BSE 4394: Water and Sanitation in Developing Countries

Credit / contact hours: 3 credits, 3 contact hours

Course instructor: Leigh-Anne Krometis

Textbook / materials:

Catalog description:
Social, economic and engineering principles of water supply and sanitation in developing countries as affected by climate, cultural and sociological factors, and material and financial resources.

Co-requisites: NA

Pre-requisites: CEE 3104

Course type: elective

Specific outcomes of instruction:

1. Describe the current level of access to, and the quality of, water supply and sanitation services globally.
2. Describe a range of water- or excreta-related infection diseases and the actions that can be taken to control these diseases.
3. Design critical components of a rural water supply or sanitation system.
4. Apply appropriate techniques to evaluate a water supply and/or sanitation project.
5. Critically evaluate planning approaches or policies relating to the delivery of sustainable water and sanitation services.

Student outcomes addressed by course:

Outcome 1: an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics

Outcome 2: an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors

Outcome 3: an ability to communicate effectively with a range of audiences
Outcome 4: an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.

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

**List of topics covered:**

**Water access**
- Definitions of access
- Debate on water and human rights
- Millennium Development Goals
- Current state of global access to water and sanitation

**Waterborne disease**
- Fecal-oral exposure route
- Waterborne disease
- Water vectored disease
- Water washed disease

**Water source selection**
- Groundwater vs surface water characteristics
- Sanitary surveys
- Estimating flow

**Water collection**
- Rainwater harvesting
- Wells (pumps)
- Spring boxes
- Distribution and storage

**Water treatment**
- Slow sand filtration
- Sedimentation
- Disinfection

**Sanitation systems**
- Latrines
- Waste stabilization ponds
- Composting systems

**Socioeconomics**
- Demand
- Privatization vs. community management
- Maintenance
- Multi-use systems