

Three Rivers Community College

Water Resources –ENV K 245

Fall 2017

B 107; M, W; 1:30 pm – 2:45

Lab W 2:46 – 4:26

Instructor; Donald W. Gerwick, P.E., L.S.

Office: B 107

Office Hours: M 12:00 – 1:15

Additional Times by Appointment

Email dgerwick@trcc.commnet.edu

Text: **Hydraulic Analysis and Design**, 4th edition; McCuen, Richard H.

Portions of the text will be utilized and will be augmented with additional materials as listed.

Required for Course: Text noted above, a trigonometric calculator, and an engineering scale.

Additional Materials which may be obtained “on line” are listed with their internet addresses; 2004 Connecticut Stormwater Quality Manual (www.ct.gov/dep/stormwater).

The course content is designed for civil and environmental students to introduce a variety of aspects of Water Resources and Storm Water Management. Starting with the Hydraulic Cycle to study concepts of rainfall, the course progresses to storm water run off and hydraulic design.

Through additional assignments students will also explore the impact that water, as a fundamental resource, will impact the 21st century.

Two principal methods of determining Stormwater run off will be introduced; the Rational Method which is the historic method for small drainage basins and the TR-55 developed by the USDA Soil Conservation Service used for larger basins. The majority of the time will be spent on the latter TR-55 methodology. A number of design problems such as gutter flow analysis, culvert analysis, weirs and orifices will also be explored. In addition students will be introduced to water quality concepts and practices as a part of emerging technologies.

Students are responsible for reading the assigned sections below. Students should be prepared to discuss assigned “exercise problems” in class. “Homework” problems shall be completed outside of class and be turned in as hard copies for grading as described after the outline of material to be covered. Additional assignments may periodically be added by the instructor.

Chap. 1 – Introduction to Hydrology - Sections 1.1 through 1.4, Section 1.6 & 1.7;
Sections 1.8 through 1.12
Exercise Problems: 1.2.1 & 1.2.2; 1.5.1; 1.7.2 & 1.7.3 –
Homework Prob. 1.1, 1.4, 1.10, 1.19, 1.21; Additional Tasks May Be Assigned.

Chap. 2 - Precipitation – Sections 2.1 through 2.2.3, 2.2.6; 2.6 through 2.6.2
Exercise problems: 2.2.1, 2.2.4
HW Problems; 2.6, 2.7, 2.8, 2.15

Quiz 1 – Chapters 1 & 2

Paper 1 – Climate Uncertainty – Topic to be assigned;

Chap. 3 – Watershed Characteristics – All sections EXCEPT the following;
Sections 3.3.4, 3.3.5, 3.5 – 3.5.4
Exercise Problems: 3.3.1, 3.3.2, 3.3.3, 3.6.1
H.W. Problems: 3.1, 3.2, 3.34, 3.38, 3.42, 3.45, 3.46
Additional problems may be given as handouts in class

Chap. 4 – Frequency Analysis – Section 4.1
Exercise 4.1.1

Chap. 5 – Peak Discharge Estimation – Sections 5.1, 5.2.3, the following sections include all sub-sections; 5.5, 5.6, 5.7
Exercise Problems: 5.5.1, 5.5.2, 5.5.3, 5.6.3; 5.7.1, 5.7.3
H.W. Problems: To be assigned

Quiz 2 - Assigned sections of Chapters 3, 4 and 5

Chap. 6 – Hydrologic Design Methods - Section 6.1, 6.3 through 6.7 and 6.9 (additional sections will be covered later in the semester)

Exercise Problems; 6.4.1, 6.4.2, 6.6.1, 6.4.4 (text typo), 6.7.2, 6.9.1, 6.9.3
Instructor will assign homework problems from the following;
H.W. Problem; 6.5, 6.8, 6.9, 6.12, 6.16, 6.21, 6.24, 6.27, 6.32, 6.44, 6.48, 6.52, 6.58, 6.63

Note: Chapters 7 through 11 are largely beyond the scope of this course, however they contain some important concepts, which will be introduced in the following chapters.

Chapter 7 – Hydrograph Analysis and Synthesis - Section 7.1

Chapter 8 – Hydrologic Routing – Section 8.1

Chapter 9 – Water Yield and Snowmelt Runoff – Section 9.1

Chapter 10 – Evaporation – Sections 10.1 & 10.2

Chapter 11 – Water-Quality Estimation – Sections 11.1 through 11.2.2

Quiz 3 – Assigned Sections of Chapters 6 through 11

Paper 2 – Water Policies Related to Sustainability & Distribution of water as a resource. (Students must submit specific topics, related to the above, for approval, prior to writing the paper)

Chapter 12 - Erosion and Sedimentation – Sections 12. 1 through 12.3.2, and 12.4

Chapter 13 – Subsurface Hydrology – Sections 13.1 through 13.3.2,
Exercises; 13.3.1, 13.3.3, 13.3.4
HW Problems; 13.1, 13.3, 13.7, 13.8, 13.9

Quiz 4 - Assigned sections of Chapters 12 & 13

As an Introduction to the State of Connecticut stormwater quality standards the following sections will be covered from the **Water Quality - 2004 CT Stormwater Quality Manual**

Chap. 3 – Preventing and Mitigating Stormwater Impacts – Sections 3.1 through 3.8
HW Prepare a one page explanation of how you would design a prevention and mitigation plan for a site.

Chap. 4 – Site Planning & Design
H.W. In one page discuss the aspects of planning and design.

Chap. 5 – Source Control Practices and Pollutant Prevention – Sections 5.1 through 5.4
HW Prepare a one page explanation of what specific recommendations you would make for either alternative designs and/or LID methods for a site to be assigned.

Chap. 6 – Introduction to Stormwater Treatment Practices – Section 6.1 through 6.6

HW Prepare a one page explanation of the differences between primary and secondary water quality control, with examples of each and their effectiveness for removal of Total Suspended Solids (TSS).

Quiz 5 – All assigned sections of CT Stormwater Manual & assigned sections of text Chapter 6

Responsibility for Work – It is the student's responsibility to determine what assignments that they may have missed due to missed classes, arriving late to class, or due to lack of attention during class. Assignments that are turned in must be identified with the student's name. The instructor reserves the right to assign a "0" to any unidentified work, and to discard it.

Final Grade – The student's final grade will be based on the weighted average of 4 of the 5 quizzes which will account for 80% of your grade. The average grade of your two papers and 2 papers will count for 10% of your grade and assigned homework and class participation will make up the remaining 10% (5% and 5% respectively).

Home Work (HW) – Home work and exercise problems assigned during any given class will be due on the following class; Exercise problems & Homework will be turned in during the next class after being assigned. Students must **SHOW ALL WORK FOR MATH RELATED PROBLEMS**. HW will be graded and returned by the following Monday. Home work will receive a grade of 0, 1, 2, 3, or 4

None turned in = 0

Minimal Attempt = 1

Moderate Attempt and Poor Results = 2

Moderate Attempt and Fair results = 3

Good Attempt and Largely Correct results = 4

The instructor reserves the right to take off points for late home work.

Quizzes – Students will be allowed one side of one 8 1/2 x 11 sheet of paper for formulas and conversion factors only (no definitions or other written notes). It is expected that students shall take all quizzes at the time and date that they are given.

Students must have their **calculators. Cell phones, iPads, etc. will not be allowed** as a substitute; failure to bring a calculator may result in lost points as many questions will be impossible to answer without one. Quizzes will be based on lecture material and all assigned sections of the text, exercise problems and homework.

Quizzes will be assigned a value by the instructor; quiz grades will be the number of points earned on the quiz divided by the total value of the quiz. Points earned for each problem will be awarded based on appropriate assumptions, solution methodology, mathematical solutions, and appropriate units. Non math based problems will be graded in a similar manner as appropriate.

Missed Quizzes – It is the student's sole responsibility to make arrangements to make up any missed quizzes. Missed quizzes, must be made up through the Testing Center, unless prior arrangement has been made with the instructor. It will remain the student's responsibility to make an appointment with the Testing Center at a time that the Center can accommodate them. Quizzes not made up within 10 days of the original quiz date

will be assigned a “0” for the quiz. Only quizzes that students have taken will be eligible for their “drop” quiz.

As taking a quiz after other students gives one a potential advantage, the quiz may or may not be the same as that taken by students on the original quiz date. The instructor shall be the sole determiner as to the necessity for a separate quiz. The Instructor will make a reasonable effort to make the alternate quiz equal in degree of difficulty, but shall also be the sole determiner as to whether the alternate quiz is comparable. Simply put, if you want to be assured, that you are taking a comparable quiz, that is not more difficult than the original quiz, shown up on the day and time of the original quiz.

Class Attendance is expected, although, while students will not be specifically penalized for non-attendance they will be responsible for material covered in their absence. It will be the student’s sole responsibility to determine what assignments that may have been missed and when they are due. Note that substantial absences will however affect the grade portion related to participation.

Class Room Policies - Cell phones brought to class shall be off and out of site (no texting). Language and behavior that is disrespectful, or disruptive, to others is unacceptable; Students should refer to their Student Handbook for examples of such behavior as well additional school policies.

Academic Integrity – Unless indicated by specific assignments, by the instructor, for group projects, all work for assignments shall be that of the individual student. Cheating on quizzes or using the work of others without proper credit (plagiarism) for assignments, or other forms of academic dishonesty, as defined by the Student Handbook, is unacceptable. If, after evaluation of the potential infraction(s), consistent with the Student Handbook, a grade of “0” for the assignment may be assigned.

Disabilities – If you have a visible or hidden disability that may require classroom or test taking modifications you are encouraged to contact Student Services for assessment.

Digication

All students are required to maintain an online learning portfolio in Digication that uses the college template. Through this electronic tool students will have the opportunity to monitor their own growth in college-wide learning. The student will keep his/her learning portfolio and may continue to use the Digication account after graduation. A Three Rivers General Education Assessment Team will select and review random works to improve the college experience for all. Student work reviewed for assessment purposes will not include names and all student work will remain private and anonymous for college improvement purposes. Students will have the ability to integrate learning from the classroom, college, and life in general, which will provide additional learning opportunities. If desired, students will have the option to create multiple portfolios.