DEPARTMENT: Environmental Health

COURSE NUMBER: EH548  SECTION NUMBER: 000  SEMESTER: Spring 2018

CREDIT HOURS: 3

COURSE TITLE: Research Methods for Studies of Water & Health

COURSE TIME: Mondays, 9-11:50 am  LOCATION: GCR 721/729 & CNR 6th floor teaching lab

INSTRUCTOR NAME: Karen Levy
EMAIL: karen.levy@emory.edu
PHONE: 404.727.4502
SCHOOL ADDRESS: CNR 2019
OFFICE HOURS: Sign-up for appointments using the following link: https://tinyurl.com/y9c576n9

INSTRUCTOR NAME: Amy Kirby
EMAIL: aekirby@emory.edu
OFFICE HOURS: By appointment only

TEACHING ASSISTANT: Steven Sola
EMAIL: steven.quincy.sola@emory.edu
OFFICE HOURS: Mondays 1-2pm; Thursdays 10:30-11:30am
LOCATION: CNR 2nd floor breakroom

BRIEF COURSE DESCRIPTION

This hands-on course covers methods needed to carry out field studies focused on water and health. Through lecture and laboratory exercises, students will learn critical skills in measuring water quality exposure assessment and waterborne disease health outcomes that will enable them to conduct their own field studies and analyze the resulting data. The focus will be on issues of microbiological contamination in developing countries, but chemical contamination and domestic cases will also be covered.

PREREQUISITES
GH 529 (Water and Sanitation in Developing Countries) or Equivalent (with permission from instructor)

ENROLLMENT
Limited to 20 students due to constraints of laboratory space

ACADEMIC HONOR CODE
The RSPH requires that all material submitted by a student in fulfilling his or her academic course of study must be the original work of the student.
LIST SCHOOL LEVEL, DEPARTMENT, AND/OR PROGRAM COMPETENCIES

**RSHP Competencies**
- Use analytic reasoning and quantitative methods to address questions in public health and population-based research
- Describe environmental conditions, including biological, physical and chemical factors, that affect the health of individuals, communities and populations
- Describe the use of epidemiology methods to study the etiology and control of disease and injury in populations
- Describe behavioral, social and cultural factors that contribute to the health and well being of individuals, communities and populations
- Assess global forces that influence the health of culturally diverse populations around the world

**EH/GEH Competencies**
- Describe major environmental risks to human health ranging from the local to global scale
- Assess the sources and movement of contaminants through the environment
- Characterize the magnitude, frequency and duration of environmental exposures
- Apply the principles of toxicology to assess health effects of environmental exposures
- Apply the principles of epidemiology to assess health effects of environmental exposures
- Appraise the environmental, behavioral and social factors that contribute to the emergence, re-emergence, and persistence of infectious diseases
- Assess the major forces that influence the health of populations around the world.

LIST LEARNING OBJECTIVES ASSOCIATED WITH THE COMPETENCIES
- Understand key issues in designing studies of water and health
- Learn theory behind and how to carry out microbiological assessment of water quality
- Learn theory behind and how to carry out physiochemical assessment of water quality
- Learn how to carry out field evaluation of water treatment technologies
- Learn how to carry out observational studies & observational techniques
- Learn how to design surveys specific to studies of water & health
- Learn how to carry out qualitative interviews

**EVALUATION**

Evaluation will be based on:

<table>
<thead>
<tr>
<th>Item</th>
<th>Points (100 total)</th>
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<tbody>
<tr>
<td>EHSO training</td>
<td>1pt</td>
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<tr>
<td>ODK aggregate set-up</td>
<td>2pts</td>
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<tr>
<td>Skill Practice Assignments (Boxplot &amp; Serial Dilutions)</td>
<td>2 Assignments x 2pt each = 4pts</td>
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<tr>
<td>Reading quizzes</td>
<td>5 quizzes x 2pts each = 10pts</td>
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<tr>
<td>Lab Reports</td>
<td>Lab 1 = 6pts</td>
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<td>Lab 2 = 5pts</td>
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<td>Lab 3 = 6pts</td>
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<tr>
<td>Project Scoping Assignment</td>
<td>3pts</td>
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<tr>
<td>Class Project Ideas</td>
<td>3pts</td>
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<tr>
<td>Water Quality Results Complete/Uploaded</td>
<td>5pts</td>
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<tr>
<td>Draft of project tools (Surveys &amp; Structured Observations)</td>
<td>2 Assignments x 5pts each = 10pts</td>
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<tr>
<td>Final Project</td>
<td>Written Report = 20pts</td>
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<td></td>
<td>Presentation = 10pts</td>
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<tr>
<td>Class participation</td>
<td>15pts</td>
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Late assignments will be penalized by **10%** of the assignment's value per day past the due date. When stated, some assignments will not be accepted late and no credit will be given for these late submissions.

Attendance at all class sessions is **MANDATORY**. Please contact instructor for any extenuating circumstances. Absences with a valid excuse must be pre-approved by course instructor. Students will lose 1 point of class participation for each unexcused absence (pro-rated for portions of class missed).
**CLASS CONDUCT**
Participation in class lectures and discussions is a vital part of the learning process and will help to reinforce the information from the readings. Students are expected to positively contribute to the lectures and discussions in class. In order to reduce the amount of distractions in class, use of laptops and tablets during lectures is highly discouraged to facilitate discussion and classroom engagement. Laptops are not allowed in the lab.

**ASSIGNMENTS**
All assignments will be posted on Canvas and are due on Sundays by 11:59PM unless otherwise specified. Weekly reading is part of your assignments. Reading quizzes will be given during the first 5 minutes of class. If you are late to class you will not be allowed to make-up the quiz and will receive a 0 for the quiz. There will be 6-8 reading quizzes but only 5 will be counted towards your final grade, with the lowest grades will be dropped.

**FINAL PROJECTS**
A major focus of this course is for students to be able to develop a research question and conduct a field study associated with water, sanitation or hygiene. This project can be completed individually or in groups. More information on the projects will be provided in class and on canvas.

***ALL ASSIGNMENTS ARE DUE ON SUNDAYS @ 11:59PM UNLESS OTHERWISE SPECIFIED***

**JANUARY 22 – MEET @ CLASSROOM**

**LECTURE:** Course Introduction & Group Project Overview [Kirby]
**LECTURE:** Teaching Lab Tour/Expectations [Sola]

Assignments:
Due Jan. 28:
(1) EHSO Lab Safety Online Course completion [1pt]
(2) Readings:
   REQUIRED:
   • Ashbolt et al. Indicators of microbial water quality. 2001. pp. 289-316
   OPTIONAL:
   • CDC Microbiological Indicator Testing in Developing Countries: A Fact Sheet for the Field Practitioner. Version 1, December 2010.

**JANUARY 29 – MEET @ CLASSROOM**

**LECTURE:** Microbial Indicators of Water Quality [Levy]
**ACTIVITY:** Limits of Detection [Levy]
Assignments:
Due Feb. 4:
(1) Complete Data Management survey
(2) Serial Dilution Skill Practice [2pts]
(3) Readings:
   - Mbuya et al. 2015. Design of an Intervention to Minimize Ingestion of Fecal Microbes by Young Children in Rural Zimbabwe. Clinical Infectious Diseases 2015;61(S7):S703–9

FEBRUARY 5 – MEET @ CLASSROOM
LECTURE: Introduction to Class Project/Project Scoping [Kirby]
LECTURE: Data Management [Delahoy]

Assignments:
Due Feb. 11:
(1) Boxplot Skill Practice Assignment [2pts]
(2) Collect water sample <24 hours before lab on February 12
(3) Readings:
   - Lab 1 – Water Quality Indicators Lab

FEBRUARY 12– MEET @ STUDENT LABORATORY
LAB 1: Water Quality Indicators Lab [Kirby]

Assignments:
Due Feb. 13:
(1) Read results of WQ assays after 24 ± 2 hrs. of incubation
(2) Upload laboratory data to Canvas

Due Feb. 18:
(1) Lab 1 write-up [6pts]
(2) Class project scoping assignment [3pts]
(3) Readings:
   REQUIRED:
   OPTIONAL:
   - Caruso BA, Clasen TF, Hadley C, et al. Understanding and defining sanitation insecurity: women’s gendered experiences of urination, defecation and menstruation in rural Odisha, India. BMJ Glob Health 2017

FEBRUARY 19 – MEET @ CLASSROOM
LECTURE: In-depth Interviews [Caruso]
PRESENTATIONS: Class Project Ideas Scoping [Kirby & Levy]
Assignments:
Due Feb. 25:
(1) Readings:
   • Hennink, Hutter & Bailey. 2011. Qualitative Research Methods. Ch. 8: Observation
   • Ram et al. 2010. Is structured observation a valid technique to measure handwashing behavior? Use of acceleration sensors embedded in soap to assess reactivity to structured observation. The American Journal of Tropical Medicine and Hygiene 83:1070-1076

FEBRUARY 26 – MEET @ CLASSROOM
LECTURE & ACTIVITY: Structured Observations [Levy]

Assignments:
Due Mar. 4:
(1) Submit Research Questions/Interests for final project [3pts]
(2) Readings:
   • UNICEF, World Health Organization. 2006. Core questions on drinking water and sanitation for household surveys.
     o Ch. 1: An Overview of the Sample Survey Process
     o Ch. 2: Designing Effective Questionnaires: Basic Guidelines
     o Ch. 3: Developing Survey Questions
     o Ch. 9: Selecting a Representative Sample

MARCH 5 – MEET @ CLASSROOM
LECTURE: Surveys [Kirby]
ACTIVITY: Project Idea – Speed Dating

Assignments:
Due Mar. 18:
(1) Get ODK aggregate is up and running – Submit screenshot on Canvas [2pts]
(2) Rough draft of project survey questions
(3) Bring your laptops and if possible, your Android phones/devices, to class

MARCH 12 – SPRING BREAK, NO CLASS

MARCH 19 – MEET @ CLASSROOM
LECTURE: ODK Survey Development [Levy]

Assignments:
Due Mar. 25:
(1) Project survey form [5pts]
(2) Project structured observation [5pts]
(3) Readings:
   • Lab 2 – Chemical/Chlorine Lab

MARCH 26 – MEET @ STUDENT LABORATORY
LAB 2: Chemical/Chlorine Lab [Kirby]
CLASSROOM: Designated in-class time for projects:
   Review of project surveys & structured observation forms [Kirby & Levy]
Assignments:
Due March 27:
(1) Upload laboratory data to Canvas

Due Apr. 1:
(1) Lab 2 write-up [5pts]
(1) Readings:
REQUIRED:

OPTIONAL:
- Discussion questions for Aderibigbe et al. and Vieira et al.

APRIL 2 – MEET @ CLASSROOM
LECTURE: Intervention Studies [Clasen]
LECTURE: Water Chemistry [Gribble]

Assignments:
Due Apr. 8:
(2) Final Project Water Quality Data uploaded on Canvas [5pts]

APRIL 9 – MEET @ STUDENT LABORATORY
LAB 3: Sterilization/Purification Lab

Assignments:
Due Apr 10:
(1) Read results of WQ assays after 24 ± 2 hrs. of incubation
(2) Upload laboratory data to Canvas
Due Apr 15:
(1) Lab 3 write-up [6pts]

APRIL 16 – MEET @ CLASSROOM
FIELD TRIP: CDC Water Quality Lab [Kirby]
Assignments:
Due Apr. 22:
(1) Readings:

APRIL 23 – MEET @ CLASSROOM
LECTURE: Microbial Source Track Markers [Mattioli]
LECTURE/PANEL/FIELD TRIP: Students’ choose between: [Levy]
  Lecture – How to give a good presentation
  Panel – Emory Alumni working in WASH
  Field Trip - Waterhub

Assignments:
Due Apr 29:
(1) Final Presentations [10pts]

APRIL 30 – MEET @ CLASSROOM
PRESENTATIONS: Student Project Presentations [Levy & Kirby]

Assignments:
Due May 6:
(1) Final project paper [20pts]