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:	`theodore.cleveland@ttu.edu`
Web:	`http://54.243.252.9/ce-5366-webroot/`
Textbook(s) :	
	Water Resources Systems Planning and Management (WRPM) (UNESCO, 2005)
	Principles of Integrated Water Resources Management (IWRM) (UNESCO-IHE, 2014)
Copyright :	

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:[1]

- `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.

[1] 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[2].

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)[3].

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[4]; 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.[5]
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

[2]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.

[3]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

[4]Regular binder paper is not acceptable — use engineering paper.

[5]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[6]

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%

[6]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
01JUL24	Water Resources Planning and Management	WRPM(pp.3-39) IWRM(pp.1-26)
02JUL24	Decision Making and Uncertainty	WRPM(pp.231-254)
03JUL24	Economics as Decision Support Structure	James and Lee (1971)
04JUL24	Independence Day (US Holiday)	
05JUL24	Simulation Modeling for Decision Support	WRPM(pp.59-80)
08JUL24	Optimization Modeling for Decision Support	WRPM(pp.81-134)
09JUL24	Merit (Objective) Functions	WRPM(pp.293-308)
10JUL24	Estimating Demand	Self-Study
11JUL24	EPANET Introduction	Self-Study
12JUL24	EPANET Examples	Self-Study
15JUL24	Open Channels (Normal Flow)	Lesson-11
16JUL24	Open Channels (Gradually Varied Flow)	Lesson-12
17JUL24	SWMM Introduction	Lesson-13 9
18JUL24	SWMM Examples	Lesson-14
19JUL24	Hydrology - IDF For Preliminary Design	Lesson-15
22JUL24	Inlet Hydraulics	Lesson-16
23JUL24	By-Hand Rational Design	Lesson-17
24JUL24	Goodwin Street Example	Lesson-18
25JUL24	Tanglewilde Example	Lesson-19
26JUL24	Hydrology - Design Storms	Lesson-20
29JUL24	Hydraulic Check using SWMM	Lesson-21
30JUL24	Dual Drainage Systems in SWMM	Lesson-22
31JUL24	Detention Ponds	Lesson-23

References

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

James L.D. and Lee R.L. (1971) Economics of Water Resources Planning McGraw-Hill ISBN 79-115146

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.