



UNIVERSITY OF TEXAS AT ARLINGTON
COLLEGE OF ENGINEERING
DEPARTMENT OF CIVIL ENGINEERING
Arlington, Texas 76019

CE 4326/5349: Advanced GIS, Hydrologic and Hydraulic Modeling
Fall 2018

Instructors: Seongjin Noh, Ph.D.

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Time and Place of Class: 5:30-6:50 pm, Tue & Thu, Rm 235/239/229, Nedderman Hall (NH)

Section Information: CE-4326-001, 101, CE-5349-001, 101
(merged into CE-5349-001 on Blackboard)

Office Hours: 9:30 - 10:30 am, Mon & Wed

GTA: TBA

GTA Hours: TBA

Description of Course Content: CE4326/5349 – (ADVACNED) GIS/HYDROLOGIC and HYDRAULIC MODELING Use of Geographic Information Systems (GIS) and design of GIS-developed hydrologic/hydraulic models commonly applied in the water resources field. The course will have three main areas of emphasis including: principles and operations of ArcGIS, design and implementation of standard hydrologic and hydraulic models, and the linkage of these models to engineering analysis of current water resources problems including flooding, water quality and water supply. Prerequisite: Grade of C or better in CE 3342.

Student Learning Outcomes: Upon completion of this course, students should be able to:

- Understand GIS data types, learn where to obtain the data and how to use GIS to reveal the significance of the data
- Operate ArcGIS and use major applications of the Toolbox in ArcGIS
- Understand the process of GIS data (raster, feature) to develop hydrologic and hydraulic models
- Operate ArcGIS to delineate watersheds and drainage patterns using DEM and existing feature data
- Understand how to run the hydrologic model –HEC-HMS and the hydraulic model – HEC-RAS
- Understand how to import and export data between HEC-HMS and HEC-RAS

Prerequisite: CE 3342 (Not for CE 5349)

Required Textbook: not applicable.

References: *GIS Tutorial 1 – Basic Workbook*, 10.3 Edition, 6th Ed., Wilpen L. Gorr and Kristen S. Kurland (2016). Esri Press, ISBN-13: 978-1589484566: ISBN-10: 1589484568

Other references and reading materials will also be assigned as necessary.

Descriptions of major assignments and examinations with due dates: There will be two exams.

Mid-term exam is scheduled for **Thursday, October 11, 2018 5:30 - 7 pm** (during the class time).

Final Exam: Date and time are based upon pre-determined University schedule. It is currently listed as **Thursday, Dec 6, 2019 5:30 - 8 pm**. Please check for updates once the final exam period approaches (<https://www.uta.edu/records/calendars/final-exams.php>).

Mid-term and Final exams are closed book; however, a single sheet of paper with relevant formulas and other information is permitted. No solved problems are permitted on the sheet. The cheat sheet shall be submitted with the exam upon completion.

Homework: Reference material should be read before the class in which it will be discussed. Homework assignments will be given throughout the semester. The completion of these assignments is an essential means of achieving the learning outcomes. Problem sets are due a week later unless otherwise specified. Late problem sets will not be accepted. Solutions are to be done neatly with answers clearly indicated and with all equations used clearly written. Key assumptions must be stated.

Missed homeworks will count as zero and may not be submitted by other students.

Grading Policy:

90-100%	A
80-90%	B
70-80%	C
60-70%	D
<60%	F

Course grading structure (tentative):

Homework	25%
Mid-Term Exam	25%
Project Presentation& Report	25% (Includes Proposal, Presentation, and Report)
Final Exam	25%

The instructor reserves the right to adjust the grade distribution, policy and structure. Any concerns about scores on individual assignments, tests or projects must be brought to the attention of the instructor within 5 days from the day that the score was returned to the student. After 5 days, scores are closed to discussion.

Attendance: At The University of Texas at Arlington, taking attendance is not required but attendance is a critical indicator in student success. Each faculty member is free to develop his or her own methods of evaluating students' academic performance, which includes establishing course-specific policies on attendance. As the instructor of this section, attendance for all class sessions is expected, although it will not be recorded as part of the grading process. For the majority of the semester, attendance will not be taken unless a change in grading policy is indicated during the course. However, while UT Arlington does not require instructors to take attendance in their courses, the U.S. Department of Education requires that the University have a mechanism in place to mark when Federal Student Aid recipients "begin attendance in a course." UT Arlington instructors will report when students begin attendance in a course as part of the final grading process. Specifically, when assigning a student a grade of F, faculty report the last date a student attended their class based on evidence such as a test, participation in a class project

or presentation, or an engagement online via Blackboard. This date is reported to the Department of Education for federal financial aid recipients.

The use of phones and recorders is not permitted during classes. Cell phones must be turned off when in the class room.

Make-up Exams: No make-up exams will be given except for medical or similar circumstances where advanced arrangements are made with the instructor; or in case of medical emergencies with appropriate physician's note or documentation. Other than above- mentioned circumstances failure to attend the exam session at the scheduled time will constitute a grade of zero in the exam.

Expectations for Out-of-Class Study: Beyond the time required to attend each class meeting, students enrolled in this course should expect to spend at least an additional 4-6 hours per week of their own time in course-related activities, including reading required materials, completing assignments, preparing for exams, etc.

Grade Grievances: Any appeal of a grade in this course must follow the procedures and deadlines for grade-related grievances as published in the current University Catalog.

Drop Policy: Students may drop or swap (adding and dropping a class concurrently) classes through self-service in MyMav from the beginning of the registration period through the late registration period. After the late registration period, students must see their academic advisor to drop a class or withdraw. Undeclared students must see an advisor in the University Advising Center. Drops can continue through a point two-thirds of the way through the term or session. It is the student's responsibility to officially withdraw if they do not plan to attend after registering. **Students will not be automatically dropped for non-attendance.** Repayment of certain types of financial aid administered through the University may be required as the result of dropping classes or withdrawing. For more information, contact the Office of Financial Aid and Scholarships (<http://www.uta.edu/aao/fao/>).

Disability Accommodations: UT Arlington is on record as being committed to both the spirit and letter of all federal equal opportunity legislation, including *The Americans with Disabilities Act (ADA)*, *The Americans with Disabilities Amendments Act (ADAAA)*, and *Section 504 of the Rehabilitation Act*. All instructors at UT Arlington are required by law to provide "reasonable accommodations" to students with disabilities, so as not to discriminate on the basis of disability. Students are responsible for providing the instructor with official notification in the form of **a letter certified** by the Office for Students with Disabilities (OSD). Only those students who have officially documented a need for an accommodation will have their request honored. Students experiencing a range of conditions (Physical, Learning, Chronic Health, Mental Health, and Sensory) that may cause diminished academic performance or other barriers to learning may seek services and/or accommodations by contacting: **The Office for Students with Disabilities, (OSD)** <http://www.uta.edu/disability/> or calling 817-272-3364. Information regarding diagnostic criteria and policies for obtaining disability-based academic accommodations can be found at www.uta.edu/disability.

Counseling and Psychological Services (CAPS) www.uta.edu/caps/ or calling 817-272-3671 is also available to all students to help increase their understanding of personal issues, address mental and behavioral health problems and make positive changes in their lives.

Non-Discrimination Policy: The University of Texas at Arlington does not discriminate on the basis of race, color, national origin, religion, age, gender, sexual orientation, disabilities, genetic information, and/or veteran status in its educational programs or activities it operates. For more information, visit uta.edu/eos.

Title IX Policy: The University of Texas at Arlington ("University") is committed to maintaining a learning and working environment that is free from discrimination based on sex in accordance with Title IX of the Higher Education Amendments of 1972 (Title IX), which prohibits discrimination on the basis of sex in educational programs or activities; Title VII of the Civil Rights Act of 1964 (Title VII), which prohibits sex

discrimination in employment; and the Campus Sexual Violence Elimination Act (SaVE Act). Sexual misconduct is a form of sex discrimination and will not be tolerated. *For information regarding Title IX, visit www.uta.edu/titleIX or contact Ms. Michelle Willbanks, Title IX Coordinator at (817) 272-4585 or titleix@uta.edu*

Academic Integrity: Students enrolled all UT Arlington courses are expected to adhere to the UT Arlington Honor Code:

I pledge, on my honor, to uphold UT Arlington's tradition of academic integrity, a tradition that values hard work and honest effort in the pursuit of academic excellence.

I promise that I will submit only work that I personally create or contribute to group collaborations, and I will appropriately reference any work from other sources. I will follow the highest standards of integrity and uphold the spirit of the Honor Code.

UT Arlington faculty members may employ the Honor Code in their courses by having students acknowledge the honor code as part of an examination or requiring students to incorporate the honor code into any work submitted. Per UT System *Regents' Rule* 50101, §2.2, suspected violations of university's standards for academic integrity (including the Honor Code) will be referred to the Office of Student Conduct. Violators will be disciplined in accordance with University policy, which may result in the student's suspension or expulsion from the University. Additional information is available at <https://www.uta.edu/conduct/>. Faculty are encouraged to discuss plagiarism and share the following library tutorials <http://libguides.uta.edu/copyright/plagiarism> and <http://library.uta.edu/plagiarism/>

Electronic Communication: UT Arlington has adopted MavMail as its official means to communicate with students about important deadlines and events, as well as to transact university-related business regarding financial aid, tuition, grades, graduation, etc. All students are assigned a MavMail account and are responsible for checking the inbox regularly. There is no additional charge to students for using this account, which remains active even after graduation. Information about activating and using MavMail is available at <http://www.uta.edu/oit/cs/email/mavmail.php>.

Campus Carry: Effective August 1, 2016, the Campus Carry law (Senate Bill 11) allows those licensed individuals to carry a concealed handgun in buildings on public university campuses, except in locations the University establishes as prohibited. Under the new law, openly carrying handguns is not allowed on college campuses. For more information, visit <http://www.uta.edu/news/info/campus-carry/>

Student Feedback Survey: At the end of each term, students enrolled in face-to-face and online classes categorized as "lecture," "seminar," or "laboratory" are directed to complete an online Student Feedback Survey (SFS). Instructions on how to access the SFS for this course will be sent directly to each student through MavMail approximately 10 days before the end of the term. Each student's feedback via the SFS database is aggregated with that of other students enrolled in the course. Students' anonymity will be protected to the extent that the law allows. UT Arlington's effort to solicit, gather, tabulate, and publish student feedback is required by state law and aggregate results are posted online. Data from SFS is also used for faculty and program evaluations. For more information, visit <http://www.uta.edu/sfs>.

Final Review Week: for semester-long courses, a period of five class days prior to the first day of final examinations in the long sessions shall be designated as Final Review Week. The purpose of this week is to allow students sufficient time to prepare for final examinations. During this week, there shall be no scheduled activities such as required field trips or performances; and no instructor shall assign any themes, research problems or exercises of similar scope that have a completion date during or following this week *unless specified in the class syllabus*. During Final Review Week, an instructor shall not give any examinations constituting 10% or more of the final grade, except makeup tests and laboratory examinations. In addition, no instructor shall give any portion of the final examination during Final Review Week. During this week, classes are held as scheduled. In addition, instructors are not required to limit content to topics that have been previously covered; they may introduce new concepts as appropriate.

Emergency Exit Procedures: Should we experience an emergency event that requires us to vacate the building, students should exit the room and move toward the nearest exit, which is shown in the following evacuation route map.

http://www.uta.edu/campus-ops/ehs/fire/Evac_Maps_All/Evac_NH/Evac_NH_235.pdf

http://www.uta.edu/campus-ops/ehs/fire/Evac_Maps_All/Evac_NH/Evac_NH_239.pdf

When exiting the building during an emergency, one should never take an elevator but should use the stairwells. Faculty members and instructional staff will assist students in selecting the safest route for evacuation and will make arrangements to assist individuals with disabilities.

Student Support Services: UT Arlington provides a variety of resources and programs designed to help students develop academic skills, deal with personal situations, and better understand concepts and information related to their courses. Resources include [tutoring](#), [major-based learning centers](#), developmental education, [advising and mentoring](#), personal counseling, and [federally funded programs](#). For individualized referrals, students may visit the reception desk at University College (Ransom Hall), call the Maverick Resource Hotline at 817-272-6107, send a message to resources@uta.edu, or view the information at <http://www.uta.edu/studentssuccess/success-programs/programs/resource-hotline.php>

**Course Outline:
(Tentative)**

Week	Dates	Topic	Class materials	HW
1	Aug 23	Introduction, Syllabus and GIS Basics		
2	Aug 28, 30	GIS Basics and Map Design	Intro_A, B	On-line course certificate
3	Sep 4, 6	Building a Hydrology GIS Database I	Tutorial 1	Solutions and plots requested in each tutorial
4	Sep 11, 13	Building a Hydrology GIS Database II	Tutorial 2	
5	Sep 18, 20	Spatial Analysis in GIS for Hydrology I	Tutorial 3	
6	Sep 25, 27	Spatial Analysis in GIS for Hydrology II	Tutorial 4	
7	Oct 2, 4	Watershed and Stream Network Delineation I	Tutorial 5	
8	Oct 9, 11	Review and Mid Term Exam		
9	Oct 16, 18	Watershed and Stream Network Delineation II	Tutorial 6	Solutions and plots requested in each tutorial
10	Oct 23, 25	GIS Applications in Hydrology	Tutorial 7	
11	Oct 30, Nov 1	Hydrologic Model (HEC-HMS)	Tutorial 8	
12	Nov 6, 8	Hydrologic Model (HEC-HMS)	Tutorial 8	
13	Nov 13, 15	Hydraulic Model (HEC-RAS)	Tutorial 9	
14	Nov 20, 27	Hydraulic Model (HEC-RAS)	Tutorial 9	
15	Nov 29, Dec 4	Project Presentation and Review		Project Report
16	Dec 6	Final Exam		

“As the instructor for this course, I reserve the right to adjust this schedule in any way that serves the educational needs of the students enrolled in this course. – Seongjin Noh”