# NRM 150
# PLANT PROPAGATION – I. Seeds and Seed Germination

1 credit (1+0)
Prerequisites: none; recommended basic high school biology
Location: 183 Arctic Health Bldg (AHRB)
Time: TBA (1 hr per week, 14 weeks; 2 hour final)

Instructor: Dr. Patricia S. Holloway
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Textbook: Beyl, C. and R. Trigiano. 2008. Plant Propagation Concepts and Laboratory exercises. CRC Press, New York.

## Course Description:

Principles and practices of plant propagation useful in horticulture, botany, forestry, agronomy, revegetation and land reclamation projects and plant research. Course will cover seed and fern spore biology, seed dormancy mechanisms, germination techniques, and the seed industry. Emphasis will be on Alaska native and economically useful plants.

Prerequisite: none
Recommended: basic course in high school biology. (1+0)

## Goals and Objectives

The propagation of plants by seeds, cutting, grafting and more is the foundation of plant-based natural resources management. This course is part one of a three-part series exploring the theory and methods of propagating plants. It is designed to provide natural resource managers with basic knowledge in plant regeneration by seeds and fern spores and an exploration of the seed industry. The lectures and assigned activities explore the fundamental basis for reproduction in plants and the methods by which we use natural processes to propagate plants for use in horticulture, agronomy, forestry, revegetation and reclamation.

## Student Learning Outcomes

It is expected that you will become familiar with the theory and practice of plant propagation by seeds and fern spores sufficient for entry level positions in a commercial greenhouse/nursery; tree seedling nursery; on revegetation sites such as mining, wetlands, highway; and on commercial or residential farms and gardens. You will develop a working knowledge of seed germination terminology and techniques to allow you to

pursue specific interests as well as practice problem-solving skills for researching and making management decisions in resources management.

Instructional Methods:

The basic course will use Blackboard as the main interface for exams, presentation of videos, YouTube and more. Methods will include:

1) Online or classroom powerpoint lecture
2) Audio/video demonstrations using Powerpoint, Camtasia, Youtube
3) Propagation terms- a combination of puzzles, quizzes, matching, short answer
4) Situational essays: essays answering questions about how seeds are harvested, processed, used, that require independent research of literature, analysis and problem solving in natural resources management
5) Videos or production practices for seeds
6) In-class or distance discussions about the biology and/or business of seeds

**Technology Requirements**

One section of this course will be online and will use several multimedia technologies accessible through Blackboard. Lectures will be recorded using Powerpoint/Camtasia/Youtube and will require audio and video capabilities. There are no requirements to purchase additional software. Students will be expected to have the most current versions of several applications that will be used in this course, including QuickTime, Flash (Mac|Windows), iTunes and Jam[

Exams: Two exams will be given, a mid term and a final. Using a mixture of short answer, fill in the blank, and essay, the exams will cover a review of materials for one half of the course. The final is not cumulative, however because of the nature of the course content, material from the first half will be required to answer questions from the second half.

## Course Policies:

### Plagiarism and Academic Honesty

Plagiarism is using what another person has developed as your own words or thoughts. Plagiarism is never acceptable. UAF requires students to conduct themselves honestly and responsibly and to respect the rights of others. Cheating, plagiarism or other forms of academic dishonesty may result in disciplinary action and sanctions. The UAF Student Code of Conduct is adhered to in this course.

### Disability Services

Tentative Schedule (by week)

1. Course introduction: The importance of seeds to humans and processed products resulting from seeds: waxes, oils and fats; medicines; spices and condiments; agriculture; bird and wildlife food; domestic animal feed; cosmetics; aromatic compounds; beverages; ornamental decorations. Main crops propagated by seeds esp agronomic crops, flower and vegetable seeds, tree seeds. (quiz 1, essay 1)

2. Where seeds come from - flower initiation: the development of flowers in annuals, biennials and perennials and the process by which flowers are formed; environmental factors that influence flower initiation and development; recognizing flower buds and when they occur. (quiz 2, video commentary 1)

3. Flower development: mitosis, meiosis, results of these processes (quiz 3, essay 2)

4. Pollination and production of seeds ï types of pollination; the special case of honey bees; wild Alaska abiotic and biotic pollinators; pollination in naturally cross pollinated and self pollinated crops; the consequences of inadequate pollination. (quiz 4, video commentary 2)

5. Hybrid seed production and incompatibility - selfing versus cross pollination and how plants prevent self pollination (timing differences, incompatibility). The invention of the F1 Hybrid. (quiz 5, essay 3)

6. A bit of anatomy - the anatomical components of seeds and how they affect germination, Fruit and fruit ripening, where to find fruits and seeds. (quiz 6, video commentary 3)

7. Mid term exam

8. Seed Processing: harvesting, extraction, cleaning, drying, storage. (quiz 6, essay 4)

9. Seed conditioning -

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13.The seed industry Seed quality: seed purity, noxious weeds, moisture content, seed size Seed testing: Association of Official Seed Analysts (AOSA), International Seed Testing Association, Society of Commercial Seed Technologists (SCST) International Seed Testing Association (ISTA)American Seed Trade Association (ASTA), USDA Agricultural Marketing Service (USDA/AMS) Seed Testing ServiceCanadian Food Inspection Agency (CFIA), Association of Official Seed Certifying Agencies (AOSCA) Association of American Seed Control Officials (AASCO), Seed Quest, National Seed Health System, Alaska Division of Agriculture Seed testing Program (quiz 11, video commentary 5)

14.Seed certification- Alaska Division of Agriculture Seed testing, noxious weed program (quiz 12)

15.Final Exam