

SYLLABUS

CE 520 GROUNDWATER DYNAMICS

Section: 001 CRN 17641 3 credits Spring 2013.

January 14, 2013

Catalog Description:

CE 520. Groundwater Dynamics. 3 Hours. PR: Consent. Introduction to groundwater, formulation of equations for saturated and unsaturated flow, analytical solutions for steady and transient cases, transport of pollutants, and numerical techniques. (3 hr. lec.).

Desirable Background:

1. Familiarity with elementary hydraulics; especially the concepts of density, pressure, head, and flowrate.
2. Familiarity with multivariable calculus including partial differentiation and Taylor's series.
3. Familiarity with elements of hydrology.

Instructor: Dr. Donald D. Gray, Room 641a ESB, 304-293-9933
Donald.gray@mail.wvu.edu

Textbook: Bear and Verruijt, Modeling Groundwater Flow and Pollution, Springer, 1987.

Class Hours: MWF 10:00-10:50, Room 211 ESB

Office Hours: To be announced.

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|-----------------|---------------------|-----|---------------------|
| Grading: | Class participation | 5% | |
| | Homework | 15% | |
| | Project | 20% | |
| | Test 1 | 20% | Friday, February 15 |
| | Test 2 | 20% | Friday, March 15 |
| | Test 3 | 20% | Friday, April 26 |

Make-up tests will be allowed only in documented cases of illness or emergency.

Dishonesty on tests is a serious violation of both academic and professional ethics. The penalty in such cases will be the unforgivable F.

Attendance policy:

I strongly encourage you to attend every class session. I will not take attendance, but if I collect written in-class work or call on you and you are not present, you will lose points.

Accommodations:

If you have a disability and anticipate needing any type of accommodation in order to participate fully in this class, advise the instructor and make appropriate arrangements with the Office of Disability Services (304-293-6700).

Course Web Site:

Most official communication concerning the course, including reading assignments, homework assignments, and test announcements, will take place through the CE 520 eCampus web site. The web site allows you to check your grades, obtain assignments, and to communicate with the instructor and fellow students through e-mail.

Classroom Behavior:

Do: Turn off your cell phone ringer or pager at the start of class.

Do: Behave in a professional manner. Be on time, stay awake, pay attention, **take notes using at least two colors of ink**. You may eat or drink if you need to.

Do: When I assign in-class work, use a loose sheet that you can hand in (be sure your name and the date are on the page).

Do not: Sleep, read the paper, text, use electronic media, study for other classes, or talk to neighbors except when assigned to do so.

I understand that you may occasionally be late due to unavoidable circumstances. If you are late, you will probably find that the door is closed, but not locked. Enter, close the door behind you, and take your seat. If the door is locked, knock and it will be opened.

GROUNDWATER REFERENCES

I. Introductory texts

Bouwer, 1978. Groundwater Hydrology, McGraw-Hill.

Deming, 2002. Introduction to hydrogeology, McGraw-Hill.

Fetter, 2001. Applied Hydrogeology, 4th Ed., Prentice Hall.

McWhorter and Sunada, 1977. Ground-Water Hydrology and Hydraulics, Water Resources Press.

Pinder and Celia, 2006. Subsurface Hydrology, Wiley.

Todd and Mays, 2005. Groundwater Hydrology, 3rd ed., Wiley.

II. Advanced general texts

Bear, 1972. Dynamics of Fluids in Porous Media, Elsevier. (Also Dover paperback)

Bear, 1979. Hydraulics of Groundwater, McGraw-Hill. (Also Dover paperback)

Domenico and Schwartz, 1990. Physical and Chemical Hydrogeology, 2nd Ed., Wiley.

Freeze and Cherry, 1979. Groundwater, Prentice-Hall.

Harr, 1992. Groundwater and Seepage, Dover.

Hillel, 1998. Environmental Soil Physics, Academic Press.

Kirkham and Powers, 1984. Advanced Soil Physics, Kreiger.

III. Mostly numerical modeling

Anderson and Woessner, 1992. Applied Groundwater Modeling, Academic Press.

Huyakorn and Pinder, 1983. Computational Methods in Subsurface Flow, Academic Press.

Walton, 1984. Practical Aspects of Ground Water Modeling, National Water Well Association.

Wang and Anderson, 1982. Introduction to Groundwater Modeling: Finite Difference and Finite Element Methods, Freeman.

IV. Contaminant transport

Bear and Bachmat, 1991. Introduction to Modeling of Transport Phenomena in Porous Media, Kluwer.

Bedient, Rifai, and Newell, 1994. Ground Water Contamination, PTR Prentice Hall.

Fetter, 1993. Contaminant Hydrogeology, Macmillan.

V. Journals

Water Resources Research

Ground Water

Journal of Hydrology

Journal of Hydraulic Engineering (ASCE)

Journal of Irrigation and Drainage Engineering (ASCE)

Journal of Water Resources Engineering (ASCE)

Journal of Water Resources Planning and Management (ASCE)