CIVE 580-A9 – Methods of Sustainable Water Supply
Spring 2014

Instructor: Dr. Ryan Bailey
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Office location: A209 Engineering Building
Office hours: T-Th 12:00 – 1:00

Class Time: T-Th 3:30 – 4:45 pm
Class Location: Engineering B4

Class Website: https://ramct.colostate.edu/ The RamCT website will be used to post reading assignments, homework assignments, additional instructional material, etc. Other course announcements will be communicated via e-mail.

Course Description:
Methods for designing sustainable water supply systems, with emphasis on systems in developing countries; water use policy and the effects of climate change on water systems; design problems and analysis.

Course Objectives:
Upon completion of this course you will be able to:

- Understand the issues governing sustainability of water systems, for various climatic and demographic regions world-wide
- Use hydrologic and demographic principles and methods to estimate current and future water supply and demand
- Design Gravity Flow Water Supply systems for branched systems and looped (network) systems, using hand calculations *and* water distribution models
- Incorporate principles of sustainability, hydraulic design, climate change, and cost analysis to design sustainable water systems in various climatic and demographic regions world-wide

Academic Integrity: This course adheres to the CSU academic integrity policy (p. 7 in general catalog) and the student conduct code. All course submissions must be entirely your own individual work, but discussion with others is allowed.

Textbooks:

**Community Water, Community Management: From System to Service in Rural Areas* (Required Text)
Tom Schouten and Patrick Moriarty, 2003

A Handbook of Gravity-Flow Water Systems
Thomas D. Jordan Jnr., 1980

Rainwater Catchment Systems for Domestic Supply: Design, construction and implementation
John Gould and Erik Nissen-Petersen, 1999

Developing Groundwater: A Guide for Rural Water Supply
Alan MacDonald, Jeff Davies, Roger Calow, and John Chilton, 2005

Small-Scale Water Supply: A Review of Technologies
Brian Skinner, 2003

Water Distribution Systems Handbook
Larry W. Mays, 2000

Water Distribution Systems
Edited by Dragan Savic and John Banyard, 2011

Reading Assignments: Reading assignments will be assigned to complement lectures.

Homework Assignments: Due at the start of class on the due date. Late homework is not accepted. Solutions are posted on the website after due date. Show your work and explain your results.

Exams: Midterm exam is given during the class period. Final exam is given during the scheduled final exam period. Reference to books and notes is allowed for both exams.

Semester Design Project: All design principles discussed throughout the semester will be applied in a Water Supply Design project, to be completed during the final third of the course. More information will be given during the course of the semester.

Course Grading:
The grading breakdown is as follows:

- Classroom Participation 5%
- Homework 30%
- Design Project 25%
- Midterm Exam 20%
- Final Exam 20%

Term grades for this course will use the ± grading system as described in the CSU catalog. Grades will be assigned according to the following ranges:

90 – 100% A	80 – 89% B	70 – 79% C
60 – 69% D	< 60% F	

*Daily topics may change at the discretion of the instructor

Lecture	Date	Day of Week	Section	Topic	Home work	Lecture due
1	21-Jan	Tue	Water System Sustainability	Course Introduction / Problem State,emt	HW 1	2
2	23-Jan	Thur		History of Water Systems / Current Water Systems	HW 2	3
3	28-Jan	Tue		Sustainability of Water Systems	HW 3	4
4	30-Jan	Thur		Sustainability of a Water System / Overview of System		
5	4-Feb	Tue	Site Survey	Feasibility Study / Water Demand		
6	6-Feb	Thur	Water System Supply	Supply: Water Sources	HW 4	8
7	11-Feb	Tue		Rainwater Harvesting		
8	13-Feb	Thur		Rainwater Harvesting	HW 5	10
9	18-Feb	Tue		Groundwater: Theory and Reconaissance		
10	20-Feb	Thur		Groundwater Supply	HW 6	12
11	25-Feb	Tue		Springs / Surface Water / Technologies		
12	27-Feb	Thur	Water Distribution Hydraulics	Water System Components and Design	HW 7	14
13	4-Mar	Tue		Water Distribution Hydraulics: Basic principles		
14	6-Mar	Thur		Water Distribution Hydraulics: Pipe layout design	HW 8	15
-	**11-Mar**	**Tue**		**Mid-Term Exam**		
15	13-Mar	Thur		Water Distribution Hydraulics: Special Topics	HW 9	17
-	**18-Mar**	**Tue**		**Spring Break**		
-	**20-Mar**	**Thur**		**Spring Break**		
16	25-Mar	Tue		Water Distribution Hydraulics: Air Blocks and Water Hammer		
17	27-Mar	Thur		Pipe System Installation	HW 10	19
18	1-Apr	Tue	System Considerations	Water Treatment / Domestic Waste Water		
19	3-Apr	Thur		Finances and Economics of a Water System	HW 11	21
20	8-Apr	Tue	Water Distribution Modeling	Network Modeling: Introduction	HW 12	21
21	10-Apr	Thur		Network Modeling: EPANET	HW 13	23
22	15-Apr	Tue		Network Modeling: EPANET		
23	17-Apr	Thur	Climate Change	Climate: Historical Context, Patterns	HW 14	25
24	22-Apr	Tue		Climate: Global Circulation Models		
25	24-Apr	Thur	Real-World Applications	Recap of System Design / Special Topics	HW 15	27
26	29-Apr	Tue		Regional Applications		
27	1-May	Thur		Regional Applications		
28	6-May	Tue		Presentation of Design Projects		
29	8-May	Thur		Presentation of Design Projects		
	13-May	**Tue**		**Final Exam: 9:40-11:40 am**		