

**COURSE: CEE 9567 A/B/L - GIS APPLICATIONS TO WATER RESOURCES
MANAGEMENT**

OBJECTIVES: This course introduces students to the concepts and applications of Geographic Information Systems (GIS) to water resources management. The students will learn about the application of GIS to hydrologic and hydraulic issues. The course will add insight to a number of hydrologic and hydraulic problems using computer packages such as Arc Hydro, HEC-HMS, HEC-GeoHMS, HEC-RAS, HEC-GeoRAS and PCSWMM and ArcGIS modules.

PREREQUISITES: Knowledge of basic hydrology and hydraulics and familiarity with MS Office.

TOPICS:

1. Introduction to GIS in Water Resources and ArcGIS
2. Fundamentals of Vector and Raster GIS Data Modeling in water resources management
3. Development and editing TIN and DEM terrain
4. Understanding Arc Hydro and basic hydrology functionality within ArcMap
5. Terrain processing, watershed delineation and stream network analysis
6. Hydrologic modeling using HEC HMS and HEC GeoHMS
7. Hydrologic modeling using PCSWMM
8. Hydraulic Modeling and floodplain mapping using HEC RAS and HEC GeoRAS
9. Term project presentations and discussions

CONTACT

HOURS: One 2 – hour lecture per week and one 1 hour tutorial per week. Some of the classes will be taken at the CEE computer lab.

TEXT: Class notes and reference materials.

REFERENCE:

1. Maidment, David R., Arc Hydro: GIS for Water Resources, ESRI Press, 2002
2. HEC GeoHMS Geospatial Hydrologic Modeling Extension, User's Manual, Hydrologic Engineering Center, 2009.
3. HEC GeoRAS GIS Tools for Support of HEC RAS, User's Manual, Hydrologic Engineering Center, 2009.
4. HEC-RAS River Analysis System, User's Manual, Hydrologic Engineering Center, 2010.
5. HEC-HMS Hydrologic Modeling System, User's Manual, Hydrologic Engineering Center, 2013.

ASSIGNMENTS: Five assignments for the entire course. Each assignment must be completed and submitted every two weeks. Assignments will require the use of different softwares such as ArcGIS and ArcHydro and other hydrology and hydraulic softwares.

EXAMINATION: Final Exam will be 3 hours (close book).

EVALUATION:	Assignments:	25%
	Course Project and Presentation:	25%
	Final Examination:	50%

	Total	100%

Note: Students must pass the final examination (at least 50%) to pass this course.

The students will select a project case study approved by the instructor. The assessment will be based on PowerPoint presentation and final report.

INSTRUCTOR: TBA

ATTENDANCE: Any students who, in the opinion of the instructor, is absent too frequently from class or laboratory periods in any course, will be reported to the Dean (after due warning has been given). On the recommendation of the Department concerned, and with the permission of the Dean, the student will be debarred from taking the regular examination in the course.

CHEATING: University policy states that cheating is a scholastic offense. The commission of a scholastic offense is attended by academic penalties which might include expulsion from the program. If you are caught cheating, there will be no second warning.

ENGLISH: In Accordance with Senate and Faculty Policy, students may be penalised up to 10% of the marks on all assignments, tests, and examinations for the improper use of English. Additionally, poorly written work with the exception of the final examination may be returned without grading. If resubmission of the work is permitted, it may be graded with marks deducted for poor English and/or late submission.

General Learning Objectives:

Knowledge Base	x	Individual Work	x	Ethics and Equity	
Problem Analysis	x	Team Work	x	Economics and Project Management	
Investigation		Communication		Life-Long Learning	x
Design	x	Professionalism			
Engineering Tools	x	Impact on Society			