

# Syllabus

## Course Location, Textbook, Instructor Contact Information

Class Meetings:	18:30-19:50 , T-TH, CE 001 (Section 001) 11:00-12:20 , T-TH, CE 211 (Section 002)
Instructor:	Theodore G. Cleveland, CE Room 203F
TA:	none
Office Hours:	Open Door Policy
Telephone:	(806) 834-5101
E-mail:	<a href="mailto:theodore.cleveland@ttu.edu">theodore.cleveland@ttu.edu</a>
Web:	<a href="http://54.243.252.9/ce-5366-webroot/">http://54.243.252.9/ce-5366-webroot/</a>
Textbook(s) :	Water Resources Systems Planning and Management (WRPM) (?) Principles of Integrated Water Resources Management (IWRM) (?)
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## Catalog Description

**CE 5366: Water Resources Management (3:3:0)** Models and other technical elements of water resources systems in context of the political, social, and other environments in which they exist.

## Course Objectives

The purpose of this class is to study ...

1. Construct solution tools using **R** as a computation engine and **Excel** as an interface for small-scale linear and non-linear programming problems.
2. Locate and use solution tools for large-scale linear and non-linear programming problems.
3. Formulate integrated simulation and optimization models for improved decision making and analysis in water resources management.
4. Quantify risks and uncertainties in planning, design, and management objective(s) in water resources systems.
5. Evaluate alternatives in water resources management with respect to economic, environmental, ecological, regulatory, and social aspects.
6. Describe the large scale complex interactions between engineered infrastructure and natural systems and the issues associated with holistic decision-making.

## ABET Program Outcomes

A subset of the ABET Program Outcomes are addressed in CE 3372, these outcomes are listed below:<sup>1</sup>

- 3[a]. Ability to apply knowledge of mathematics, science, and engineering.
- 3[b]. Ability to design and conduct experiments, as well as to analyze and interpret data.
- 3[e]. Ability to identify, formulate, and solve engineering problems.
- 3[i]. Recognition of need for life-long learning.
- 3[k]. Ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
- 8[d]. Proficiency in water resources engineering.

## Course Specific Policies

Any policies stated in this section that differ from University Operating Policies are null and void and the University Operating Policies shall be in force.

### Disability:

Texas Tech policy provided as part of syllabus (see last section).

### Religious Holidays:

*"A student who intends to observe a religious holy day (as defined by OP 34.19) should make that intention known to the instructor prior to the absence in order to receive accommodations prescribed by OP 34.19."*

### Cellphones/Pagers:

Please set your personal communication devices to silent ring or off during class. Do not take calls in class. Disturbance during class time is not acceptable.

### Prerequisites:

Mastery of material from CE 3305 and CE 3354 or equivalent is expected.

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<sup>1</sup>Item 3[b] below is only partially fulfilled — in this course students will analyze and interpret data, design of experiments is beyond the scope of the class.

**Attendance:**

Roll will be taken to determine attendance for class participation. Please let the instructor know in advance if you must miss a class for a legitimate reason<sup>2</sup>.

**Evaluation Instruments and Grading**

Student performance will be evaluated using attendance (coming to class), article reviews, exercises (homework), project reports, and examinations. The exams will derive much of their content from the exercises.

**Exercises:**

Assignments follow nearly every lecture and are due the following class meeting (but consult the schedule below for actual due dates – changes are announced on the main page of the class website)<sup>3</sup>.

1. Every homework assignment is to be accompanied by a descriptive memorandum containing your analysis of the problem. Report materials should be prepared with a word processor. Hand computations may be turned in on engineering paper attached as an appendix to the memorandum<sup>4</sup>; important steps in each solution must be shown. Legibility is determined by the reader; illegible materials will not be graded.
2. Assignments are to be uploaded to the learning management system (LMS) on the assigned date.<sup>5</sup>
3. Due dates are shown in Table ??; Exercises are denoted by ES-#

**Engineering Reports:**

A project report comprised of various components developed during the course is to be completed. The project is introduced early in the semester and is related to the design of a water distribution, stormwater collection, and/or wastewater collection system and

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<sup>2</sup>Legitimate reasons include: Academically-related extracurricular activities (ASCE, AGU, etc.); Illness with documentation; Federal Family Leave Act Policies; Orders to activate (Military, Peace Officer, Public Health, etc.). Bring me some kind of documentation for such absences.

<sup>3</sup>Legibility, correct method, and correct answer are substantial components of grading criteria. The grader will not diagnose sources of arithmetic or algebra errors unless the errors are obvious. Solutions are reviewed in class and posted on the server

<sup>4</sup>Regular binder paper is not acceptable — use engineering paper.

<sup>5</sup>The use of a LMS (Learning Management System) is an experiment this semester. The LMS is accessed through the course server. If the LMS is not working, then assignments are due by midnight on the due date. Late assignments are not accepted.

accompanying appurtenances. There are two "reports" on the schedule: RP-1, and RP-2. The reports are to be constructed as a team activity (teams will be selected in the first two weeks of the semester).

## **Presentations**

An engineering presentation is to be completed and presented to the class for peer evaluation. The topic is the same as in RP-2. The report is due by each team on the day of presentation.

## **Exams:**

Two examinations will be given, they will be of approximately equal difficulty.

1. Examinations are open notes.
2. Examinations are comprehensive, even though the main focus will be the materials discussed prior to the examination.
3. Full credit for problems will only be given if all computations are documented.
4. Examination dates are shown in Table ??.

## **Grading:**

Final grades are determined based on performance during the semester. Letter grades will be assigned using University standards. The **approximate** weighting of graded material in determining the final grade is as follows<sup>6</sup>

Item	Percent of Grade
Attendance and Participation	5%
Project Presentation	5%
Project Report-1	10%
Project Report-2	10%
Exercises	20%
Mid-Term Exam	25%
Final Exam	25%

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<sup>6</sup>Graded materials with fewer than 100 points will have raw scores recorded and will be normalized to 100 points for calculating the final grade.

## Schedule

DATE	TOPIC	READINGS	DUE
28 Aug 18	Introduction	Lesson-1	
30 Aug 18	Design Manuals	Lesson-2	
04 Sep 18	Pressure Pipe Hydraulics	Lesson-3	ES-1
06 Sep 18	Pumps and System Curves	Lesson-4	ES-2
11 Sep 18	Storage Tanks	Lesson-5	ES-3
13 Sep 18	Pipe Networks	Lesson-6	ES-4
18 Sep 18	Network Analysis with Pump (Excel Assisted)	Lesson-7	ES-5
20 Sep 18	Estimating Demand	Lesson-8	ES-6
25 Sep 18	EPANET Introduction	Lesson-9	ES-7
27 Sep 18	EPANET Examples	Lesson-10	ES-8
02 Oct 18	Mid-Term Exam		
04 Oct 18	Open Channels (Normal Flow)	Lesson-11	
09 Oct 18	Open Channels (Gradually Varied Flow)	Lesson-12	
11 Oct 18	SWMM Introduction	Lesson-13	ES-9
16 Oct 18	SWMM Examples	Lesson-14	ES-10
18 Oct 18	Hydrology - IDF For Preliminary Design	Lesson-15	ES-11
23 Oct 18	Inlet Hydraulics	Lesson-16	RP-1
25 Oct 18	By-Hand Rational Design	Lesson-17	ES-12
30 Oct 18	Goodwin Street Example	Lesson-18	ES-13
01 Nov 18	Tanglewilde Example	Lesson-19	
06 Nov 18	Hydrology - Design Storms	Lesson-20	
08 Nov 18	Hydraulic Check using SWMM	Lesson-21	
13 Nov 18	Dual Drainage Systems in SWMM	Lesson-22	
15 Nov 18	Detention Ponds	Lesson-23	
20 Nov 18	Green-Infrastructure	Lesson-24	ES-14
22 Nov 18	Thanksgiving Holiday		
27 Nov 18	Outfall Considerations	Lesson-25	ES-15
29 Nov 18	Self-Study		
04 Dec 18	Review		RP-2
07 Dec 18	Final Exam (Sec 002)(07:30-10:00)		
12 Dec 18	Final Exam (Sec 001)(19:30-22:00)		

## References

- Chin, D. (2006). *Water Resources Engineering, 2 ed.* Prentice Hall, Inc.
- Mays, L. W. (2011). *Water-Resources Engineering.* Wiley.
- Wurbs, R.A., and James, W. P. (2002). *Water Resources Engineering* Prentice Hall; pp.130-156; and 156-198.
- NCEES (2008). *Fundamentals of Engineering Supplied Reference Handbook* (8th ed.). 280 Seneca Creek Road, Clemson, SC 29631: National Council of Examiners for Engineering and Surveying ISBN 978-1-932613-37-7.
- Roberson, J. A., Cassidy, J. J., and Chaudry, M. H. (1988). *Hydraulic Engineering.* Houghton Mifflin.
- Rossman, L. (2000). EPANET 2 users manual. Technical Report EPA/600/R-00/057, U.S. Environmental Protection Agency, National Risk Management Research Laboratory Cincinnati, OH 45268.
- Rossman, L. (2009). Storm Water Management Model user's manual version 5.0. Technical Report EPA/600/R-05/040, U.S. Environmental Protection Agency, National Risk Management Research Laboratory Cincinnati, OH 45268.
- UNESCO (2005). Water Resources Systems Planning and Management. ISBN 92-3-103998-9
- Pieter van der Zaag and Hubert H.G. Savenije (2014). Principles of Integrated Water Resources Management UNESCO-IHE October 2014

## University Policies

Policies stated in this section override any policies in the course specific policies section above.

These University Operating Policies are provided as directed and cover institutionally required information including: ADA Statement, Academic Integrity, Religious Holy Day Statement.

Additionally the institutionally suggested statements are also included in the syllabus. These statements cover topics related to discrimination, civility, and diversity.

The University ADA Policy is presented verbatim – students requesting accommodations must do so using the procedures defined in the policy.