



Irrigation Principles and Practices
BEE 439- Fall 2015
4 credits

Instructor name

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Course Description

Setting-up practical (economical, reliable, easy to use) and efficient irrigation systems and using good irrigation management can improve crop productivity and profitability, minimize water use, and protect natural resources. Having the fundamental understanding of irrigation principles and practices will help farmers, extension workers, and other students connected to irrigated agriculture to achieve these goals.

This non-engineering course provides students with the basic technical concepts that are needed to select appropriate irrigation systems, develop operational specifications, manage irrigation operations, and monitor performance. Students will learn about different types of irrigation systems, system configurations, soil-water-plant relationship, crop water requirements, factors that influence irrigation efficiency, irrigation scheduling, measurements of water flow and soil water content, pumps, and energy requirements.

Prerequisites

MTH 111

Learning Resources

All materials for this course will be provided or linked to from within Blackboard. There will not be a required textbook for this course. The below books are recommended but won't be assigned reading.

- 1) "Irrigation", Irrigation Association, Sixth edition, 2011.
- 2) "Principles of Irrigation", Irrigation Association, Third edition, 2013.
- 3) "Principles of Farm Irrigation System Design", Larry James, 1988, John Wiley and sons.
- 4) "Crop Water Requirements", FAO* Irrigation and Drainage Paper #24, 1992, FAO, Rome.
- 5) "Oregon Crop Water Use and Irrigation Requirements", R H Cuenca. 1992, Extension Bulletin 8530.
- 6) "Irrigation of Agricultural Crops", Agronomy No. 30. B A Stewart and D. R. Nielsen. 1990. Publ. ASA, CSSA, SSSA.
- 7) "Oregon Engineering Handbook: Irrigation Guide", US Soil Conservation Service, 1982.
- 8) "Sprinkler and Trickle Irrigation", J. Keller and R. Bleisner, Chapman and Hall, 1990.

This course is offered through Oregon State University Extended Campus. For more information, contact:
Web: ecampus.oregonstate.edu Email: ecampus@oregonstate.edu Tel: 800-667-1465

Measurable Student Learning Outcomes

Through lectures, recitations, and subject matter covered, the student should be able to:

- Calculate crop water requirements and estimate required irrigation system capacity.
- Calculate allowable soil moisture depletion and assess maximum interval between irrigations.
- Estimate economically optimal levels of water use.
- Recognize application uniformity and irrigation adequacy and their relationship to irrigation efficiency.
- Create preliminary designs for standard irrigation systems: center pivot, drip irrigation, and wheel line.
- Estimate the pressure losses in pipes and fittings.
- Describe the operational characteristics of pumps, and evaluate their performance.
- Adapt the principles and technology of scientific irrigation scheduling.
- Identify the processes and factors to deal with to ensure sustainability of irrigation.

Evaluation of Student Performance

All assignments should be submitted by their due date. Participants must accrue at least 70% of all points possible in the course. Students will be evaluated as follows:

	<u>Percentage</u>
Assignments	20
Discussions	10
Midterm (2 @ 20 points each)	40
<u>Final exam</u>	<u>30</u>
Total:	100

Course Content

Week	Topic	Reading Assignments	Learning Activities
1	General introduction Crop water requirements	Foreword Chapter I (pp 1-18) Video lectures (3)	Online discussion Assignment #1
2	Net irrigation requirements	Chapter I- (pp 18- 34) Video lectures (2)	Assignment #2 Online Discussion Self Quiz #1
3	Gross water requirements and efficiency	Chapter II Video lectures (2)	Assignment #3 Self Quiz #2
4	Types of irrigation systems	Chapter III	Recitation Midterm #1
5	Selection and specification of irrigation systems: (A) Sprinkler systems	Chapter III Video lectures (2)	Assignment #4 Online Discussion Self-quiz #3
6	Selection and specification of irrigation systems: (B) Drip/Trickle systems	Chapter IV Video lectures (2)	Assignment #5 Online Discussion Self-Quiz #4
7	Pumps and delivery systems Head loss	Chapter VI and VII Video lectures (2)	Assignment #6
8	Water use, yield and profit		Recitation

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			Midterm #2
9	Irrigation management Economics and irrigation optimization	Chapter V Paper Online documents	Assignment #7 Online Discussion Self-Quiz #5
10	Measuring water flow and soil water content Sustainability	Paper videos	Recitation
Finals	Final exam		Final Exam

Communication

The course will be facilitated daily during the Monday-Friday work week, excluding University holidays. General course questions should be posted in the Q&A Discussion Forum so that all participants can benefit from the exchange. Private matters, of course, can be communicated via email or telephone. You can expect a response within 24-48 hours to all inquiries.

Technical Assistance

If you experience computer difficulties, need help downloading a browser or plug-in, assistance logging into the course, or if you experience any errors or problems while in your online course, contact the OSU Help Desk for assistance. You can call (541) 737-3474, email osuhelpdesk@oregonstate.edu or visit the [OSU Computer Helpdesk](#) online.

Blackboard

This course will be delivered via Blackboard where you will interact with your classmates and with your instructor. Within the course Blackboard site you will access the learning materials, such as the syllabus, class discussions, assignments, projects, and quizzes.

To preview how an online course works, visit the [Ecampus Course Demo](#). For technical assistance, please visit [Ecampus Technical Help](#).

Course Policies

This course will take place over the course of ten weeks. Students will review online content each week, participate in online discussions, complete assignments and quizzes.

Please plan to log in and participate in course activities *two to three times per week*. Participants are expected to participate in accordance with the weekly schedule.

Exams are open book and timed. Makeup exams will be given only for missed exams excused in advance by the instructor. Excused absences will not be given for airline reservations, routine illness (colds, flu, stomach aches), or other common ailments. Excused absences will generally not be given after the absence has occurred, except under very unusual circumstances. Incomplete (I) grades will be granted only in emergency cases (usually only for a death in the family, major illness or injury, or birth of your child).

Statement Regarding Students with Disabilities

Accommodations are collaborative efforts between students, faculty and [Disability Access Services \(DAS\)](#) with accommodations approved through DAS are responsible for contacting the faculty member in charge of the course prior to or during the first week of the term to discuss accommodations. Students who believe they are eligible for accommodations but who have not yet obtained approval through DAS should contact DAS immediately at 541-737-4098. .

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Academic Integrity

Students are expected to comply with all regulations pertaining to academic honesty. For further information, visit [Avoiding Academic Dishonesty](#), or contact the office of Student Conduct and Mediation at 541-737-3656.

OAR 576-015-0020 (2) Academic or Scholarly Dishonesty:

a) Academic or Scholarly Dishonesty is defined as an act of deception in which a Student seeks to claim credit for the work or effort of another person, or uses unauthorized materials or fabricated information in any academic work or research, either through the Student's own efforts or the efforts of another.

b) It includes:

(i) CHEATING - use or attempted use of unauthorized materials, information or study aids, or an act of deceit by which a Student attempts to misrepresent mastery of academic effort or information. This includes but is not limited to unauthorized copying or collaboration on a test or assignment, using prohibited materials and texts, any misuse of an electronic device, or using any deceptive means to gain academic credit.

(ii) FABRICATION - falsification or invention of any information including but not limited to falsifying research, inventing or exaggerating data, or listing incorrect or fictitious references.

(iii) ASSISTING - helping another commit an act of academic dishonesty. This includes but is not limited to paying or bribing someone to acquire a test or assignment, changing someone's grades or academic records, taking a test/doing an assignment for someone else by any means, including misuse of an electronic device. It is a violation of Oregon state law to create and offer to sell part or all of an educational assignment to another person (ORS 165.114).

(iv) TAMPERING - altering or interfering with evaluation instruments or documents.

(v) PLAGIARISM - representing the words or ideas of another person or presenting someone else's words, ideas, artistry or data as one's own, or using one's own previously submitted work. Plagiarism includes but is not limited to copying another person's work (including unpublished material) without appropriate referencing, presenting someone else's opinions and theories as one's own, or working jointly on a project and then submitting it as one's own.

c) Academic Dishonesty cases are handled initially by the academic units, following the process outlined in the University's Academic Dishonesty Report Form, and will also be referred to SCCS for action under these rules.

Conduct in this Online Classroom

Students are expected to conduct themselves in the course (e.g., on discussion boards, email postings) in compliance with the [university's regulations regarding civility](#).

Tutoring

[NetTutor](#) is a leading provider of online tutoring and learner support services fully staffed by experienced, trained and monitored tutors. Students connect to live tutors from any computer that has Internet access. NetTutor provides a virtual whiteboard that allows tutors and students to work on problems in a real time environment. They also have an online writing lab where tutors critique and return essays within 24 to 48 hours. Access NetTutor from within your Blackboard class by clicking on the Tools button in your course menu.