

Course Information

Course number and title: CE 54900 – Computational Watershed Hydrology

CRN: 21395/28626/28627

Meeting days and time: Asynchronous Online Learning

Meeting Place: Asynchronous Online Learning

Instructional Modality: Asynchronous Online Learning

Course credit hours: 3

Course website: Brightspace

Information About the Instructor(s)

Lead Instructor

Dr. Venkatesh Merwade – is a Professor in the Hydraulics and Hydrology group of the Lyles School of Civil Engineering at Purdue University. His research and teaching interests are in the area of surface water hydrology with specific focus on simulating floods at different spatial scales, use of computing tools and cyberinfrastructure for studying water movement, and doing anything that makes him happy! You can find more about his research and hobbies at his Purdue homepage (link below).

Office Location: HAMP 1101G

Phone number: 765 - 494 2176

Email Address: vmerwade@purdue.edu

Webpage: <https://web.ics.purdue.edu/~vmerwade/>

Office hours: Thursday 5-6 PM online via Microsoft Teams or by appointment.

Online meeting link: <https://tinyurl.com/ce54900>

Course Description

This course is designed to train students in performing watershed scale hydrologic analysis and simulations using real observations, geospatial data and computational tools. This course is intended for senior level undergraduate students and graduate students who already have some knowledge of basic hydraulics or fluid mechanics and hydrologic processes. Most classes are designed in the form of self-learning exercises using ArcGIS, HEC-HMS, HEC-RAS and SWAT. Some python programming may also be covered towards the end of the course. Students are expected to have some computer proficiency in using computers and software applications.

Learning Outcomes

By the end of this course, students will be able to:

- Obtain, process and analyze hydrologic data;
- Develop commonly used hydrologic and hydraulic models (HEC-HMS, HEC-RAS, SWAT (optional)) for simulating hydrologic processes for flood modeling and inundation mapping
- Use geospatial tools for hydrologic applications;
- Present and communicate results effectively using ArcGIS mapping tools

How to Succeed in this Course

Here is a simple recipe to pass this course with flying colors!

1. For in-person students, attend all classes/labs. Think while you are working on exercises and write/ask any questions that come to mind.
2. Watch all videos and follow tutorials carefully. Think while you are working on exercises and write any questions that come to mind.
3. Be willing to “speak up” or ask questions if something does not make sense, but also learn to find answers using the internet and software help menu
4. Finish all exercises, assignments and homeworks on time. Work independently as much as you can.

Learning Resources, Technology, & Texts

No text is required for this course. All reading material will be provided by the instructor.

We will be using the following software/applications in this class: ArcGIS Pro (3.1), HEC-HMS 4.10 or higher, HEC-RAS 6.x or higher, QGIS 3.34.7 (optional) and QSWAT 3 v1.7.2 (optional)

If you are using an older version (2.x) of ArcGIS pro, tutorials and videos using this version are available on Brightspace.

You will need windows operating system to install all software and complete all exercises without any technical issues. Mac OS may work, but you will have to do extra work to get all software installed and run smoothly. Instructor does not have expertise in installing software or fixing software issues.

Overall Course Logistics

Participation: All students are expected to follow the course schedule and finish each module on time.

Late Submission: Late submission of Homework or project deliverable is allowed only under critical circumstances. Any late submission without prior approval will automatically results in 50% reduction of credit for that particular submission.

Term Project: There will be one major class project which will involve the use of HEC-HMS and HEC-RAS and one minor project of your choice that show the use of skills you learned in class to address a practical water related issue.

Groupwork: Groupwork is strongly discouraged in this course. You are expected to start and complete all your HW assignments and term project on your own. It is okay to ask questions and get help from your classmates. During grading, if two or more assignments are found similar, these assignments will get will get zero credit. More than two instances of similarity will result in disciplinary action, including referring the case to the Office of Student Rights and Responsibilities (OSSR) for review and further action.

Instructor’s Face-to-Face Office Hours

Monday 11:00 – 12:00 PM in HAMP 1101G. If this does not work, email me at vmerwade@purdue.edu to setup a time.

Instructor’s Email Availability and Policies

I will be available via email daily, and try to respond as soon as possible (generally within 24-48) hours. When emailing me, please place the course number and the topic in the subject line of the email (e.g., CE54900 – Module x Question). This will help me tremendously in locating and responding to your emails quickly.

Virtual Office Hours

Thursday 5-6 PM online via Microsoft Teams. If this time does not work, email at vmerwade@purdue.edu to setup a time.

Course Work and Credit

Your learning will be assessed through a combination of classroom assignments, homework and exams throughout the semester. I will use the following grading scheme.

Work	Credit
Homework	30%
Exam 1	15%
Exam 2	15%
Exam 3	15%
Term Project(s)	25%
Total	100%

- See course logistics section for policy on Assignments and Homework
- See Tentative Course Outline for Exam schedule. Exam 3 will not be cumulative. More details about exams will be shared as we get closer to their dates.
- Any problems, personal or otherwise, affecting your grade should be brought to the instructor's attention as early as possible;
- Failure to turn-in your final term project report will result in I (Incomplete) grade for the course.

Missed or Late Work

See Course Logistics section for Missed or Late Work policy. Extension for HW or assignments can be provided upon request for medical or other emergency situation. The same is true with make-up exam. You have to turn-in all exams. Failure to turn-in any exam will result in F grade for the course.

Course Schedule

This schedule is intended as a rough guideline only, and it is the student's responsibility for keeping on track with assigned readings and material through Brightspace.

Week	Lab
1	Module 1 - Handling of point observations and time series data in hydrology
2	Module 2 - Handling of raster Data (topography and land use) in Hydrology
3	Module 3 - Using Spatial Interpolation Tools in ArcGIS
4	Module 4 - Terrain analysis using Digital Elevation Model
5	Module 5 - Terrain Analysis using ArcHydro Tools
6	Module 6 - Development of CN grid using land use and topography

7	Exam 1 – October 3, 6-9 PM EST
8	Module 7 - Development of HEC-HMS model
9	Module 8 – SWAT Modeling or Machine Learning
10	Module 9 – HEC RAS Modeling
11	Exam 2 – October 31, 6-9 PM EST
12	Project Work
13	Project Work
14	Thanksgiving Break
15	Project Work
16	Exam3/Project Work

Disclaimer: The syllabus and/or schedule is subject to change

Attendance Policy

This is an online course. You are expected to keep up the weekly work and assignments.

Academic integrity and code of conduct

Academic integrity is one of the highest values that Purdue University holds. Individuals are encouraged to alert university officials to potential breaches of this value by either [e-mailing](#) or by calling 765-494-8778. While information may be submitted anonymously, the more information that is submitted provides the greatest opportunity for the university to investigate the concern.

The [Purdue Honor Pledge](#) “As a boilermaker pursuing academic excellence, I pledge to be honest and true in all that I do. Accountable together - we are Purdue” is implicitly assumed to be taken. For further guidance, you should consult *Purdue's [student guide for academic integrity](#)*.

Students are expected to adhere to a professional and ethical code of conduct. Specifically, the following should be kept in mind:

- Collaboration on homework is permitted, but this includes only an exchange of ideas, and specifically does not include direct copying.
- Unethical and unprofessional activities include
 - copying of work to be graded or the submission of work to be graded not one’s own,
 - the use of unauthorized materials,
 - disruptive behavior in class (including non-compliance with Purdue’s policies)
 - the sharing of course materials, such as homework or exam solutions, with those who are not students in the course (see also the Purdue [copyright policy](#), as well as student regulations in parts 9 and 10 of the [Miscellaneous Conduct Regulations](#))
 - the aiding and abetting of unethical and unprofessional activities.

Penalties may be imposed on those deemed to have engaged in unethical and unprofessional conduct, including in extreme cases, a failing grade and reporting to the Office of Dean of Students.

Nondiscrimination Statement

Purdue University is committed to maintaining a community that recognizes and values the inherent worth and dignity of every person; fosters tolerance, sensitivity, understanding, and mutual respect among its members; and encourages each individual to strive to reach his or her potential. In pursuit of its goal of academic excellence, the University seeks to develop and nurture diversity. The University believes that diversity among its many members strengthens the

institution, stimulates creativity, promotes the exchange of ideas, and enriches campus life. [Link to Purdue's nondiscrimination policy statement.](#)

Accessibility

Purdue University strives to make learning experiences as accessible as possible. If you anticipate or experience physical or academic barriers based on disability, you are welcome to let me know so that we can discuss options. You are also encouraged to contact the Disability Resource Center at: drc@purdue.edu or by phone: 765-494-1247.

Emergency preparation and standard procedures

In the event of a major campus emergency, course requirements, deadlines and grading percentages are subject to changes that may be necessitated by a revised semester calendar or other circumstances beyond the instructor's control. Relevant changes to this course will be posted onto the course website.

Although Purdue University actively prepares for natural disasters or human-caused incidents with the ultimate goal of maintaining a safe and secure campus, emergency preparedness is ultimately a personal responsibility. The following procedures may be recommended:

- To report an emergency, call 911.
- To obtain updates regarding an ongoing emergency, and to sign up for Purdue Alert text messages, go to www.purdue.edu/ea
- There are nearly 300 Emergency Telephones outdoors across campus and in parking garages that connect directly to the Purdue Police Department (PUPD). If you feel threatened or need help, push the button and you will be connected immediately.
- If we hear a fire alarm, we will immediately suspend class, evacuate the building, and proceed outdoors, and away from the building. Do not use the elevator.
- If we are notified of a Shelter in Place requirement for a tornado warning, we will suspend class and shelter in the lowest level of this building away from windows and doors.
- If we are notified of a Shelter in Place requirement for a hazardous materials release, or a civil disturbance, including a shooting or other use of weapons, we will suspend class and shelter in our classroom, shutting any open doors or windows, locking or securing the door, and turning off the lights.

Mental Health/Wellness Statement

If you find yourself beginning to feel some stress, anxiety and/or feeling slightly overwhelmed, try [Therapy Assistance Online \(TAO\)](#), a web and app-based mental health resource available courtesy of Purdue Counseling and Psychological Services (CAPS). TAO is available to all students at any time by creating an account on the [TAO Connect website](#), or downloading the app from the App Store or Google Play. It offers free, confidential well-being resources through a self-guided program informed by psychotherapy research and strategies that may aid in overcoming anxiety, depression and other concerns. It provides accessible and effective resources including short videos, brief exercises, and self-reflection tools.

If you need support and information about options and resources, please contact or see the [Office of the Dean of Students](#). Call 765-494-1747. Hours of operation are M-F, 8 a.m.- 5 p.m.

If you find yourself struggling to find a healthy balance between academics, social life, stress, etc., sign up for free one-on-one virtual or in-person sessions in West Lafayette with a [Purdue Wellness Coach at RecWell](#). Student coaches can help you navigate through barriers and challenges toward your goals throughout the semester. Sign up is free and can be done on BoilerConnect.

If you're struggling and need mental health services: Purdue University is committed to advancing the mental health and well-being of its students. If you or someone you know is feeling overwhelmed, depressed, and/or in need of mental health support, services are available. For help, such individuals should contact [Counseling and Psychological Services \(CAPS\)](#) at 765-494-6995 during and after hours, on weekends and holidays, or by going to the CAPS offices in [West Lafayette](#) or [Indianapolis](#).

Violent Behavior Policy

Purdue University is committed to providing a safe and secure campus environment for members of the university community. Purdue strives to create an educational environment for students and a work environment for employees that promote educational and career goals. Violent Behavior impedes such goals. Therefore, Violent Behavior is prohibited in or on any University Facility or while participating in any university activity.

See the [University's full violent behavior policy](#) for more detail.

Course Evaluation

During the last two weeks of the course, you will be provided with an opportunity to evaluate this course and your instructor. Purdue uses an online course evaluation system. You will receive an official email from evaluation administrators with a link to the online evaluation site. You will have up to two weeks to complete this evaluation. Your participation is an integral part of this course, and your feedback is vital to improving education at Purdue University. I strongly urge you to participate in the evaluation system.

Disclaimer

This syllabus is subject to change. Any significant changes will be announced on the Brightspace course site or in the (recorded) lectures.