

# Syllabus: Spring 2017

## ABE/CE 456/556 (3) Irrigation Systems Design

Shantz 440, Tuesdays & Thursdays; 11:00am - 12:15pm; Spring 2017

### Course Description

Design and operation of surface, sprinkler, and trickle irrigation systems based on economic and environmental criteria.

### Instructor and Contact Information

Akrum H. Tamimi, PhD  
Office: Forbes 140  
Email: [akrumt@email.arizona.edu](mailto:akrumt@email.arizona.edu)  
Phone: 520-621-9663

### Office Hours

Tuesdays 1:00pm to 3:00pm and by Appointments.

### Absence and Class Participation Policy

UA's policy concerning Class Attendance, Participation, and Administrative Drops is available at: <http://catalog.arizona.edu/policy/class-attendance-participation-and-administrative-drop>

The UA policy regarding absences for any sincerely held religious belief, observance or practice will be accommodated where reasonable, <http://policy.arizona.edu/human-resources/religious-accommodation-policy>

Absences pre-approved by the UA Dean of Students (or Dean Designee) will be honored. See: <https://deanofstudents.arizona.edu/absences>

Attendance is not required, but is highly recommended.

### Credits and Contact Hours

3 Units, 3 hours per week. One hour Engineering Science and 2 hours Engineering Design. Field Trips.

## Field Trips

We will schedule the field trips based on students' availability. The following field trips are being planned:

1. Yuma, AZ
2. Campus Agricultural Center (CAC), Roger Road, Tucson, AZ
3. MAC - Maricopa
4. Rainbird, Tucson, AZ

## Course Prerequisites

Math 124, CE 318.

## Co-requisites

Not Applicable.

## Required, Elective, or Selected Elective

Design Elective or Technical Elective.

## Course Objectives and Expected Learning Outcomes

**Course Objectives:** This course is designed to give upper division students in ABE and other engineering disciplines the ability to analyze and design water and chemical application systems in agricultural and environmental systems. Students should develop the following specific capabilities when they complete this course:

**Learning Outcomes:**

1. Design irrigation systems based on economics and environmental protection.
2. Understand fundamentals of surface, sprinkler, drip, and bubbler irrigation design.
3. Understand fundamentals of chemical injection systems and water quality parameters.

## Books and Programs

The textbook is posted at D2L Content. The textbook is oriented around the WINDS model (Wastewater, Irrigation, Nitrogen, Drainage, and Salinity). This is a precision agriculture computer model. The WINDS model is also in D2L content.

An excellent technical handbook on pressurized irrigation techniques compiled by Food and Agriculture Organization of the United Nations (FAO) which can be used as reference and can be downloaded from <ftp://ftp.fao.org/agl/aglw/docs/pressirrig.pdf>

## Exams

There are two midterm exams and a final. Exams will be taken in Shantz 440. All students must come to take the exams in class.

## Projects

Individuals or groups of students will either design an irrigation system or develop Excel/VBA computer programs for the WINDS model. Graduate students will have a larger design projects or WINDS models. A proposal for the project has to be developed by the student or the group and approved by Dr. Tamimi.

The procedure for designing an irrigation system will follow the engineering design process. Necessary field data should be collected as needed for the design. A technical report detailing input data collection, methods and materials used in the design and calculations sections should be presented in the technical report.

Students will make a video on their project and upload it to YouTube. This is very easy and innumerable students in my class have done this with no problem. Instructions on video production will be available

## Grading Scale and Policies

Component	Percent
Project Design or Program (25% video and 75% project)	15
Homework	35
Midterm 1	15
Midterm 2	15
Final	20
Total	100

Grades will be assigned based on the following scale

Letter Grade	Total Grade
A	90 – 100%
B	80 – 90%
C	65 – 80%
D	50 – 65%

## Schedule

Class No.	Date	Content	Chapter
1	Thursday, January 12, 2017	Center Pivots	12
2	Tuesday, January 17, 2017	Center Pivots	12
3	Thursday, January 19, 2017	Center Pivots	12
4	Tuesday, January 24, 2017	Center Pivots	12
5	Thursday, January 26, 2017	Linear Move Irrigation Systems	14
6	Tuesday, January 31, 2017	Turf Irrigation	13
7	Thursday, February 2, 2017	Turf Irrigation	13
8	Tuesday, February 7, 2017	Irrigation Lateral Design	7
9	Thursday, February 9, 2017	Mainline Design	8
10	Tuesday, February 14, 2017	Mainline Design	8
11	Thursday, February 16, 2017	Agricultural Sprinkler Irrigation	14
12	Tuesday, February 21, 2017	Agricultural Sprinkler Irrigation	14
13	Thursday, February 23, 2017	Agricultural Sprinkler Irrigation	14
14	Tuesday, February 28, 2017	Field Trip to Yuma	
15	Thursday, March 2, 2017	Landscape Irrigation Systems	15
16	Tuesday, March 7, 2017	Landscape Irrigation Design & Management	16
17	Thursday, March 9, 2017	Landscape Irrigation Design & Management	16
18	Tuesday, March 14, 2017	Spring Break	
19	Thursday, March 16, 2017	Spring Break	
20	Tuesday, March 21, 2017	First Midterm - Agricultural Drip Irrigation	17
21	Thursday, March 23, 2017	Drip Irrigation System Design	18
22	Tuesday, March 28, 2017	Drip Irrigation System Design	18
23	Thursday, March 30, 2017	Drip Irrigation System Design	18
24	Tuesday, April 4, 2017	Chemigation	19
25	Thursday, April 6, 2017	Surface Irrigation	20
26	Tuesday, April 11, 2017	Surface Irrigation	20
27	Thursday, April 13, 2017	Surface Irrigation	20
28	Tuesday, April 18, 2017	Hydroponic Irrigation System	21
29	Thursday, April 20, 2017	Hydroponic Irrigation System	21
30	Tuesday, April 25, 2017	Low Head Bubbler Irrigation System	22
31	Thursday, April 27, 2017	Low Head Bubbler Irrigation System	22
32	Tuesday, May 2, 2017	Review	
33	Thursday, May 4, 2017	Reading Day-No Classes or Finals	

University policy regarding grades and grading systems is available at <http://catalog.arizona.edu/policy/grades-and-grading-system>

**Requests for incomplete (I) or withdrawal (W)** must be made in accordance with University policies, which are available at <http://catalog.arizona.edu/policy/grades-and->

[grading-system#incomplete](#) and <http://catalog.arizona.edu/policy/grades-and-grading-system#Withdrawal> respectively.

**Dispute of Grade Policy:** Students are welcome to dispute a grade on a quiz, project, or exam at any time during the semester

## Honors Credit

Students wishing to contract this course for Honors Credit should email me to set up an appointment to discuss the terms of the contract. Information on Honors Contracts can be found at <http://www.honors.arizona.edu/faculty-and-advisors/contracts>

## Classroom Behavior Policy

To foster a positive learning environment, students and instructors have a shared responsibility. We want a safe, welcoming, and inclusive environment where all of us feel comfortable with each other and where we can challenge ourselves to succeed. To that end, our focus is on the tasks at hand and not on extraneous activities (e.g., texting, chatting, reading a newspaper, making phone calls, web surfing, etc.)

Students are asked to refrain from disruptive conversations with people sitting around them during lecture. Students observed engaging in disruptive activity will be asked to cease this behavior. Those who continue to disrupt the class will be asked to leave lecture or discussion and may be reported to the Dean of Students.

There are no restrictions on phones or computers in this class. However, during exams, no cell phone use is allowed.

## Threatening Behavior Policy

The UA Threatening Behavior by Students Policy prohibits threats of physical harm to any member of the University community, including to oneself. See <http://policy.arizona.edu/education-and-student-affairs/threatening-behavior-students>

## Accessibility and Accommodations

Our goal in this classroom is that learning experiences be as accessible as possible. If you anticipate or experience physical or academic barriers based on disability, please let me know immediately so that we can discuss options. You are also welcome to contact the Disability Resource Center (520-621-3268) to establish reasonable accommodations. For additional information on the Disability Resource Center and reasonable accommodations, please visit <http://drc.arizona.edu> .

If you have reasonable accommodations, please plan to meet with me by appointment or during office hours to discuss accommodations and how my course requirements and activities may impact your ability to fully participate.

Please be aware that the accessible table and chairs in this room should remain available for students who find that standard classroom seating is not usable.

## Code of Academic Integrity

Students are encouraged to share intellectual views and discuss freely the principles and applications of course materials. However, graded work/exercises must be the product of independent effort unless otherwise instructed. Students are expected to adhere to the UA Code of Academic Integrity as described in the UA General Catalog. See:

<http://deanofstudents.arizona.edu/academic-integrity/students/academic-integrity>

Selling class notes and/or other course materials to other students or to a third party for resale is not permitted without the instructor's express written consent. Violations to this and other course rules are subject to the Code of Academic Integrity and may result in course sanctions.

Additionally, students who use D2L or UA e-mail to sell or buy these copyrighted materials are subject to Code of Conduct Violations for misuse of student e-mail addresses. This conduct may also constitute copyright infringement.

## UA Nondiscrimination and Anti-harassment Policy

The University is committed to creating and maintaining an environment free of discrimination; see <http://policy.arizona.edu/human-resources/nondiscrimination-and-anti-harassment-policy>

Our classroom is a place where everyone is encouraged to express well-formed opinions and their reasons for those opinions. We also want to create a tolerant and open environment where such opinions can be expressed without resorting to bullying or discrimination of others.

## Additional Resources for Students

UA Academic policies and procedures are available at <http://catalog.arizona.edu/policies>

Student Assistance and Advocacy information is available at <http://deanofstudents.arizona.edu/student-assistance/students/student-assistance>

## Confidentiality of Student Records

<http://www.registrar.arizona.edu/personal-information/family-educational-rights-and-privacy-act-1974-ferpa?topic=ferpa>

## Subject to Change Statement

Information contained in the course syllabus, other than the grade and absence policy, may be subject to change with advance notice, as deemed appropriate by the instructor.