BSE 4224 – Field Methods in Hydrology

Credit / contact hours: 3 credits, 5 contact hours

Course instructor: Durelle Scott

Textbook / materials:
suggested textbook:

Online materials:
USGS Techniques of Water-Resources Investigations Reports, available electronically at no cost (http://pubs.usgs.gov/twri/)

Catalog description:

Co-requisites: NA

Pre-requisites: BSE 3305 or CEE 3314 or FOR 4354 or FREC 3104

Course type: elective in the program

Specific outcomes of instruction:
1. Measure stream velocity and discharge, travel time, stream/ hyporheic exchange, bankfull stage, hydrologic return intervals
2. Measure stream and land slopes, areas; determine land cover
3. Work safely in various field environments
4. Develop and implement a quality assurance plan to insure collection of quality data
5. Select, install, and operate hydrologic equipment and sensors (samplers, flow measurement systems, datasondes, meteorological equipment, soil moisture)
6. Conduct basic laboratory analytical analyses (total suspended solids, dissolved and particulate nutrients, bacteria, total suspended sediment)
7. Identify and deal with statistical outliers
8. Interpret existing and measured data to characterize stream/ watershed/aquatic system
9. Plan and conduct a hydrologic and water quality field study

Student outcomes addressed by course:

Outcome 3: an ability to communicate effectively with a range of audiences
Outcome 5: an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives

Outcome 6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions

Outcome 7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies

**List of topics covered:**

Site characterization
- Basic surveying
- Cross-sections
- Using existing digital data for site characterization
- Collection and application of historical data (e.g. USGS discharge) using data systems/R
- Managing collected data in databases

Surface water
- Basic channel assessment and geomorphology; Surveying
- Stream discharge measurements
- Working with data loggers
- Stream tracer approaches

Groundwater
- Piezometer installation & long-term water level collection
- Hydraulic conductivity measurements via slug tests

Meteorology
- Basic weather measurements
- Collection and use of weather data • Dataloggers

Water quality
- Basic measurements: pH, temperature, conductivity, oxygen
- Sample collection

Analytical laboratory procedures
- Quality control and calibration approaches
- Specific measurements: Nutrients, anions, isotopes