# Duke Global Health Institute
# One Health: Public Health Laboratory Techniques
# GLHLTH 739
# Summer 2016, 1 Credit Hour

## Instructor Information

Gregory Gray, MD, MPH and Nancy Henshaw, PhD

Laboratory Managers: Benjamin Anderson, MPH, PhD and Emily Bailey, PhD

TA: Sarah Philo

Location: Class will begin each day at the Field Auditorium in Environmental Hall and end in the Biological Science Building Room 0032/0066

Office hours: arranged

## Course Description

Introduction to common laboratory techniques used in emerging infectious respiratory disease research and surveillance laboratories; emphasis on techniques for culturing, characterization, and serological surveillance of exposure to influenza viruses.

One semester credit hour class

## Course Objectives and/or Goals

At the end of the course the student will be able to:

1. Be familiar with good laboratory practices and standard biosafety protocols;
2. Understand the laboratory skills used in identifying, culturing and characterizing infectious agents;
3. Describe the serological procedures involved in detecting previous infection with infectious agents;
4. Apply above laboratory techniques with a special emphasis on influenza A viruses; and
5. Understand the methods described above as well as the analysis and reporting of data resulting from their use.

## Course Materials

There is no specific textbook for this course. Students will be provided with handouts and laboratory exercises that correspond to classroom activities.

## Course pre-requisite

Before reporting to class students must complete the online courses Basic Biological Safety and Blood Borne Pathogens for College of Public Health. Certification of completed courses must be brought to class.

## Course Requirements/Evaluation/Grading

Students will be graded on a standard letter scale of A to F. Students will be evaluated by their class participation (50%) and a final open-note, short answer/ essay exam (50%). Students who fully participate and attend every session will earn at least a B for the class participation portion of the overall grade. To earn an A in class participation, students must attend each session and demonstrate that they prepared for lectures beforehand (through familiarity with assigned readings, interacting with the lecturers, and actively participating in group exercises).

| **Percentage or points earned in class** | **93%-100%** | **90%-92%** | **87%-89%** | **83%-86%** | **80%-82%** | **77%-79%** | **73%-76%** | **70%-72%** | **Below 70%** |
|---|---|---|---|---|---|---|---|---|---|
| **Letter Grade equivalent** | A | A- | B+ | B | B- | C+ | C | C- | E |

| **Letter Grade** | **A** | **A-** | **B+** | **B** | **B-** | **C+** | **C** | **C-** | **F** | **NC** |
|---|---|---|---|---|---|---|---|---|---|---|
| **Grade Points** | 4.0 | 3.7 | 3.3 | 3.0 | 2.7 | 2.3 | 2.0 | 1.7 | 0.0 | 0.0 |

For greater detail on the meaning of letter grades and university policies related to them, see https://registrar.duke.edu/student-records/how-calculate-gpa

## Topical Outline

| Day | Topic | Time | Instructor |
|---|---|---|---|
| 5/22 | Course Introduction | 1:20pm-1:30pm | Gray |
| 5/22 | Applied Lab Topic I: Seasonal and Novel Influenza Virus | 1:30pm-2:20pm | Henshaw |
| 5/22 | Introduction to Biosafety and Lab Skill Primer | 2:30pm-3:15pm | Anderson |
| 5/22 | Genomic Extractions | 3:15pm-3:45pm | Bailey |
| 5/22 | **Walk to BioSci 0032/0066** | 3:45pm-4:00pm | ---- |
| 5/22 | Lab Orientation/PPE Instructions | 4:00pm-4:15pm | Anderson |
| 5/22 | **LAB: vRNA Extraction** | 4:15pm-5:30pm | Bailey |
| 5/23 | Applied Lab Topic II: Zika Virus | 1:20pm-2:10pm | Henshaw |
| 5/23 | Reverse Transcription PCR (RT-PCR) | 2:10pm-2:40pm | Bailey |
| 5/23 | Hemagglutination as a means of quantifying influenza virus and antigen detection (i.e. FA, EIA, etc.) | 2:40pm-3:00pm | Anderson |

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| 5/23 | **Walk to BioSci 0032/0066** | 3:00pm-3:15pm | ---- |
| 5/23 | **LAB: RT-PCR for gene segment amplification**<br>**LAB: Hemagglutination Assay (HA)** | 3:15pm-5:30pm | Bailey<br>Anderson |
| 5/24 | Applied Lab Topic III: Ebola Virus | 1:20pm-2:10pm | Henshaw |
| 5/24 | Agarose Gel Electrophoresis | 2:10pm-2:30pm | Philo |
| 5/24 | Real-time RT-PCR | 2:30pm-2:50pm | Bailey |
| 5/24 | Standardization of influenza A antigen for use in HI Assay | 2:50pm-3:10pm | Anderson |
| 5/24 | **Walk to BioSci 0032/0066** | 3:10pm-3:25pm | ---- |
| 5/24 | **LAB: Gel Electrophoresis of RT-PCR Product**<br>**LAB: Back Titration of Viral Antigen for HI Assay**<br>**LAB: Real-time RT-PCR for Influenza Subtyping** | 3:25pm-5:30pm | Philo<br>Bailey<br>Anderson |
| 5/25 | Applied Lab Topic IV: Other Respiratory Viruses and Viral Diagnostic Techniques | 1:20pm-2:10pm | Henshaw |
| 5/25 | Real-time RT-PCR Analysis and Results | 2:10pm-2:30pm | Bailey |
| 5/25 | Hemagglutination Inhibition Assay | 2:30pm-2:50pm | Anderson |
| 5/25 | Rapid Diagnostic Tests (RDTs) | 2:50pm-3:10pm | Philo |
| 5/25 | **Walk to BioSci 0032/0066** | 3:10pm-3:25pm | ---- |
| 5/25 | **LAB: Hemagglutination Inhibition Assay**<br>**LAB: Rapid Diagnostic Tests (RDTs)** | 3:25pm-5:30pm | Anderson<br>Philo |
| 5/26 | Virus Neutralization Assays | 1:20pm-1:40pm | Anderson |
| 5/26 | Virus Culture Techniques | 1:40pm-2:00pm | Anderson |
| 5/26 | Review | 2:00pm-2:15pm | |
| 5/26 | **Exam** | 2:15pm-5:15pm | |

## Duke Honor Code

Duke University is a community dedicated to scholarship, leadership, and service and to the principles of honesty, fairness, respect, and accountability. Citizens of this community commit to reflect upon and uphold these principles in all academic and non-academic endeavors, and to protect and promote a culture of integrity. To uphold the Duke Community Standard:

- I will not lie, cheat, or steal in my academic endeavors;
- I will conduct myself honorably in all my endeavors; and
- I will not act if the Standard is compromised.

Students are encouraged to review the Duke Honor Code: (http://www.integrity.duke.edu/new.html)

## Plagiarism

Plagiarism, of any kind, is not be acceptable and will result in an automatic failure and possible additional disciplinary action.

See Duke Guidelines for plagiarism: http://library.duke.edu/research/plagiarism

**Attendance Policy**
Attendance is mandatory.

**Policy Related to Make-up Exams or Other Work**
***Attendance and Make-up Work*** – I expect you to attend and be prepared to participate in all class sessions. Personal issues with respect to class attendance or fulfillment of course requirements will be handled on an individual basis.