

# EES 410 Syllabus – Physical Hydrology

## Contents

EES 410 Syllabus – Physical Hydrology.....	1
Course Information.....	2
Instructor Information.....	2
Textbook and Course Materials.....	2
Course Description.....	2
Topics.....	2
Credit Hours.....	2
Prerequisites and/or Co-requisites.....	2
Learning Outcomes.....	2
Course Format and Design.....	3
University Information and Policies.....	3
University Mission Statement.....	3
Special Needs and Accommodations.....	3
Honor Code.....	3
Student Handbook.....	3
Technology Requirements.....	4
Instructional Technology.....	4
Learning Center.....	4
Hofheimer Library.....	4
Nondiscrimination Statement.....	4
Diversity Statement.....	5
Course Policies.....	5
Participation.....	5
Late Work.....	5
Plagiarism.....	5
ADA Policy.....	5
Course Grades and Assignments.....	6
Grade Allocation.....	6
Grading Scale.....	6
Assignment Descriptions.....	6
Course Schedule.....	6
Collaborative Learning.....	8
Hints for Success in Your Online Course.....	8

## Course Information

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### Instructor Information

See the online course in Blackboard for instructor contact information and availability.

### Textbook and Course Materials

Dingman, 2015, *Physical Hydrology*, 3<sup>rd</sup> edition, Waveland Press

Supplemental readings from web resources

The lectures for this course are designed to build on and synthesize knowledge that you'll glean initially from the textbook.

Contact the [Scribner Bookstore](#) for ordering information.

### Course Description

An introductory class covering the hydrologic cycle including groundwater, precipitation, surface water, the vadose zone, and coastal hydrology. Topics include groundwater flow, runoff and streamflow processes, unsaturated flow, effects of climate change, and water resource management.

### Topics

First, fundamentals of hydrological processes will be presented. Then the class will introduce the three major fields of hydrology— 1) The atmosphere and critical zone: precipitation, climate, recharge and infiltration; 2) Groundwater: laws of flow through porous media, basin-scale hydrogeology, well hydraulics, and 3) Surface water: precipitation, runoff processes, flood generation, and watershed modeling. A final topic on water resources management will be presented to show the applications of hydrologic concepts in planning and decision making.

### Credit Hours

4

### Prerequisites and/or Co-requisites

Prerequisites: EES 132 or ESS 133 and math placement H or A, or MATH 135.

### Learning Outcomes

Students will learn about the application of principles of mass conservation, fluxes, sources/sinks, and flow laws in various components of the hydrologic cycle. Students will learn how to make connections between observations and models. Students will learn to make connections between natural systems and the governing equations that describe them.

## Course Format and Design

This course is offered fully online in modular format. The course is designed to provide students with a variety of learning experiences and equip students with learning resources and activities that enable learning outcomes.

## University Information and Policies

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### University Mission Statement

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*Prepare each student for a meaningful life and career*

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The mission of Virginia Wesleyan University is to engage students of diverse ages, religions, ethnic origins, and backgrounds in a rigorous liberal arts education that will prepare them to meet the challenges of life and career in a complex and rapidly changing world. In this endeavor, the university employs a wide range of approaches to teaching and learning and provides opportunities to connect the study of the liberal arts with practical learning experiences on campus, in the Hampton Roads region, and throughout the world. In accord with our United Methodist heritage, Virginia Wesleyan aspires to be a supportive community that is committed to social responsibility, ethical conduct, higher learning, and religious freedom.

### Special Needs and Accommodations

Virginia Wesleyan University is committed to giving all students the opportunity of academic success. If you are a student who is requesting accommodations based on the academic impact of a disability, speak to your instructor about your accommodations letter and specific needs. If you do not have an accommodations letter for this course, you will need to visit or call for an appointment with a disability support specialist to coordinate reasonable accommodations. Visit [Virginia Wesleyan University Disability Support Services](#) on the Web.

### Honor Code

As a liberal arts university, Virginia Wesleyan is committed to values of citizenship and social responsibility fundamental to a community of scholars. People who join this academic community agree to maintain academic honesty and, therefore, not to cheat, lie, falsify data, or commit plagiarism or academic theft. Refer to the [Virginia Wesleyan Honor Code](#) for definitions, rights, responsibilities, and procedures.

### Student Handbook

All students are expected to uphold the university's mission statement and abide by the university's honor code, the Virginia Wesleyan Creed, and all other standards that govern the conduct and behavior of students. For more information, refer to the [student handbook](#).

## Technology Requirements

Online courses require that you have access to a computer with a reliable Internet connection (high-speed access recommended). A backup plan is recommended in the event of an Internet outage.

You will need to have access to and be able to use the following:

- A Web browser (Google Chrome or Mozilla Firefox is recommended.)
- Adobe Acrobat Reader ([Get Adobe Acrobat Reader free.](#))
- Microsoft Office 365 ([Get Office 365 free.](#))
- A Virginia Wesleyan e-mail account to use when submitting assignments

For assistance with passwords and user IDs, contact the [Virginia Wesleyan Help Desk](#).

For assistance with Blackboard, please contact [the Help Center](#).

## Instructional Technology

For information, support, and training in the academic software of the university, refer to the university's department of [Instructional Technology](#).

## Learning Center

Contact the [Learning Center](#) for the following services:

- Academic advocacy and communication
- Academic planning and workshops
- Academic tutoring
- Computers and assistive technology
- Disability support services
- Individualized writing assistance
- Speech lab

## Hofheimer Library

The Hofheimer Library supports the Virginia Wesleyan community by providing services, resources, and facilities that advance the academic program. Visit the [Hofheimer Library](#) on the Web for information, resources, services, and hours.

## Nondiscrimination Statement

Virginia Wesleyan University does not discriminate against students of any race, religion, color, creed, gender, national and ethnic origin, age, marital status, covered veteran status, handicap, sexual orientation, or any other legally protected status in administration of its educational policies, admission policies, scholarship and loan programs, and athletic and other university-administered programs and facilities.

## Diversity Statement

Virginia Wesleyan University values the benefits of its diversity. We are committed to educating the campus community about issues of diversity. The campus promotes freedom of thought and opinion in the spirit of mutual respect. Our campus community is enriched through programs, activities, and interactions by celebrating our uniqueness as well as our commonalities.

This commitment to diversity links programs and services that support the distinctiveness of individuals regardless of racial and ethnic backgrounds, physical and cognitive abilities, family status, sexual orientation, gender identity, socioeconomic status, age, and religious and spiritual values.

An essential feature of this community is an environment in which all students, faculty, administrators, and staff are able to study and work free from bias and harassment. Such an environment contributes to the growth and development of each member of the community.

## Course Policies

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### Participation

Students are expected to maintain course engagement and presence. This will be monitored by completion of quizzes and problem sets and participation in discussions. Students with 2 or more incomplete modules without an excuse (accepted by the instructor) will be dropped from the course.

### Late Work

*Grades will be docked 10% for every day that an assignment is late. If an assignment is more than one week late, you will receive a zero for that assignment. If you have a medical/family emergency, let your instructor know immediately. No other exceptions.*

### Plagiarism

Cheating or plagiarism will be grounds for failing the class. If you are at all unclear on what constitutes plagiarism, please check the following resource:

- [Purdue Online Writing Lab \(OWL\)](#)
- [Virginia Wesleyan University Student Handbook](#)

### ADA Policy

Students with disabilities requiring special accommodations to meet the expectations of this course are encouraged to bring this to the instructor's attention as soon as possible.

# Course Grades and Assignments

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## Grade Allocation

Assignment	Percentages
Discussions	25%
Problem Sets	30%
Quizzes	30%
Final Exam	15%
Total Percentage Possible	100%

## Grading Scale

A	90-100
B	80-89
C	70-79
D	60-69
F	Less than 60

## Assignment Descriptions

### ***Problem Sets:***

One problem set per module will be assigned for the first six modules. While you can consult with your peers, you must turn in individual assignments unless otherwise indicated. The *calculations and wording* of answers should be *your own*.

### ***Quizzes:***

One quiz per module will be assigned for the first six modules. The quizzes are designed to test your comprehension of reading assignments and lectures.

### ***Discussion:***

One to two discussion questions/prompts will be assigned per module to encourage discussion with your classmates and to encourage thinking about the course materials from different perspectives. Discussion questions/prompts will be given on the last slides of the lectures. Students will be placed in discussion groups for each module. Each student will be expected to create their own responses to discussion questions/prompts as well as provide feedback and reply to each of the responses to others in their group.

### ***Final Exam:***

A cumulative final exam will be given at the end of the course and will consist of questions similar to those seen in the problem sets and quizzes.

# Course Schedule

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Refer to the [academic calendar](#) for important university dates.

The instructor reserves the right to make necessary changes, additions, deletions, and revisions to the course schedule as needed.

Week/Module	Theme	Topics	Assignments Due
1	Intro	Introduction, Global Hydrologic Cycle, and Climate Change and Variability	Problem Set 1, Quiz 1, Discussion
2	Atmosphere and Critical Zone	Precipitation, Infiltration and Recharge, Evapotranspiration	Problem Set 2, Quiz 2, Discussion
3	Groundwater	Principles of subsurface flow: Porosity, storage, Darcy's Law, permeability, saturated flow	Problem Set 3, Quiz 3, Discussion
4	Groundwater (continued)	Groundwater in the hydrologic cycle: Aquifers, Groundwater flow, Groundwater-surface water interactions, Groundwater in the water balance, Groundwater development	Problem Set 4, Quiz 4, Discussion
5	Surface Water	Runoff generation and streamflow	Problem Set 5, Quiz 5, Discussion
6	Surface Water (continued)	Streamflow responses to precipitation	Problem Set 6, Quiz 6, Discussion
7	Applications of Hydrology	Water Resources Management	Discussion and Final Exam

## Collaborative Learning

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Collaborative learning, through engagement of other students, is a key ingredient of participatory learning. Students can expect each online course to have some degree of collaborative learning. The type of collaboration may be minimal and take the form of weekly small group discussions.

Alternatively, the type of collaboration may be a major virtual team project that requires weekly and substantive participation from all members. Regardless of the type of collaborative learning, all students are expected to participate in a timely, substantive, on-subject, professional, and complete manner.

## Hints for Success in Your Online Course

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1. Be sure you have access to proper computer equipment, Internet service, and software as listed above.
2. Designate certain times each week to work on your course. Plan ahead, avoid procrastination, even out your workload, and absorb material before moving on.
3. Have a specific achievement goal for each log-on session to help you accomplish what you need to get done and avoid distractions
4. Actively participate in discussions. Meaningful interchange will lead to better understanding of various aspects of the course and also contribute to the personality and warmth of the online class community.
5. If assigned to an online team or study group, work with your team members actively from the start. Thus, team members will benefit from the other group members' ideas and experiences and can depend on one another to complete assigned tasks.
6. Practice an informal but organized, concise, and clear writing style that aids online communication.
7. Venture beyond the classroom. The Internet medium of the online classroom gives ready access to electronic libraries and to pertinent websites that offer a significant advantage in understanding graduate-level material.
8. Your class may occasionally use short multimedia components to enrich the learning environment. Follow the instructions provided.