

## KINE 460 & CONS 440: One Health Fall 2022

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### **Instructors**

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### **Teaching Assistant**

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### **Class period (place & time)**

**Lectures:** Tuesdays & Thursdays 9:30-10:50am, John E Boswell Hall, RM 201

### **Course overview**

This course is designed to introduce students to the theory and practice of One Health, a collaborative, transdisciplinary, and multi-scale approach to health that recognizes the interconnection between people, animals, and the environment. In this course, students will explore the impacts of rapid environmental degradation and global change on disease transmission rates, animal health, and human health through real-world case studies. Through an interdisciplinary lens, students will learn about the theory of One Health and will engage with veterinarians, ecologists, and public health officials on the front lines to explore how One Health approaches are being applied in the field to prevent and address global health challenges. The students will then have an opportunity to apply what they have learned to address a real-world health challenge through a One Health approach through a case study done in collaboration with an external conservation partner. This will give students an opportunity to get firsthand experience with applied research and applying One Health to solve real-world challenges. This upper-level course is designed for students who are interested in advanced study and careers in veterinary medicine, public health, environmental conservation, or the medical field.

The course is organized into four sections. The first phase of the course will include an introduction to the term "One Health" and Dr. Calvin Schwabe who coined the word. The second phase of the course will focus on the practice of One Health, diving into several zoonotic diseases of public health importance (e.g., Yellow Fever, Rabies, Schistosomiasis). The third phase of the course will involve a deep dive into a One Health case study, where students will work with the Virginia Science Museum to examine how the absence of green space in urban Richmond affects human health and environmental biodiversity to help guide the design of their urban restoration project called "The Green". The final phase of the course will focus on how One Health is applied to various career

trajectories. There will be several guest speakers invited to speak to the class via Zoom or in-person as possible.

### **Course objectives**

Through completion of this course, students will be able to:

- Explain the theory of One Health and its application to global environmental and public health crises
- Appreciate the connection between the environment, animals, and human health
- Understand the importance of integrative research that bridges public health, veterinary medicine, and ecology to develop holistic solutions to global challenges
- Explain how One Health approaches have been applied to prevent and address emerging global health challenges
- Apply research skills to contribute to a real-world One Health case study
- Reflect on how One Health is applied to various career paths

### **Required textbooks and readings**

Reading assignments for this course include background readings from the required textbooks and peer-reviewed primary articles that are available on the course blackboard site. When reading articles, please focus on take themes related to One Health and avoid getting bogged down in technical details of statistical analyses.

*Required Textbooks:*

- *Silent Spring* by Rachel Carson (ISBN 978-0-618-24906-0)
- *The Stockholm Paradigm: Climate Change and Emerging Diseases* by Brooks, Hoberg and Boeger. (ISBN 978-0-226-63244-5)

*Other Readings are either links in the syllabus or as a PDF in Blackboard.*

*Recommended*

- *One Health: People, Animals and the Environment* edited by Ronald Atlas and Stanley Maloy (ISBN 978-1-55581-842-5)

### **Lecture and seminar discussion schedule**

A detailed schedule of lectures and class seminars is provided at the end of this syllabus, although the schedule may be adapted throughout the semester. A working schedule will be available on the Blackboard site. The class will be broken up into four sections:

- Introduction to One Health Theory and Practice*
- One Health Case Study*
- One Health Applications to Zoonotic Diseases of Global Importance*
- One Health in Practice, with a focus on careers in One Health*

### **Description of One Health Case Study**

Human well-being is inextricably linked to the environment, as it provides resources, sustains livelihoods, reduces stress, increases social connection, and contributes directly and indirectly to health. Nearly 100 million Americans do not have access to green space in their neighborhoods due to increased urbanization, racial and socioeconomic discrimination because of redlining and discriminatory policies, socioeconomic discrepancies, unsafe access, and a lack of investment in equitable green space. This has resulted in increased risk of heart disease, increased depression, heat stress, health challenges associated with lack of clean air and water, and societal impacts that are disproportionately affecting

people of color and socioeconomically disadvantaged who have less access to green space. (Hoffman et al. 2019)

Several organizations in Richmond, Virginia are working to improve access to green space for communities who have faced a legacy of racial discrimination and environmental injustice as a result of redlining, lack of investment, and socioeconomic discrepancies affecting people of color and immigrant communities. The federal government created maps of cities across the US that rated the risks of real-estate investment neighborhoods with color ratings. These rankings were driven by and strongly correlated with race, as Black and immigrant communities were typically in the “red” neighborhoods that were rated as hazardous. The redlining had significant, long-lasting effects on investment in green space, infrastructure, and safety in these places, which has had profound legacy effects on health disparities and social injustice seen in Richmond today. (Hoffman et al. 2019)

The Virginia Science Museum aims to contribute to the city’s Richmond 300 Development Plan to build a 6-acre public green space that aims to improve biodiversity and the natural resources it provides as well as provide equitable access to the public benefits of green space. The Green will convert a concrete parking space into a public green space that contributes to biodiversity and opportunities for equitable human engagement and benefits from green space in the Greater Scott’s Addition, one of the fastest growing, mixed-use neighborhoods in Richmond with the low green density.

As part of the Museum’s planning process, students in this course will work in small groups to conduct research focused on applying a One Health lens to the design of “The Green” to maximize its benefits to the environment and the human well-being of all communities in Richmond. After a field visit to the Museum and consultation with the planning committee, students will work in groups to explore relevant topics including the link between green space and human health in urban environments, best practices in rewilding urban areas to maximize benefits to all communities, and the barriers and opportunities to maximize the human well-being benefits of The Green to all communities in Richmond. This research will be done in collaboration with the Museum and will directly inform the design, implementation, and evaluation of the success of The Green in meeting these objectives.

Learn more here: <https://smv.org/explore/green/>

### **Assignments and Learning Evaluation**

Your grade will be based on your participation and attendance in class, two midterm exams, a research paper, and a final presentation.

**1. Midterm exams (each will make up 15% of your final grade)- Graded by Dr. Obasanjo**

There will be two, non-cumulative exams after the instructional sections of this course. The first exam will provide an opportunity for students to demonstrate their understanding of One Health theory and practice. The second, non-cumulative exam will provide an opportunity for students to demonstrate their understanding of the applications of One Health to zoonotic diseases of public importance. This will provide an opportunity for students to apply their understanding of One Health to understand the drivers and impacts of zoonotic diseases.

**2. Literature Review (20% of final grade)- Graded by Erica**

Students will conduct a literature review on the linkage between access to green space and human health impacts in Richmond and will use this literature review to identify a research project that will address gaps in knowledge needed to advance the effectiveness of “The Green” in advancing environmental justice and equitable access to green space for all communities in Richmond. A literature review is a written summary and interpretation of what is known about the topic from peer-reviewed literature, highlighting gaps in knowledge needed to meet One Health goals. Students will work in teams to identify, review, and summarize literature, but each student will be responsible for completing their own written literature review. This literature

review then becomes the foundational background for the research paper that each student will write and will guide the development of “The Green”.

*The written literature review should be 10-20 pages, double spaced in 11 pt font and should follow the literature review guidelines that will be discussed in class.*

**3. Research Paper on One Health Case Study (30% of final grade)-graded by Erica**

A culmination of the One Health Case Study, each student will write an individual research paper that will communicate the findings from their literature review and individual research that will be presented to stakeholders to inform the design of “The Green”. Students can work in teams on the research, but must write their own, original paper. The research report will include clearly defined research objectives, an introduction section with a summary relevant literature, a summary of research methods and key findings, and a discussion of how research findings inform the design of “The Green”. In addition to providing relevant, real-world findings for the Museum, this research paper will serve as an excellent writing sample for students interested in research internships and graduate school to demonstrate their scientific writing capabilities and independent research skills.

**4. Final presentation (10% of final grade)-graded by both instructors**

After completing the Case Study research, student teams will give a 10-minute powerpoint presentation that includes an (1) introduction to the challenge your project is addressing, (2) the relationship between environmental, animal health, and human health in regard to the challenge, and (3) your plan for advancing a One Health approach to improving equitable access to green space in Richmond. Grading will be based on how your team effectively communicates the relevance of your research findings in addressing broader societal challenge and One Health approaches. The presentation should follow the same structure as the research paper. (10% of grade)

**5. Participation and attendance (10% of final grade)- graded by both instructors**

One Health is a fairly new concept that requires improved discussion and communication between scientists, practitioners, and community members from diverse disciplines, sectors, and backgrounds. As such, we have designed this course to be an opportunity for W&M students to engage in this discussion to help advance the One Health concept and its potential applications. Students will be given an opportunity to participate in discussions with guest One Health experts and will work on research teams to address a real-world One Health case study. As such, you will receive a grade for your participation and attendance in class. Participation will be graded based on whether students submit questions for guest speakers and on the student's active participation in group projects and discussions.

**Letter Grade Distribution**

>= 93.0 A	73.0 - 76.9 C
90.0 - 92.9 A-	70.0 - 72.9 C
87.0 - 89.9 B+	67.0 - 69.9 D+
83.0 - 86.9 B	63.0 - 66.9 D
80.0 - 82.9 B-	60.0 - 62.9 D
77.0 - 79.9 C+	<= 59.9 F

**Class procedures and policies**

Class lectures: It is important for you to **attend class every day** so that you can actively participate in lab discussions and the case study.

Seeking help: Our goal is to support your understanding of One Health approaches so that you can apply the theory and practice to your work and help advance this field throughout your career. We are here to help you with any aspect of the course, whenever you need it. One Health, by definition, is a transdisciplinary topic, so it is common for One Health practitioners to seek help and guidance from colleagues, so we encourage students to reach out to us and to classmates for help. Both instructors and the TA will be available during posted office hours and by appointment. If you have other commitments during office hours, please email us and suggest at least three other times that you are available so we can arrange an appointment for another time.

Attendance and assignment policy: You are required to attend every class session and submit all assignments on time. If you are not feeling well or have another legitimate reason for missing a class (we know that this happens-its life), you must email both instructors ASAP, which means before class in most instances. Because of the structure of the class and the case study, undocumented absences may hurt your performance and grades in this class. If you miss class for three or more consecutive periods you must get a letter from the Dean of Students' Office explaining your long-term absences. We will do our best to accommodate legitimate absences.

Assignments are due at the time and date outlined in the schedule below, unless an extension was given by the instructor **in advance**. Early and clear communication is key. If we do not receive an email from you within 24 hours of the deadline about a missed assignment, we will email you and will deduct 10% of your grade every day after the due date that we do not hear from you. Students who need to make special arrangements for class assignments should consult with us as soon as possible. This will give us more time to arrange an accommodation. Decisions will be made on a case-by-case basis.

Honor code policy: We support the William & Mary Honor Code.

<http://www.wm.edu/offices/deanofstudents/services/studentconduct/honorcodeandstudentconduct/honorcode/index.php>

ADA Policy: Please reach out to us if there is anything we can do to accommodate you and facilitate your learning. William & Mary accommodates students with disabilities in accordance with federal laws and university policy. Any student who feels s/h/xe may need an accommodation based on the impact of a learning, psychiatric, physical, or chronic health diagnosis should contact Student Accessibility Services staff at 757-221-2509 or at [sas@wm.edu](mailto:sas@wm.edu) to determine if accommodations are warranted and to obtain an official letter of accommodation. For more information, please see [www.wm.edu/sas](http://www.wm.edu/sas).

*Planned outline for the semester. This will be adapted throughout the semester, so please see the working schedule on Blackboard for an updated schedule.*

<b>Introduction to One Health Theory and Practice (Dr. Obasanjo)</b>		
Date	Lessons	Assignments/Reading
Th, Sept 1	<ul style="list-style-type: none"> <li>● Introductions to students and faculty-the interdisciplinary one health team</li> <li>● Discuss One Health Course and Syllabus</li> <li>● Introduction to One Health</li> </ul>	1. Chapter 1 to 12 in Silent Spring by Rachel Carson. 2. Chapter 4 of Cattle, Priests and Progress in Medicine by Calvin Schwabe (Blackboard)

		3. Explore the One Health communication resources here <a href="https://www.cdc.gov/onehealth/resource-library/one-health-graphics.html">https://www.cdc.gov/onehealth/resource-library/one-health-graphics.html</a> <a href="https://wwwnc.cdc.gov/eid/article/17/12/11-0484_article">https://wwwnc.cdc.gov/eid/article/17/12/11-0484_article</a>
T, Sept 6	One Health and Infectious Diseases	Chapter 1 and 2 in The Stockholm Paradigm Chapter 1 in Spillover by David Quammen.
Th, Sept 8	One Health and Non-Communicable Diseases	
T, Sept 13	One Health, Food and Medication (Foodborne illnesses, Pharmaceuticals and Antimicrobial Resistance)	1. <a href="https://doi.org/10.1093/jama.2021.01.210022">jama lpezmedina 2021 oi 210022 1618250230.41706.pdf</a> 2. <a href="https://www.sciencedirect.com/science/article/pii/S2352771421000409">https://www.sciencedirect.com/science/article/pii/S2352771421000409</a> 3. Chapter 9 in One Health: People, Animals and the Environment by Atlas and Moley
Th, Sept 16	One Health and the Environment	1. Chapter 5 in One Health: People Animals and the Environment by Atlas and Maloy 2. National Geographic Article: UN: Environmental threats are jeopardizing human health by Laura Parker
T, Sept 20	One Health and Climate Change	1. Chapter 5 in The Stockholm Paradigm: Climate Change and Emerging Disease by Brooks, Hoberg and Boeger.
Th, Sept 22	Impact of biodiversity loss and climate change on zoonotic diseases (Erica and Dr. Obasanjo)	1. Chapter 8 and 10 in the Stockholm Paradigm. 2. UNEP section 3 <a href="https://www.cbd.int/doc/c/084c/e8fd/84ca7fe0e19e69967bb9fb73/unep-sa-sbstta-sbi-02-en.pdf">https://www.cbd.int/doc/c/084c/e8fd/84ca7fe0e19e69967bb9fb73/unep-sa-sbstta-sbi-02-en.pdf</a>
T, Sept 27	<b>Mid-term exam</b>	
<b>One Health Case Study: Health impacts of lack of green space in Richmond VA (Erica Garrouette)</b>		
Th, Sept 29	Introduction to the Case Study: How to write an applied research paper  Identify teams, narrow down research focus and discuss lit review and introduction expectations.	1. Writing a research paper <a href="https://www.enago.com/academy/writing-first-scientific-research-paper/">https://www.enago.com/academy/writing-first-scientific-research-paper/</a>  2. <a href="https://www.nytimes.com/interactive/2020/08/24/climate/racism-redlining-cities-global-warming.html">https://www.nytimes.com/interactive/2020/08/24/climate/racism-redlining-cities-global-warming.html</a>

		3. <a href="https://www.mdpi.com/2225-1154/8/1/12/htm">https://www.mdpi.com/2225-1154/8/1/12/htm</a>
T, Oct 4	Examining the link between access to green space and human health (Erica)	1. <a href="https://eprints.utas.edu.au/31135/2/132536%20-%20The%20impact%20of%20green%20space%20and%20biodiversity%20on%20health.pdf">https://eprints.utas.edu.au/31135/2/132536%20-%20The%20impact%20of%20green%20space%20and%20biodiversity%20on%20health.pdf</a> 2. <a href="https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5876990/">https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5876990/</a> 3. <a href="https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6651051/">https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6651051/</a>
Th, Oct 6	<b>Workshop 1: Identifying research objectives and conducting a literature review</b>	<a href="https://libguides.uwf.edu/c.php?g=215199&amp;p=1420520">https://libguides.uwf.edu/c.php?g=215199&amp;p=1420520</a>
T, Oct 11	<b>Workshop 2: Identify gaps in literature and refining research objectives</b>	Assignment due before class: Each group finds and reads 6 relevant scientific articles and is prepared to summarize in class
Th, Oct 13	Fall break-no class	
Th, Oct 18	<b>Panel discussion with Virginia Science Museum Staff</b>	Groups prepare specific questions for Science Museum Staff about gaps in knowledge and applied research needs
Th, Oct 20	<b>Workshop 4: Translation of literature review into introduction section</b>	
T, Oct 25	<b>Workshop 5: Identifying methods and data collection</b>	<b>Literature review due by 11 pm</b>
	<b>Workshop 6: Results and Discussion sections</b>	
Th, Oct 27	Kanopy Video on Place and Health and Discussion	<b>Research Paper outline due by 11 pm</b>
T, Nov 1	Built Environment and Health (Prof Obasanjo)	
Th, Nov 3 <b>One Health Day!!!</b>	<b>Field Trip to Richmond 7am-2pm</b> One Health and Environmental Justice: Introduction to the Case Study on Health Impacts of Redlining in Richmond, VA	
<b>One Health in Practice: Zoonotic Diseases of Public Importance (Dr. Obasanjo)</b>		

T, Nov 8	Election day-no classes	
Th, Nov 10	Bacterial & Parasitic Zoonoses	1. MacKenzie et al NEJM 1994. 2. <a href="https://wwwnc.cdc.gov/eid/article/8/10/02-0353_article">https://wwwnc.cdc.gov/eid/article/8/10/02-0353_article</a> 3. Science Magazine article. <a href="https://www.newsobserver.com/news/local/article253552474.html">https://www.newsobserver.com/news/local/article253552474.html</a>
T, Nov 16	Coronavirus: COVID-19 and other emerging diseases	1. Podcast on One Health approach to COVID <a href="https://tools.cdc.gov/medialibrary/index.aspx#/media/id/422796">https://tools.cdc.gov/medialibrary/index.aspx#/media/id/422796</a> 2. <a href="https://www.gcatresearch.com/gcatr/pdf/2021/gcatr.03.0042.pdf">https://www.gcatresearch.com/gcatr/pdf/2021/gcatr.03.0042.pdf</a>
Th, Nov 18	Viral Zoonoses: eg Yellow Fever, Coronaviruses (SARS and MERS), Dengue, West Nile, Ebola, Marburg	1. Chapter 8 in One Health: People, Animals and the Environment. By Atlas and Maloy 2. National Geographic Article: Inside the massive effort to tackle one of America's greatest rabies threats (Blackboard)
T, Nov 22	<b>Non-cumulative Exam (Section 3 only)</b>	
Th, Nov 25	Thanksgiving break	
<b>Real-World Applications of One Health (Guest speaker for 40 mins and then open workshops)</b>		
T, Nov 29	<ul style="list-style-type: none"> <li>Careers in One Health</li> <li>Guest Speaker: Dr. Griffin; Chief, Division of Infectious Disease - ProHEALTH, an OPTUM Company</li> </ul>	1. Chapter 2 and 4 in The Global Threat of New and Reemerging Infectious Diseases: Reconciling US National Security and Public Health Policy by Brower and Chalk (In Blackboard)
Th, Dec 1	<ul style="list-style-type: none"> <li>Careers in One Health- Conservation</li> <li><b>Guest Speaker: Steve Osofsky</b></li> </ul>	1. Chapter 18 in One Health: People, Animals, and the Environment by Atlas
T, Dec 6	<ul style="list-style-type: none"> <li>One health applications to the animal health and environmental sector</li> <li><b>Guest Speaker: Angela Yang</b></li> </ul>	<b>Final papers due by 11pm ET</b>  1. <a href="https://pubmed.ncbi.nlm.nih.gov/33066254/">https://pubmed.ncbi.nlm.nih.gov/33066254/</a>
Th, Dec 8	<ul style="list-style-type: none"> <li><b>Final Presentations in class (8-10 mins each)</b></li> </ul>	<b>Final group ppt presentations in class</b>

**Resources:**

<https://www.cdc.gov/ncezid/index.html>

