

ORIGINATOR'S SECTION:	
1. College: <input type="checkbox"/> CHABSS <input checked="" type="checkbox"/> CoBA <input type="checkbox"/> CoEHHS <input type="checkbox"/> CSM	Desired Term and Year of Implementation (e.g., Fall 2008): Summer 2017
2. Current Course abbreviation and Number: WTRM 425 <i>Core Concepts of Water Science, Engineering and Technology for Water Managers</i>	

TYPE OF CHANGE(S). Check ☒ all that apply.

Course Number Change	<input type="checkbox"/>	Delete Prerequisite	<input type="checkbox"/>	Other Prerequisite Change	<input type="checkbox"/>
Course Title Change	<input type="checkbox"/>	Add Corequisite	<input type="checkbox"/>	Grading Method Change	<input type="checkbox"/>
Unit Value Change	<input type="checkbox"/>	Delete Corequisite	<input type="checkbox"/>	Mode of Instruction Change (C/S Number)	<input type="checkbox"/>
Description Change	<input checked="" type="checkbox"/>	Add Consent for Enrollment	<input type="checkbox"/>	Consider for G.E. If yes, also fill out appropriate GE form.	<input type="checkbox"/>
Add Prerequisite	<input type="checkbox"/>	Delete Consent for Enrollment	<input type="checkbox"/>	Cross-list	<input type="checkbox"/>

Information in this section-- both current and new -- is required only for items checked (✓) above.

NEW INFORMATION:**CURRENT INFORMATION:**

3. Title:			Course abbreviation and Number:		
			Title: (Titles using jargon, slang, copyrighted names, trade names, or any non-essential punctuation may not be used.)		
4. Abbreviated Title for Banner (no more than 25 characters):			Abbreviated Title for PeopleSoft: (no more than 25 characters, including spaces)		
5. Number of Units:			Number of Units:		
6. Catalog Description: Examines water science and engineering technology from the molecular level through the macro treatment and distribution scale of a functioning water treatment and delivery system. Examines the properties of a water molecule, where water supplies come from, how it becomes contaminated, how the polluted water is treated, and then distributed to the end user, and then recovered and recycled during wastewater treatment. Covers issues and key concepts that guide professional scientists and engineers in water/wastewater system operation.			Catalog Description: Introduces concepts and terminology relevant to management of water supply and quality. Examines fundamental hydrologic, geohydrologic, and engineering concepts and methods associated with decisions for efficient water management.		
7. Mode of Instruction* (See pages 17-23 at http://www.calstate.edu/cim/data-elem-dict/APDB-Transaction-DEFD-SectionV.pdf for Definitions of the Course Classification Numbers)					
Type of Instruction	Number of Credit Units	Instructional Mode (Course Classification Number)	Type of Instruction	Number of Credit Units	Instructional Mode (Course Classification Number)
Lecture			Lecture		
Activity			Activity		
Lab			Lab		
8. Grading Method:*			Grading Method:*		

*If Originator is uncertain of this entry, please consult with Program Director/Chair

CURRENT INFORMATION:

- ☐ Normal (N) (Allows Letter Grade +/-, and Credit/No Credit)
☐ Normal Plus Report-in-Progress (NP) (Allows Letter Grade +/-, Credit/No Credit, and Report-in-Progress)
☐ Credit/No Credit Only (C)
☐ Credit/No Credit or Report-in-Progress Only (CP)

NEW INFORMATION:

- ☐ Normal (N) (Allows Letter Grade +/-, and Credit/No Credit)
☐ Normal Plus Report-in-Progress (NP) (Allows Letter Grade +/-, Credit/No Credit, and Report-in-Progress)
☐ Credit/No Credit Only (C)
☐ Credit/No Credit or Report-in-Progress Only (CP)

9. If the NP or CP grading system was selected, please explain the need for this grade option.

10. Course Requires Consent for Enrollment?

- ☐ Yes ☐ No
☐ Faculty ☐ Credential Analyst ☐ Dean
☐ Program/Department/Director/Chair

Course Requires Consent for Enrollment?

- ☐ Yes ☐ No
☐ Faculty ☐ Credential Analyst ☐ Dean
☐ Program/Department/Director/Chair

11. Course Can be Taken for Credit More than Once?

- ☐ Yes ☐ No
 If yes, how many times (including first offering)

Course Can be Taken for Credit More than Once?

- ☐ Yes ☐ No
 If yes, how many times (including first offering)

12. Is Course Cross Listed? ☐ Yes ☐ No

If yes, indicate which course

Is Course Cross-listed? ☐ Yes ☐ No

If yes, indicate which course and check "yes" in item #17 below.

13. Prerequisite(s):

Prerequisite(s):

14. Corequisite(s):

Corequisite(s):

15. Documentation attached:

- ☒ Syllabus ☐ Detailed Course Outline

PROGRAM DIRECTOR/CHAIR - COLLEGE CURRICULUM COMMITTEE SECTION:

(Mandatory information - all items in this section must be completed.)

16. Does this course fulfill a requirement for any major (i.e. core course or elective for a major, majors in other departments, minors in other departments)? ☐ Yes ☐ No

If yes, please specify:

17. Does this course change impact other discipline(s)? (If there is any uncertainty as to whether a particular discipline is affected, check "yes" and obtain signature.) Check "yes" if the course is cross-listed. ☐ Yes ☐ No
 If yes, obtain signature(s). Any objections should be stated in writing and attached to this form.

Physics

Discipline

Signature

Date

☒ Support ☐ Oppose

Discipline

Signature

Date

☐ Support ☐ Oppose

18. Reason(s) for changing this course:

Following up on agreement to consult with Physics over course description and content made during original UCC Senate approval in May 2016.

SIGNATURES : (COLLEGE LEVEL) :

1. Originator (Please Print) PS 3-9-17
 2. Program Director/Chair PS 3-9-17
 3. College Curriculum Committee PS 3-30-17
 4. College Dean (or Designee) PS 4/3/17

(UNIVERSITY LEVEL)

5. UCC Committee Chair _____ Date _____
 6. Vice President for Academic Affairs (or Designee) _____ Date _____
 7. President (or Designee) _____ Date _____

Tracey Brown

From: Tracey Brown
Sent: Tuesday, March 14, 2017 3:22 PM
To: Robert Aboolian; Fang Fang; Catalin Ratiu; Ted Shore; Qi Sun; Syed Zaidi; Kristin Stewart
Cc: Mohammad Oskoorouchi; Jeff Green; Whitney Worley; Alan Styles
Subject: RE: WTRM 425
Attachments: WTRM 425_revised_syllabus_highlights.docx; Original_proposed_WTRM_425_syllabus.pdf

Hello,

Ok, found the original syllabus and have attached both it and the revised one. There were many minor changes throughout that I did not highlight (such as conforming to the writing requirement statement etc., differences in point breakdown). What I did highlight was the description, learning outcomes and the topic details. If you compare the two you will see there are many places where changes were made to indicate that the course includes only enough physical science to help the students understand the water management aspects. The previous syllabus and descriptions were much more heavy on the molecular and chemical makeup of water and some fluid dynamics and engineering, which were the aspects that Physics were concerned with. I believe the revised syllabus is a much better representation of what actually is to be taught in the course.

Let me know if you need any further information.

Tracey

Dr. Tracey K. Brown

Tracey K. Brown, Ph.D.
Professor, Dept. of Biological Sciences
Interim Director, Water Management & Leadership Certificate Program
California State University, San Marcos
San Marcos, California 92096
(760) 750-8017 traceyb@csusm.edu

From: Robert Aboolian
Sent: Monday, March 13, 2017 3:47 PM
To: Tracey Brown <traceyb@csusm.edu>; Fang Fang <fangfang@csusm.edu>; Catalin Ratiu <cratiu@csusm.edu>; Ted Shore <tshore@csusm.edu>; Qi Sun <qsun@csusm.edu>; Syed Zaidi <szaidi@csusm.edu>; Kristin Stewart <kstewart@csusm.edu>
Cc: Mohammad Oskoorouchi <moskooro@csusm.edu>; Jeff Green <jegreen@csusm.edu>; Whitney Worley <wworley@csusm.edu>; Alan Styles <astyles@csusm.edu>
Subject: Re: WTRM 425

Hi Tracy,

I think it would help if you could send the original syllabus and highlighting the changes made to it. I think UCC would ask for it eventually.

Best,
Robert

~~~~~  
*Robert Aboolian, Ph.D.*

Professor & Chair, Department of Operations and Supply Chain Management

College of Business Administration

California State University San Marcos

333 S Twin Oaks Valley Rd.

San Marcos, California 92096-0001

Phone: (760)750-4221

E-mail: [raboolia@csusm.edu](mailto:raboolia@csusm.edu)

URL: <http://www.csusm.edu/aboolian>  
~~~~~

From: Tracey Brown <traceyb@csusm.edu>

Date: Monday, March 13, 2017 at 7:07 AM

To: Fang Fang <fangfang@csusm.edu>, Catalin Ratiu <cratiu@csusm.edu>, Ted Shore <tshore@csusm.edu>, Qi Sun <qsun@csusm.edu>, Syed Zaidi <szaidi@csusm.edu>, Kristin Stewart <kstewart@csusm.edu>, Robert Aboolian <raboolia@csusm.edu>

Cc: Mohammad Oskoorouchi <moskooro@csusm.edu>, Jeff Green <jegreen@csusm.edu>, Whitney Worley <wworley@csusm.edu>, Alan Styles <astyles@csusm.edu>

Subject: WTRM 425

Hi Fang Fang,

I am helping Alan with the Water Program while he is on sabbatical and can help answer your questions. The original course description presented to Senate last May was written prior to the class being taught and from what I understand Physics had some concerns that the description and some of the contents was too much in the general physics realm. They agreed to approve the course with the caveat that WTRM would work with Physics to review the description and content. The new description and syllabus (I attached the revised syllabus we sent with the C2 form) are the product of several conversations that occurred over the past few months between Michael Burin (chair of Physics) and Lee Brown (former WTRM program coordinator and instructor of the course). Together they settled on language that indicates WTRM 425 covers just the basic knowledge needed by water managers to understand various aspects of water. While the wording is different, the actual changes aren't that large but more a refining of the description and topics. The refinement also better reflects what is being now taught in the class.

Does this help? I can put more of this description in the reason for change box on the C2 form, I just wasn't sure how lengthy I could get there.

Happy to answer any further questions!

Cheers,

Tracey

Tracey K. Brown, Ph.D.

Professor, Dept. of Biological Sciences

Interim Director, Water Management & Leadership Certificate Program

California State University, San Marcos

San Marcos, California 92096

(760) 750-8017 traceyb@csusm.edu

**College of Business Administration and Extended Learning
California State University - San Marcos
Summer 2017**

MODULE 4 ~ Core Concepts of Water Science, Engineering, & Technology for Water Managers

Course Leaders: John Adrianany and Charlie Wyatt
Class Room: TBA
Class Meeting Time: Wednesday, 6:00pm – 8:50pm, 8JUN2017 to 10AUG2017
Office: Markstein Hall, Room 435
Office Hours: Thurs 5:30 pm to 6:00 pm, and by appointment
Phone: (760) 859.6668
E-mail: cwyattpg1965@gmail.com; john.adrianany@yahoo.com; lbrown@csusm.edu

COURSE DESCRIPTION:

Module 4 Core Concepts of Water Science Engineering, & Technology for Water Managers

Water resource management is, by its very nature, a complex enterprise driven by scientific and engineering principles. No one manager could be familiar with the frontier of hydrology, geohydrology research, numerical modeling for flood control, and distributions systems analysis, or technology involved in plant operations and water quality protection. What Module 4 does do, however, is to select the key foundational concepts used in modern water science and engineering; and discuss their bearing on technology and water system logic with certificate participants. This courses draws heavily on experts in these fields and may involved field trips.

COURSE STUDENT LEARNING OBJECTIVES:

General:

This general survey will require the student to demonstrate understanding of water science and engineering technology from the molecular level through the macro treatment and distribution scale of a functioning water treatment system. The student will demonstrate understanding of the defining and unique properties of a water molecule, where water supplies comes from, how it becomes contaminated and how the polluted water is treated and distributed to the end user. The student will understand and define the issues and key concepts that guide professional scientists and engineers in water / wastewater system operation.

Specific:

- Learn the fundamental molecular property of water and its structure, angle between atoms, and how the structure subsequently defines water pollution issues and treatment options / effectiveness.
- Identify and state the differences between chemical, biological and physical contaminants in water as well as define the difference between point source and non-point sources of pollution.
- Understand and discuss the sources of and threats to California's water supply including ground and surface water, river and ocean.
- Understand the basic scientific concepts of hydrology, fluid dynamics, and electricity and how engineers are guided and bound by these fundamental laws when designing and managing a system.
- Identify and discuss the components of a water supply distribution system and a waste water treatment system.
- Identify the different treatment / filtration alternatives as well as major types of components (tanks, pumps, mixers etc.) used in water treatment technology and define how they are dependent on the chemical / physical contaminants and treatment targets.
- Understand and discuss the power water nexus: how power/energy issues affect supply and distribution construction and operation.

- Survey various modeling and information system software available to engineers for predictive and estimation purposes. Review the prominence and use of real time system control and data acquisition systems (SCADA).
- Define the agency engineering staff core competency (design, program management, maintenance, etc.) and compare and contrast that to the roles of outside consulting companies.
- Discuss and evaluate emergent trends in water reuse, future contaminants of concern and profile technology trends and how to conduct benefit analysis.

COURSE MATERIALS AND OTHER REQUIRED MATERIALS:

Required:

TBD

Additional Required Resources:

The instructor will post class materials and grades on the Cougar Courses site for the course accessible ONLY to students enrolled in this course. You are expected to access this website on a regular basis. ***You MUST have access to a reliable Internet connection and computer for this course.***

Additional Readings:

The course instructor may post articles from professional journals or other material to the Cougar Courses site that will be referred to during this course.

PREREQUISITES:

Enrollment within the Certificate of Water Resources Management & Leadership Program or permission of instructor.

STUDENTS WITH DISABILITIES:

Students with disabilities who require academic accommodations must be approved for services by providing appropriate and recent documentation to the Office of Disabled Student Services (DSS). This office is located in Craven Hall 4300, and can be contacted by phone at (760) 750-4905, or TDD (760) 750-4909. Students authorized by DSS to receive accommodations should meet with me during my office hours or in a more private setting in order to ensure your confidentiality.

CONDUCT OF CLASS:

This class will utilize a mixture of lecture, in-class discussions, online formats and guest speakers for coverage of topics. Success in this class will require active learning by students and professors. Keeping current with assigned reading and class participation are required components of this course. Participation extends beyond class attendance to include asking questions (in and out of class), involvement in class discussions and identifying current examples relevant to the course subject matter.

Students are expected to act in a professional manner at all times during class. You are expected to be familiar with the University Code of Conduct (http://www.csusm.edu/academic_programs/catalog/).

ALL CELL/DIGITAL PHONES, PAGERS, PDA'S, LAPTOPS OR OTHER ELECTRONIC EQUIPMENT MUST BE TURNED OFF BEFORE ENTERING THE CLASSROOM. If your phone, pager or PDA rings or vibrates during class you will be asked to leave the classroom and we reserve the right not to allow you to return for the remainder of the class.

No recording of the class (or broadcast in any form) allowed without prior written permission of the instructors.

No food should be eaten during class.

GRADING:

Your final grade in this course will be determined based on the following:

Final Examination	30%
Midterm Examination	25%
Assignments and homework	25%
Quizzes	<u>20%</u>
Total	<u>100%</u>

Grade of

A	90-100%
B+	86-89%
B	80-85%
C+	76-79%
C	70-75%
D	60-69%
F	< 60%

ASSIGNMENTS:

Students will complete a 300-500 word paper for each assignment on a selected topic covered in the class. Each paper will require students to illustrate their understanding of the topics.

REPORTING OF GRADES:

Students can access their personal grade during the course at the Cougar Courses site for this course. We will not provide scores for any assignment, exam, or quiz via the telephone or e-mail. Please present all questions regarding grading of an assignment or examination in writing for our review no later than two weeks after the assignment/examination was due.

ACADEMIC DISHONESTY:

All students are expected to be academically honest. Reasonable efforts will be taken to discourage cheating. Please refer to the University Code of Conduct and Code of Academic Honesty. Any student violating the Code of Conduct and/or Code of Academic Honesty will be reported to the Office of the Dean of Students and the instructor will request the most severe sanctions available to the Dean of Students. Pay particular attention to plagiarism and unauthorized co-operation with other students when completing class assignments. It is your responsibility to be aware of the Code of Conduct and Code of Academic Honesty and understand clearly what constitutes violations such as plagiarism – ignorance is not an excuse! If you have any questions on academic honesty issues in this course, do not hesitate to contact me.

TENTATIVE CLASS SCHEDULE:

Class	Topic	Reading	Assignment
June 8	Discuss the fundamental molecular structure of water. Explore water's fundamental properties and how it is unique in nature. Review what pollution is and define toxicity and how pollution impacts terrestrial and aquatic life.	Selected material on Cougar Website	Write a 250 to 500 word report relating to a fundamental water pollution issue in California.
June 15	Discuss chemical, biological, and physical water pollution. Learn the differences between these pollution types. Identify sources of anthropogenic and natural contaminants. Discuss point source and non-point source pollution. Identify the primary treatment technologies (adsorption, chemical, filtration, etc.) for water pollution and fundamental process involved in removing pollution from water and wastewater.	Selected material on Cougar Website	Use last week's topic and write a 250 to 500 paper to define the type of pollution and typical treatment alternatives.
June 22	Identify sources of California's groundwater and surface water supply and associated pollution threats. Discuss water quality standards established by regulatory agencies and the science of establishing toxicity standards in human and terrestrial populations.	Selected material on Cougar Website	Write a 250-500 word paper on a water pollutant and identify the pollution standard and typical treatment alternatives for removing the pollutant from drinking water.
June 29	Survey fundamental engineering principles behind water flow; gravity, continuity, energy and momentum. Define Darcy's Law and Bernoulli's Principle and what it means to water flow. Discuss how water is moved to where it is needed inclusive of both gravity and pumped systems. Basics of pumps, types, principles, selection process, power requirements.	Selected material on Cougar Website	Write a 250-500 word paper on a component in a water or waste water treatment system.
July 6	Identify and discuss the individual components of both a water treatment and a wastewater treatment facility, the purpose of each component, considerations for selection of types of treatment options.	Selected material on Cougar Website	Midterm Exam
July 13	Review engineering tools used for running and maintaining water treatment and delivery systems. Engineering evaluation modeling software, predictive software, operation and maintenance programs, real time system control and data acquisition systems (SCADA), life-cycle analysis,	Selected material on Cougar Website	Write a 250-500 word paper on a modeling software or engineering tool (GIS, CAD, etc) used by a local water authority.
July 20	Review engineering department structure and characteristics and core competencies required for rural and urban agencies, water purveyors, and distribution companies. Discuss strategic differences for engineering department in these agencies and how they operate. Discuss use and considerations for use of outside	Selected material on Cougar Website	Write a 1-page paper on a local water or wastewater agency and describe their engineering department focus and core competency.

	consultants/engineering firms. What should your engineer know?		
July 27	Electrical power and water movement and treatment. Efficient energy use. Power system considerations (AC vs DC), mode of operation. Control system application in energy efficiency. Power generation through water movement / waste treatment.	Selected material on Cougar Website	Write a 1-page paper discussing some aspect of how water and power issues are related in California.
Aug 3	Technological design of a non-potable water reuse system and salt water desalination systems Identification of system components, equipment types, required engineering studies, engineering cost analysis and other engineering considerations.	Selected material on Cougar Website	Write a 250 to 500 word paper on a technologic innovation implemented in the water or wastewater treatment/distribution globally.
Aug 10	Discuss how will emergent trends in water reuse, future chemical contaminants of concern, and climate change impact water/wastewater utilities in the future. How to build a resilient engineering team to address these future concerns.	Selected material on Cougar Website	Final

**College of Business Administration and Extended Learning
California State University - San Marcos**

WTRM 425 ~ Core Concepts of Water Science, Engineering, & Technology for Water Managers

Course Leader: Lee Brown, *Ph.D.*, Charlie Wyatt *P.E.*
Class Room: Markstein Hall 103
Class Meeting Time: Wednesday, 6:00pm - 8:50pm, 7JUN2017 to 9AUG2017
Office: Markstein Hall, Room 435
Office Hours: Wednesday 5:30 pm - 6:00 pm, and/or by appointment
Phone: Brown: 760.304.4291; Wyatt: 760. 859.6668
E-mail: cwyattpgh1965@gmail.com or lbrown@csusm.edu

COURSE DESCRIPTION:

Introduces concepts and terminology relevant to management of water supply and quality. Examines fundamental hydrologic, geohydrologic, and engineering concepts and methods associated with decisions for efficient water management.

COURSE STUDENT LEARNING OBJECTIVES:

General:

WTRM 425 will enable participants to discuss the foundational concepts and methods of disciplines involved in water science and applied engineering. Drawing from key ideas found not only in hydrology, geohydrology, climatology and civil engineering, the course will also incorporate relevant aspects from the social and behavioral sciences as they pertain to contemporary challenges in regional water quality and supply.

Specific:

- Review the major differences between water engineering and hydrology;
- Learn the fundamental assumptions and limits of the scientific method with respect to water science;
- Examine key concepts of surface and subsurface hydrology;
- Be able to discuss the fundamentals of survey research design and aggregate data analysis as it applies to validity and reliability in water resources management;
- Understand the basics of isomorphic digital models and their application to water resource management;
- Identify the differences between the major categories of water contaminants;
- Understand field and laboratory techniques for compliance with governmental water standards;
- Be able to identify key components of a water supply distribution facility;
- Review specific challenges in contemporary integrated reservoir management
- Be able to identify alternative methods commonly used by water treatment facilities;
- Discuss the power water nexus in southern California water supply.
- Review commonly adopted modeling and information software used for predictive and estimation purposes.
- Define an agency's core competency for engineers and contrast with outside consulting companies.

COURSE MATERIALS AND OTHER REQUIRED MATERIALS:

Required:

Selected passages from faculty authored texts and articles; pertinent publications of aquatic associations and organizations; notable case studies.

Additional Required Resources:

Instructors will post class materials and grades on the Cougar Courses site for the course accessible ONLY to students enrolled in this course. You are expected to access this website on a regular basis. ***You MUST have access to a reliable Internet connection and computer for this course.***

Additional Readings:

Instructors may post articles from professional journals or other material to the Cougar Courses site that will be referred to during this course.

PREREQUISITES:

WTRM 401 or MGMT 482-4

STUDENTS WITH DISABILITIES:

Students with disabilities who require academic accommodations must be approved for services by providing appropriate and recent documentation to the Office of Disabled Student Services (DSS). This office is located in Craven Hall 4300, and can be contacted by phone at (760) 750-4905, or TDD (760) 750-4909. Students authorized by DSS to receive accommodations should meet with me during my office hours or in a more private setting in order to ensure your confidentiality.

CONDUCT OF CLASS:

This class will utilize a mixture of lecture, in-class discussions, online formats and guest speakers for coverage of topics. Success in this class will require active learning by students and professors. Keeping current with assigned reading and class participation are required components of this course. Participation extends beyond class attendance to include asking questions (in and out of class), involvement in class discussions and identifying current examples relevant to the course subject matter.

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No recording of the class (or broadcast in any form) allowed without prior written permission of the instructors.

GRADING:

A class presentation	10%
Midterm Examination	40%
Final Examination	40%
Participation in class discussions	<u>10%</u>
Total	<u>100%</u>

Grade of

A	90-100%	B+	86-89%	B	80-85%	C+	76-79%
C	70-75%	D	60-69%	F	<60%		

ASSIGNMENTS:

Periodic assignments may occur throughout the term. In addition, each participant will be asked to prepare and share comments about a current water issue. Faculty will assign both topic and date of this presentation and it occurs only once during the term. These assignments, along with the examinations satisfy the All-University Writing Requirement.

EXAMINATIONS:

Two examinations will be administered during the term. Both exams are open-book, open-note, and center upon key concepts discussed during the first half and second half of the course. The first take-home exam is distributed at the end of the 5th meeting and collected at the beginning of the 6th meeting. The second take-home exam is distributed at the end of the 10th meeting and is due no later than 1800 (6:00 p.m.) on the day set aside for the final. Procedures for submission of the second exam will be discussed in class.

REPORTING OF GRADES:

Students can access their personal grade during the course at the Cougar Courses site for this course. We will not provide scores for any assignment, exam, or quiz via the telephone or e-mail. Please present all questions regarding grading of an assignment or examination in writing for our review no later than two weeks after the assignment/examination was due.

ACADEMIC DISHONESTY:

All students are expected to be academically honest. Reasonable efforts will be taken to discourage cheating. Please refer to the University Code of Conduct and Code of Academic Honesty. Any student violating the Code of Conduct and/or Code of Academic Honesty will be reported to the Office of the Dean of Students and the instructor will request the most severe sanctions available to the Dean of Students. Pay particular attention to plagiarism and unauthorized co-operation with other students when completing class assignments. It is your responsibility to be aware of the Code of Conduct and Code of Academic Honesty and understand clearly what constitutes violations such as plagiarism – ignorance is not an excuse. If you have any questions on academic honesty issues in this course, do not hesitate to contact me.

PROPOSED SYLLABUS & SCHEDULE FOR WTRM 425

Class	Topics	Reading	Assignment
June 7	Common differences between hydrology and water engineering. What assumptions comprise a water science, its subfields, tools, and methods? To illustrate highlights of this topic, examples will be drawn from fluvial and aquatic science applications frequently used in the physical, behavioral and social sciences.	Excerpts: <i>Philosophy of Science</i> , Feigl & Brodbeck; <i>Rules & Conflict</i> , Brown; <i>A Great Aridness</i> , deBuy	None
June 14	Core concepts of hydrology I will emphasize surface geomorphology and lotic water bodies. Examples from western rivers with emphasis on the Sacramento, Colorado, and Owens Rivers. Guest speaker from San Diego River Conservancy.	Excerpts: <i>Process Geomorphology</i> , Ritter; <i>Elements of Physical Hydrology</i> , Wiberg; Intro. to Hydrology, Viessman et. al.	Student topic: Sacramento River
June 21	Core concepts of hydrology II takes up lentic water bodies and bio-assessment. Examples from Lake Tahoe, Lake San Marcos, and local bays and estuaries. Guest speaker from SDWQCB	<i>Lentic Benthic Bio-Assessment California</i> , Hayworth;	Student topic: Lake San Marcos

June 28	Core concepts of hydrology III. What is geohydrology? Flow and measurement in different types of aquifers; well water	Excerpts: <i>Hydrologic Assessment Big Wood River</i>	Student topic: Groundwater
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	<p>quality assessment; safe yield and recharge. Examples drawn from Ogallala (Texas); Big Wood River (Idaho); and San Joaquin Valley aquifers. Guest speaker from San Diego County Geohydrologist Office or USGS.</p> <p>Ends Water Science with Summary.</p>	<p><i>Watershed</i>, Brown; <i>Ground Water</i>, Freeze; <i>Ground Water Manual</i>, U.S. Bureau Of Reclamation; <i>Hydrologic Effect of Development Borrego Valley</i>, USGS</p>	<p>in San Diego County</p>
July 5	<p>Controlling nature's impact: Reclamation & Homemaking – the era of large Federal Government dam building.</p> <p>Take Home Concepts Exam distributed</p>	<p>California's Water Storage Investment Program and the Calif. Water Action Plan Update October 2016</p>	<p>Student topic: Dam rise projects in California – what are they, why and where.</p>
July 12	<p>Core concepts of water transportation and energy generation and consumption.</p> <p>Take Home Concepts Exam collected</p>	<p>PPIC Energy and Water, October 2016 http://www.ppic.org/main/publication.asp?i=1212</p>	<p>Student topic: Water treatment options in developing countries</p>
July 19	<p>Where will our water come from in the 21st Century? Discussion of alternatives including microbial nanotechnology, off stream surface storage & groundwater banking, wastewater recycling for potable reuse, desalination, psychological adjusting, efficient reservoir management practices.</p> <p>Guest Lecturer from Orange County Water Authority</p>	<p>The Water Resources Utility of the Future. A Blueprint for Action http://www.quasarenergygroup.com/pages/utilityofthefuture.pdf</p>	<p>Student topic: Provide context - : relevant examples of scale for parts per million, parts per billion, and parts for trillion.</p>
July 26	<p>Key to building a resilient engineering team and when to bring in a consultant. Fundamental considerations in efficient reservoir management.</p>	<p>The difference between winning and succeeding – Ted 2001. https://www.ted.com/talks/john_wooden_on_the_difference_between_winning_and_success</p>	<p>Student topic: What are PFOS and the associated challenges with environmental trade-offs?</p>
August 3	<p>How do new pollutants and external realities (i.e. climate change, environmental justice) impact future water/waste water treatment?</p> <p>2nd Take Home Exam Distributed</p>	<p>California's Future – Public Policy Institute of California http://www.ppic.org/content/pubs/report/R_117BKR.pdf</p>	<p>Student topic: Ice Age</p>
August 10	<p>2nd Take Home Exam Collected</p>		