CE 461 WATER RESOURCES ENGINEERING
Spring 2014
Tuesdays and Thursdays 11:15 am-12:30 pm in 109 Walker Building

INSTRUCTOR: Dr. Alfonso Mejía
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OFFICE HOURS: Dr. Mejia's: TUESDAYS 2:00 pm-3:00 pm, THURSDAYS 4:00 pm-5:00 pm, or by appointment

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OFFICE HOURS: WEDNESDAYS 1 pm-2 pm and FRIDAYS 11 am-12 pm

REQUIRED TEXT: Larry W. Mays, *Water Resources Engineering*, 2nd Edition, John Wiley & Sons, Inc., New York, NY, 2011

Guided notes for this class will be made available through ANGEL.

GRADING:		
	Participation	10% (In-Class Exercises)
	Homework	30%
	Bi-Weekly Quizzes	45%
	Class Project	15%

Final grades will be based on the weighted-average specified above and assigned as follows:

- A = 94-100%
- A- = 90-93%
- B+ = 87-89%
- B = 84-86%
- B- = 80-83%
- C+ = 76-79%
- C = 70-75%
- D = 60-69%
- F < 60%

I reserve the right to adjust your grades. Your grade will only improve if adjustments are necessary. Feel free to contact me during office hours or by appointment if you have grade-related questions or concerns. I will provide regular grade postings to help you keep track of your progress in the course.

COURSE LEARNING OBJECTIVES:
Water Resources Engineering is about solving problems to achieve water security for people, based on a sound scientific understanding of hydrologic and hydraulic processes. Water security for people includes protection from excess water and from water shortage, as well as providing sufficient water for a sustainable environment.

At the end of this class you will:

- be aware of the main water resources issues at local, national, and global scale,
- be able to qualitatively and quantitatively describe the main processes in the hydrologic cycle, and
- be able to provide solutions for typical water resources problems found in practice.

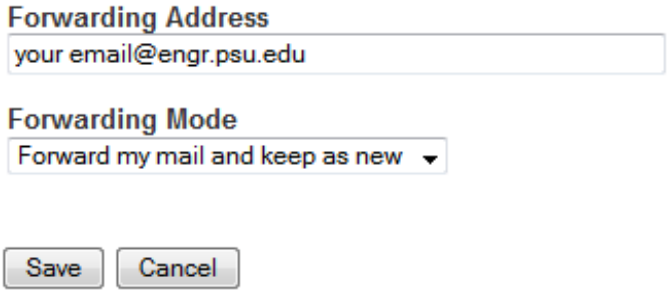
COURSE DESCRIPTION:
This course offers a quantitative introduction to water resources engineering based on a sound background in fluid mechanics applied to understanding hydrologic and hydraulic processes. Hydrologic processes include rainfall, evapotranspiration, infiltration, groundwater flow, surface runoff, and routing. This knowledge is applied to the analysis of the natural water-cycle, human-made water systems including flood and stormwater control, reservoirs, and hydrologic extremes (floods and droughts).

IN-CLASS PARTICIPATION:
Please bring your text, notes, a calculator, a few good pieces of paper, and scrap paper to each class. ***You will be participating in the solution and discussion of in-class exercise problems***. You will work alone or in small groups while solving these problems. Each group will hand in their attempt to solve the problem with each member's signature on the paper. Simply attempting the solution will result in full participation credit for the day. These in-class exercises will require that you **complete the assigned readings** prior to the beginning of each class. ***Note that participation counts for 10% of your grade***. *You are encouraged to keep your notes/materials organized.*

ON-LINE CLASS PARTICIPATION:
All course emails and web postings will be made using the ANGEL course management software. You will need to regularly login (**https://cms.psu.edu/default.asp**) to check course announcements, download in-class example solutions, and access posted homework solutions.

Important: When you 1st login into the system you must configure "My Settings" to forward course emails to your primary email account as follows:

Step 1: Login into system
Step 2: Click "Preferences"
Step 3: Click "System Settings"
Step 4: Type your PSU Email under "Forwarding Address" and set "Forwarding Mode" as shown below:



Step 5: Click "Save". You now should receive all course announcements in your primary email account as well as your ANGEL account.

HOMEWORK:
Homework will be assigned bi-weekly and is due at the **beginning of class** on the Thursday of the subsequent week. Late homework **will not** be accepted. Feel free to work on the assignments in groups of 2 or 3. If you are working as a group, **each group member needs to submit a homework**.

Each assignment requires:

- Your name(s) on each page of **stapled** solutions.
- A legible step-by-step presentation (**in pencil**) of the solutions (**include problem diagrams**).
- Boxed answers presented in proper units.

Solutions will be made available after your assignments have been collected.

CLASS PROJECT:
You will work in groups of three for the class project. The project will involve working with computer tools (e.g., GIS, HEC-GeoHMS, and HEC-HMS) to perform analysis and modeling tasks. **The central goal with the class project is for you to gain familiarity with tools commonly used in water resources engineering**. We will meet a few times in the semester in the CAD lab; the TA will lead these meetings. More details on the project content and requirements will be provided during the semester. You will need to complete and submit two assignments as part of the class project.

QUIZZES:
This class has no mid-term or final exams. Quizzes will be given in class on the dates listed below (every 2 weeks). Make-up quizzes will not be given. In extreme cases, a quiz grade will be replaced by the average of your grades on the remaining quizzes (proof of illness or emergency will be required). For quizzes, you must work in pencil. You are allowed to bring in a calculator (in most cases the simplest of calculators will suffice), but *no other cell phones, blackberries or any other electronics will be allowed*. The quiz will include questions based on the reading material (Mays), the in-class lecture discussions as well as the posted lecture notes. **You will not be able to get the maximum number of points without having read the relevant chapters in Mays!**

EXTRA CREDIT:

(1) This course introduces you to the importance of water resources engineering. I will increase your score on each homework assignment by 10% of the total points possible, if you find examples in newspapers, magazines, or the internet of real-world problems where the topics covered in this course play a vital role. Submit a 1-paragraph (<300 words), well written synopsis that provides:
   - A summary of the problem (in your own words).
   - A brief discussion of how the problem relates to this class (what principles covered in class are important in solving the problem?).
   - A reference for where you found the story.

(2) This extra credit activity will be specified later in the semester. It will be related to the class project (part II). If you decide to pursue this extra credit activity, assuming that you do it correctly, you will get an additional 3 points on your final grade for the class. A minimum of 1 point will be given if the analysis is seriously attempted but the final answer is incorrect.

ACADEMIC INTEGRITY
The College of Engineering' statement on academic integrity is available at http://www.engr.psu.edu/FacultyStaff/AcademicIntegrity.aspx. Please review this information as it provides details on what constitutes a violation of academic integrity, how violations are dealt with, and penalties for violations.

OFFICE FOR DISABILITY SERVICES
"Penn State welcomes students with disabilities into the University's educational programs. If you have a disability-related need for reasonable academic adjustments in this course, contact the Office for Disability Services (ODS) at 814-863-1807 (V/TTY). For further information regarding ODS, please visit the Office for Disability Services Web site at http://equity.psu.edu/ods/.

In order to receive consideration for course accommodations, you must contact ODS and provide documentation (see the documentation guidelines at http://equity.psu.edu/ods/guidelines/documentation-guidelines). If the documentation supports the need for academic adjustments, ODS will provide a letter identifying appropriate academic adjustments. Please share this letter and discuss the adjustments with your instructor as early in the course as possible. You must contact ODS and request academic adjustment letters at the beginning of each semester."

The course schedule is on the next page

COURSE SCHEDULE (subject to change, if topics require more lecture time)

Lec. #	*Week/Date*	*Topic*	*Reading*	*Assignments*
1	1T – Jan. 14	Course Introduction	1	
2	1Th – Jan. 16	Principles of flow; control volume and continuity	3.1-3.2	
3	2T – Jan. 21	Control volume and continuity continued	3.3	
4	2Th – Jan. 23	Energy; momentum	3.4-3.5	Quiz #1
5	3T – Jan. 28	Pressure and pressure forces	3.6	
6	3Th – Jan. 30	Hydrologic cycle; precipitation	7.1-7.2.2	Homework #1 due
7	4T – Feb. 4	Design storms; limiting storms	7.2.3-7.2.5	
8	4Th – Feb. 6	Evaporation; energy balance	7.3-7.3.1	Quiz #2
9	5T – Feb. 11	Evaporation; other methods	7.3.2-7.3.3	
10	5Th – Feb. 13	Infiltration; unsaturated flow	7.4-7.4.1	Homework #2 due
11	6T – Feb. 18	GIS (CAD Lab)	TBA	
12	6Th – Feb. 20	Infiltration; unsaturated flow	7.4.2	Quiz #3
13	7T – Feb. 25	GIS and HEC-GeoHMS (CAD Lab)	TBA	
14	7Th – Feb. 27	Groundwater flow; steady 1-D groundwater flow	6.1-6.2.1, 6.3	Class Project Part I due
15	8T – Mar. 4	Surface runoff – basin/losses	8.1-8.2	
16	8Th – Mar. 6	Surface runoff continued	8.6-8.7	Quiz #4
	Mar. 9-15	NO CLASSES – *Spring Break* ☺		
17	9T – Mar. 18	Unit hydrograph	8.3	
18	9Th – Mar. 20	Unit hydrograph, overland flow	8.4-8.5	Homework #3 due
19	10T – Mar. 25	Reservoir routing	9.1-9.2	
20	10Th – Mar. 27	Streamflow routing	9.3	Quiz #5
21	11T – Apr. 1	Probability concepts	10.1	
22	11Th – Apr. 3	Common distributions	10.2	Homework #4 due
23	12T – Apr. 8	HEC-HMS	TBA	
24	12Th – Apr. 10	Water excess management ***** Late Drop Deadline*****	10.3	Quiz #6
25	13T – Apr. 15	HEC-HMS	TBA	
26	13Th – Apr. 17	Hydrologic frequency analysis	10.4	Homework #5 due
27	14T – Apr. 22	Flood frequency analysis	10.5	
28	14Th – Apr. 24	Flood control; flood damage	14.1-14.4	Quiz #7
29	15T – Apr. 29	Guest speaker or advanced topics		
30	15Th – May 1	Guest speaker or advanced topics		Class Project Part II due