

OHIO VALLEY UNIVERSITY
NSC 436: ENVIRONMENTAL HYDROLOGY
FALL 2016/7 – 3 CREDIT HOURS

NAME OF INSTRUCTOR: DR. STEPHEN OPOKU-DUAH

Office: ISOM 239

Office Hours

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TBD

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Class Schedule: MWF 3:00 – 3:50pm

@DSC PS Lab/Office

Other hours by appointment

OVU MISSION STATEMENT

At Ohio Valley University, we seek to transform lives in a Christ-centered academic community that integrates higher learning, biblical faith, and service to God and humanity.

- Equipping students for life through quality academic programs
- Encouraging life-shaping relationships among faculty, staff, and students
- Fostering holistic growth through varied co-curricular activities
- Promoting knowledge, values, and skills inherent in healthy families and quality relationships
- Connecting students to the global community
- Instilling a desire for life-long learning
- Creating opportunities for growth in faith and service

COURSE DESCRIPTION

NSC 436 Environmental Hydrology (3 credits).

The “*OVU Ech₂O Water Purification Research Project*” will underpin the study of water sciences in this course. Students will study the hydrological cycle, water chemistry, environmental pollution and control, water contamination and methods for water purification. All students will be expected to demonstrate a mastery of all topics through successful completion of quizzes, problem sets, and exams as well as a *water purification design assignment*.

Prerequisites:

This is an advanced undergraduate level course, which means students are required to have completed introductory and middle level biology, chemistry and physics courses. Good writing and research skills are also required.

Table 1 Learning Outcomes

<i>Learning Outcomes</i>	<i>Standards Addressed</i>	<i>Activities</i>	<i>Assessments</i>
Articulate the knowledge and skills of contemporary science	NSTA 1.A, 1.B., 1.C., 1.D, and 1.E	Class discussion, peer presentations, and research paper	Quizzes, assignments, tests, rubrics
Relate chemistry and water quality to the community	NSTA 7.A. and 7.B.	Case studies	Rubrics
Maintain a safe learning environment	NSTA 9.A, 9.B., 9.C., and 9.D	Class participation	Quiz

COURSE OBJECTIVES

My goals for the course are for students to:

- Know the hydrological cycle and its role in water availability for existence of life.
- Apply the scientific method for modeling water contamination and decontamination.
- Generate, analyze, interpret, validate and document water and environmental data using the Ech_2O water purification technology.

COURSE RESOURCES

Textbook:

- Ward, A.D. & Trimble, S. *Environmental Hydrology 2e* ISBN 13: 9781566706162 CRC Press, 2003.
- **Additional Required Readings:** Brezonik, P.L. & Arnold, W.A. *Water Chemistry: An Introduction to the Chemistry of Natural and Engineered Systems*, Oxford University Press. 2011.

GRADING STANDARDS

Grades will be based on the total points that students accumulate during the term compared to the total possible. Student final grade will be based on accumulation of approximately 1000 points. Nine hundred to 1000 points = A; 800 to 900 points = B; 700 to 800 points = C; 600 to 700 points D; and below 600 = F.

- Unit Exams (3) 300 points
- Final Exam (1) 100 points
- Assignments & quizzes 500 points
- Science research 50 points
- Water purification design assignment 50 points

ATTENDANCE POLICY & MAKE-UP WORK

Attendance is essential to success in this class. Missed or failed assignments, tests and laboratory work must be made up. Students should contact me within one week of an absence to make arrangements for the make-up work.

SCHOLASTIC CONDUCT

Because Ohio Valley University expects students to follow the highest standards of honorable conduct in all areas of life, it is essential that students maintain high standards of academic integrity. Violators of academic honesty will be punished according to guidelines outlined in the OVU Students' Handbook.

TENTATIVE CALENDAR

Table 2 Schedule of course topics and assessments

Week	Topic	Assignment
1	Introduction to EcH ₂ O water purification project	Reflective analysis of published paper: EcH ₂ O technology (Rubrics)
2	Introduction to Hydrological Cycle & Water Budgets	Water budget (Assignment) Water environments (Quiz)
3	Precipitation & atmospheric water	Generation and analysis of hydrographs (Assignment)
TEST 1		
4	Evaporation & transpiration	Water budget calculations (Assignment)
5	Infiltration & runoff	
6	Surface water hydrology	Review paper (Rubrics)
7	Groundwater hydrology	Theory and analysis of Darcy's Law
TEST 2		
8	Water pollution and control	Analysis of online data (EPA sources) (Quiz)
9	EcH ₂ O water purification	EcH ₂ O water data collection and analysis (Assignment and quiz)
10		
11	Global water problems	Analysis of global water demand and supply (Rubrics)
12	Water problems in USA	
TEST 3		
13	Specific water contaminants (Ohio River basin)	Water sampling and analytical methods (Quiz)
14	Design of water purification systems	Class presentations (Rubrics)
15	Improvement of the EcH ₂ O water purification technology	
FINAL EXAM		

