

THE UNIVERSITY OF ARIZONA
Department of Agricultural and Biosystems Engineering

WATERSHED ENGINEERING

ABE /CE/WSM 426/526

Fall 2016

COURSE SYLLABUS AND TOPICAL OUTLINE

<u>DATE</u>	<u>TOPIC</u>	<u>READING IN TEXT</u> (Prior to class)
<u>August 2016</u>		
22	Introduction, Definitions	Chapter 1
24	Precipitation, Characteristics, Measurements	Chapter 3 pp.39-52
26	Frequency Analysis	Chapter 2 & Handouts
29	Frequency Analysis	Chapter 2 & Handouts
31	Synthetic Time Distribution	Chapter 3 pp 44-52
<u>September 2016</u>		
2	Synthetic Time Distribution (SCS method)	Chapter 3 pp 44-52 (Guest Lecturer)
5	HOLIDAY (LABOR DAY) – NO CLASS	
7	Infiltration	Chapter 3 pp.54-60 & Handouts. (Guest Lecturer)
9	Green and Ampt Infiltration (background and derivation)	Handouts & Chapter 3 pp59-60 (Guest Lecturer)
12	Green and Ampt Infiltration (applications)	Handouts & Chapter 3 pp59-60
14	Evaporation, Evapotranspiration	Chapter 3 pp.52-53 & Handouts.
16	Estimating Rainfall “Excess” (The SCS Curve Number Method)	Chapter 3 pp. 63-67
19	Runoff; Factors, Definitions	Chapter 3 pp. 67-69
21	Runoff Volumes and Yield	Chapter 3 pp. 67-83

23	Hydrographs (Unit Hydrographs)	Chapter 3 pp. 63-101 and Handouts
26	Dimensionless Hydrographs	Chapter 3 pp. 63-101, Handouts and 5.20-5.22 Reference #1
28	Development of Runoff Hydrographs	Chapter 3 pp72-83
30	Runoff Hydrographs from unit hydrographs	Chapter 3 pp72-83

October 2016

3	Peak Runoff Rates	Chapter 3, pp 83-93
5	Open Channels Basic Energy Relationships	Chapter 4 pp.104-112
7	Channel Design (Earthen Channels)	Ch. 4 pp 112-113 and Handouts.
10	Vegetated Waterways	Ch. 4 pp. 115-126 and Handouts (Guest Lecturer)
12	Vegetated waterway design	Ch. 4 pp. 115-126 and Handouts
14	Waterway Design (Riprap linings)	Ch. 4 pp. 115-126 and Handouts.
17	Waterway Design (Riprap linings)	Ch. 4 pp. 115-126 and Handouts
19	Hydraulics of Structures & Channel Structures	Ch. 5 & Handouts
21	Design of Erosion Control Structures	Ch. 5 & Handouts.
24	Drop Spillways (Review for Exam)	Handouts
26	EXAM I (Through Peak Runoff Rates)	
28	Gabions & Rockfill Structures	Ch. 5 pp 151-155 & Handouts.
31	Gabions & Rockfill	Ch. 5 pp 151-155 & Handouts.

Structures

November 2016

- 2 Culverts & Pipe Spillways Ch. 5 pp. 156-166 and Handouts.
- 4 Channel Routing Ch. 6 pp. 182-190 and Handouts.
- 7 Flood Routing (Reservoir) Ch. 6 pp. 190-198 and Handouts.
- 9 Flood Routing " " " " Handouts
- 11 VETERANS DAY (No Class)**
- 14 Storm Detention Ponds** Ch. 6 pp. 198-200
- 16 Estimating Rainfall Erosion Ch. 8 pp 238-285 & Handouts
- 18 Revised Universal Soil Loss Equation (Introduction) Ch. 8 pp 249-285
- 21 RUSLE Software RUSLE Handbook & Ch. 8 pp 249-285
- 23 Review for Exam II
- 25 THANKSGIVING HOLIDAY – NO CLASS**
- 28 EXAM II (Through Hydraulic Structures)**
- 30 RUSLE Applications RUSLE Software & Handbook

DECEMBER 2016

- 2 Erosion Control Practices Ref. #1 7.11-7.15
- 5 Earth Embankments and Small Dams Ref. #1 9.12-9.26 & Handouts and Ref. #4
- 7 **REVIEW — TCE Evaluations LAST DAY OF CLASS**

FINAL EXAMINATION: Wednesday, December 14, 2016 - 10:30am – 12:30pm Shantz 440

Evaluation Procedures:

	<u>Grading Emphasis:</u>	
	426	526
Two one-hour exams	40 %	30%
Homework	30%	30%
Final Exam	30%	30%
Technical Paper Review	---	10%

Text and Reference Materials:

Text: **Design Hydrology and Sedimentology for Small Catchments. C.T. Haan, B.J. Barfield and J.C. Hayes. Academic Press. 1994. 588p.** – Class Notes Available from UA Bookstore. Some copies of the full text are for sale at amazon.com

Supplemental References:

1. Soil and Water Conservation Engineering Fangmeier et. al. – Thomson Delmar Learning, 5th Edition
2. RUSLE Users Manual and Software -- USDA
3. Engineering Field Manual USDA-SCS (Selected sections will be made available as handouts)
4. Design of Small Dams U.S. Bureau of Reclamation, 2nd Edition 1977.
5. Technical Papers and Reports

Instructor: Dr. Donald C. Slack
627 Shantz Building
621-7230
slackd@email.arizona.edu

Office Hours: By Appointment

Homework Requirements:

1. Due one week after assigned, unless otherwise stated. Exercises will take 2-5 hours each
2. Work should be done with "**Engineering office quality**", i.e. neat, well-organized, complete, with data sources and equation numbers referenced, so that anyone familiar with the general subject can follow easily and so that you yourself can follow it several years later. **(grading will include all of these factors--not just "correctness" of answers). All homework should be done using EXCEL and submitted to the course D2L site.** Be sure

that your name, date and a page number appear on each page of your homework as shown in the attached example!!

3. Grading will be on basis of 10 pts per assignment. Neatness and organization will be graded. Late assignments will be deducted 10% per class period after the due date. Assignments later than 2 weeks from due date will not be accepted. (You will receive a zero for such assignments. **You will also receive a zero for any assignments handed in after the solutions have been distributed to the class**)

Additional Requirements for Graduate Credit (526):

All graduate students registered for ABE 526 will be required to complete a written critical review of a recent technical paper published in a relevant publication (e.g. ASCE Journal of Hydrologic Engineering, Transactions of the ASABE, etc.) The student will propose the paper to the instructor no later than the fifth week of class. **The paper for review must be selected prior to the fifth week of class (NO LATER THAN SEPTEMBER 25, 2016) and formally approved by the instructor.**

Academic integrity policy:

Students are encouraged to share intellectual views and discuss freely the principles and applications of course materials. However, graded work/exercises/homework must be the product of independent effort unless otherwise instructed. Students are expected to adhere to the UA Code of Academic Integrity as described in the UA General Catalog. See:

<http://deanofstudents.arizona.edu/codeofacademicintegrity>

Classroom behavior policy: The use of cell phones or pagers are prohibited during class.

Please turn off your cell phones prior to the start of class. *The Arizona Board of Regents' Student Code of Conduct, ABOR Policy 5-308, prohibits threats of physical harm to any member of the University community, including to one's self.* See:

<http://deanofstudents.arizona.edu/disruptiveandthreateningstudentguidelines>

Special Needs and Accommodations: Students who need special accommodation or services should contact the Disability Resources Center, 1224 East Lowell Street, Tucson, AZ 85721, (520) 621-3268, FAX (520) 621-9423, email: drc-info@email.arizona.edu, <http://drc.arizona.edu>. You must register and request that the Center or DRC send me official notification of your accommodations needs as soon as possible. Please plan to meet with me by appointment or during office hours to discuss accommodations and how my course requirements and activities may impact your ability to fully participate. The need for accommodations must be documented by the appropriate office.

Subject to Change Statement:

Information contained in the course syllabus, other than the grading policy, may be subject to change with advance notice, as deemed appropriate by the instructor.