Department of Equity and Compliance, 1692 Tok Lane, 3rd floor, Constitution Hall, Fairbanks, AK 99775, 907-474-7300, uaf-deo@alaska.edu

In addition, we want you to know that:

1. UA is an AA/EO employer and educational institution and prohibits illegal discrimination against any individual: www.alaska.edu/nondiscrimination.
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 [click here](#).

NRM 212-Spring 2023, tentative schedule (pages Nelson, 2012. Greenhouse Operation and Management, 7th ed.)

January 23	Course introduction Greenhouse definitions and industry characteristics	p. 1-33
January 30	Greenhouse designs and construction	p. 35-76
February 6	Greenhouse heating	p. 77-123
February 13	Greenhouse cooling and environmental control systems	p. 125-149, 151-159
February 20	Root substrates	p. 161-194, 195-209
February 27	First Take-Home Exam Watering	p. 211-260
March 6	Fertilization and carbon dioxide	p. 261-318, 319-327
March 13	No class (Spring Break)	
March 20	Light and temperature Literature review is due	p. 330-372
March 27	Light and temperature Literature presentations	p. 330-372
April 3	Regulation of plant growth	p. 373-389
April 10	Pest and disease management	p. 391-442, 443-462
April 17	Second Take-Home Exam Postproduction quality	p. 463-488
April 24	Marketing and business management Greenhouse design project is due	p. 489-530, 531-586
May 1	Presentations and discussion of your greenhouse designs (last day of instruction)	
May 5	Final Take-Home Exam is due (scheduled Final Exam during Finals' week is on Friday May 5, 1-3 pm)	