

"CONTAMINANTS HYDROGEOLOGY"
(EESD02 H3-S L30)

Instructor: Dr. Silvija Stefanovic

Lecture: Monday 7–10pm; IC212

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Office hours: Friday 3-4pm

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The intent of the course:

Natural hydrochemical processes; the use of major ions, minor ions, trace metals and environmental isotopes in studying the occurrence and nature of groundwater flow. Point and non-point sources of ground water contamination and the mechanisms of contaminant transport.

Prerequisite: At least 1 full credit in Environmental Science at the C-level.

Suggested Readings:

“Contaminant Hydrogeology”, C. W. Fetter, 2008, 2nd Edition, Prentice Hall.

Lecture notes:

The lecture slides will be posted in *.pdf format on the Blackboard. You will require Adobe Reader to open the files (available free of charge at www.adobe.com).

Course email policy:

Email is not an effective way of teaching and email inquiries regarding course materials will not be answered.

Dr. Stefanovic will be available during designated office hours to answer questions regarding course material.

If you have questions, then please see instructor during office hours – this time is for you so please do not hesitate to use it.

TA will also be available during his designated office hours and he will respond on the emails pertaining assignments.

Grading:

Assignments (3)	40% (10+15+15 %)
Seminar	15%
Participation	5%
Final Examination:	40%

Assignments:

You will have three group assignments (maximum 2 students per group) during the term. You will be able to access the problem sheets on the Blackboard at the times detailed below. More details on the assignments will be circulated during the term.

<i>Topic</i>	<i>On the Blackboard</i>	<i>Submission Due</i>
Assignment #1	Jan.23 rd	Feb.6 th
Assignment #2	Feb.6 th	Feb.27 th
Assignment #3	Feb. 27 th	Mar.13 th

Seminar:

Teams of maximum three students will each be assigned a specific subsection of the studied major contaminant hydrogeology area. Each team will need to review ONE recent research paper (from the last 10 years) and to prepare a short power point presentation (10-12 min) of these reviews (findings). The rest of student will need to submit a handwritten summary of the presentation for participation mark.

Final Exam:

The final examination is worth 40% of the final grade for the course. It will be a combination of "fill-in-the-blanks", figure labeling, short answer questions and calculations.

The final exam will draw from the lectures and includes lecture notes and any material presented in the classroom. Information from the suggested readings and other resources not directly covered in class will not be tested on exams. More details about the exams will follow.

Other Course Policies:

Late assignments will not be accepted and assigned a grade of zero. *Extensions will be granted ONLY with a medical note or under exceptional circumstances. You instructor must be informed about that immediately.*

Plagiarism will not be tolerated. Each group is expected to submit **individual work** for grading. It is an academic offense to plagiarize and those who do will be subjected to University procedures (see the University calendar).

Lecture topics:

1. Introduction, ground rules, expectations and course structure.
Introduction to Contaminant Hydrogeology;
Video: "The Nature of Earth: Introduction to Geology", Lecture #23:" Groundwater" Jan. 2th
2. Types and sources of the contamination; Groundwater Chemistry Jan. 9th
3. Principles of Groundwater Flow Jan.16th
4. Capture Curve Analysis
Assignment #1 – Tutorial Jan.23th
5. Contaminant Transport: Transport of passive and reactive contaminants;
One-dimensional soil column Advection-Dispersion Equation (ADE) Jan.30th
6. Contaminant Transport: Two dimensional Advection-Dispersion Equation for instantaneous input
One and Three dimensional Advection-Dispersion Equation for continuous input
Assignment #2 – Tutorial Feb.6th
7. Contaminant Partitioning in the Subsurface Environment Feb.13th
8. **FAMILY DAY (University closed)** Feb.20th
9. Problem Set (Tutorial)
Assignment #3 – Tutorial Feb.27th
10. Abiotic and Biotic Contaminant Transformations in Subsurface Waters Mar.6th
11. Isotope Hydrology and Applications in Hydrogeology Mar.13th
12. Climate Change Impacts on Groundwater Quality Mar. 20th
13. Course Review; Final exam preparation Mar. 27th

I will follow this schedule as closely as possible, but things being what they are, some of these topics may "overflow" over into other time slots.