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**Cover Sheet for In-State Institutions**  
**New Program or Substantial Modification to Existing Program**

Institution Submitting Proposal	Johns Hopkins University
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*Each action below requires a separate proposal and cover sheet.*

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|--|---|
| <input type="radio"/> New Academic Program                   | <input type="radio"/> Substantial Change to a Degree Program            |
| <input type="radio"/> New Area of Concentration              | <input type="radio"/> Substantial Change to an Area of Concentration    |
| <input type="radio"/> New Degree Level Approval              | <input type="radio"/> Substantial Change to a Certificate Program       |
| <input checked="" type="radio"/> New Stand-Alone Certificate | <input type="radio"/> Cooperative Degree Program                        |
| <input type="radio"/> Off Campus Program                     | <input type="radio"/> Offer Program at Regional Higher Education Center |

Payment Submitted: <input checked="" type="radio"/> Yes <input type="radio"/> No	Payment Type: <input type="radio"/> R*STARS <input checked="" type="radio"/> Check	Payment Amount: \$850	Date Submitted: 7/18/2019
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Department Proposing Program	Bloomberg School of Public Health		
Degree Level and Degree Type	Post-Baccalaureate Certificate		
Title of Proposed Program	Climate Change and Public Health		
Total Number of Credits	18		
Suggested Codes	HEGIS: 121400.00	CIP: 51.0000	
Program Modality	<input type="radio"/> On-campus	<input type="radio"/> Distance Education ( <i>fully online</i> )	<input checked="" type="radio"/> Both
Program Resources	<input checked="" type="radio"/> Using Existing Resources	<input type="radio"/> Requiring New Resources	
Projected Implementation Date	<input checked="" type="radio"/> Fall	<input type="radio"/> Spring	<input type="radio"/> Summer Year: 2020
Provide Link to Most Recent Academic Catalog	URL: <a href="https://www.jhsph.edu/admissions/how-to-apply/prospectus-request/_pdf/2019-2020_prospectus.pdf">https://www.jhsph.edu/admissions/how-to-apply/prospectus-request/_pdf/2019-2020_prospectus.pdf</a>		
Preferred Contact for this Proposal	Name:	Natalie Lopez	
	Title:	Senior Academic Compliance Specialist	
	Phone:	(410) 350-9181	
	Email:	nlopez13@jhu.edu	
President/Chief Executive	Type Name:	Sunil Kumar	
	Signature:		Date: 07/18/2019
	Date of Approval/Endorsement by Governing Board: Not Applicable		

Revised 12/2018



July 18, 2019

James D. Fielder, Jr., PhD  
Secretary  
Maryland Higher Education Commission  
6 N. Liberty Street, 10th Floor  
Baltimore, MD 21201

Dear Dr. Fielder:

On behalf of Provost Sunil Kumar, Dean Ellen MacKenzie, and the Bloomberg School of Public Health, I write to request your review and endorsement of the enclosed proposal. The Bloomberg School proposes a new **Post-Baccalaureate Certificate in Climate Change and Public Health**.

The proposed Post-Baccalaureate Certificate in Climate and Public Health is designed for students who wish to enhance their knowledge in climate as it relates to public health. Students who complete the program will be prepared to explain how the climate is changing, the impacts of those changes on public health, and ways to mitigate or adapt to them.

The proposed program is consistent with the Johns Hopkins mission and the State of Maryland's Plan for Postsecondary Education. The proposal is fully endorsed by The Johns Hopkins University.

A business check (#11794135) for the review of this proposal has been sent to the Commission. Should you have any questions or need further information, please do not hesitate to contact Natalie Lopez at (410) 516-6430 or [nlopez13@jhu.edu](mailto:nlopez13@jhu.edu). Thank you for your support of Johns Hopkins University.

Sincerely,

A handwritten signature in blue ink, appearing to read "Janet Simon Schreck".

Janet Simon Schreck, PhD  
Associate Vice Provost for Education

cc: Dr. Sunil Kumar  
Ms. Natalie Lopez

Enclosures

**The Johns Hopkins University  
Bloomberg School of Public Health  
Proposal for New Academic Program**

**Post-Baccalaureate Certificate in Climate Change and Public Health**

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**A. Centrality to Institutional Mission Statement and Planning Priorities**

**1. Provide a description of the program, including each area of concentration, and how it relates to the institution's approved mission**

The Johns Hopkins University Bloomberg School of Public Health (JHSPH) proposes a new Post-Baccalaureate Certificate in Climate and Public Health in response to increasing changes in global climate and the impact they have on public health.

The mission of JHSPH is the improvement of health through discovery, dissemination, and translation of knowledge and the education of a diverse global community of research scientists and public health professionals. This new certificate program enhances this mission by building an awareness of the effects of climate on health and training future leaders to implement new strategies to mitigate these effects. Those who complete the certificate program will be prepared to explain how the climate is changing, the impacts of those changes on public health, and ways to mitigate or adapt to them. The certificate program directly supports the strategic education goal of "preparing leaders in public health science and practice to address current and future public health challenges."

This program is designed for full-time or part-time students who wish to enhance their knowledge or activities in climate as it relates to public health, as well as individuals who are not currently enrolled in degree programs at the Johns Hopkins University. This program aims to train graduates to anticipate, prevent and mitigate public health consequences due to climate change.

The proposed program will commence in Fall 2020 and will require successful completion of a minimum of 18 credits of didactic courses. Individuals not currently enrolled in a degree program at the Johns Hopkins University must complete the certificate program within three years of commencing the first certificate course.

**2. Explain how the proposed program supports the institution's strategic goals and provide evidence that affirms it is an institutional priority.**

The proposed program advances the university's *Ten by Twenty* vision, and related strategic goals for Johns Hopkins University. The program will support the core academic mission of the University by enhancing and enriching the impact of the University on the nation, Baltimore, and the world through state-of-the-art training of individuals who will apply the latest concepts and tools of public health to address climate change and its effects.

**3. Provide a narrative of how the proposed program will be adequately funded for at least the first five years of program implementation.**

JHSPH sets aside a portion of its tuition revenue each year as part of its budgeting process to fund the development of new programs and new courses. In addition, the tuition revenue from enrollments in the courses in any program is used to cover the instructional costs of the program before any excess is used for other JHSPH efforts. If a new program finds that its instructional costs are greater than the tuition revenue, funds are allocated from elsewhere in the overall JHSPH budget to cover the startup program's shortfalls during the first five years. Additional information is in Appendix C.

**4. Provide a description of the institution's commitment to:**

**a) Ongoing administrative, financial, and technical support of the proposed program.**

JHSPH's ongoing administrative, financial, and technical support for this program is reflective of the 100 years this school has been supportive of public health programs that have educated many generations and individuals all over the world. JHSPH does a careful program viability study for new programs based on prospective student enrollment estimates, in addition to addressing global health concerns. The proposed program would receive the same sort of administrative, financial, and technical support as the other academic programs in JHSPH's portfolio.

**b) Continuation of the program for a period of time sufficient to allow enrolled students to complete the program.**

JHSPH is committed to providing all enrolled students the opportunity to complete the certificate program, including under circumstances of low demand. Programs are evaluated by the departments and determinations are made as to whether they should continue to admit students. If a program ceases to admit new students, the school remains committed to see the current students through their program of study.

**B. Critical and Compelling Regional or Statewide Need as Identified in the State Plan**

**1. Demonstrate demand and need for the program in terms of meeting present and future needs of the region and the State in general.**

According to the most recent report presented by the Intergovernmental Panel on Climate Change (IPCC), the UN body of scientists tasked with monitoring and predicting climate change, the increase in global average atmospheric temperature (from a baseline of 1850-1900) will reach 2.7°F by 2040. While many changes in climate are already occurring, this expected increase is considered a 'tipping point' for the environment. This change in global temperatures will accelerate food shortages, coastal flooding, increase wildfires,

create mass extinctions, kill off most coral reefs and worsen droughts. Overall, damages are estimated to cost \$54 trillion, will leave people displaced and without food or water, and will increase heat related morbidity and mortality. Mass migration is predicted with the well-characterized risks to population health when populations are on the move.

When it comes to demand, anecdotally we have heard from some students who declined our offer of admission to the MHS degree in Environmental Health that they were looking for something more climate-centric. At least a few of these students chose to go to Columbia University instead. According to Google Ad Words, each month the following terms are searched:

Google Search Terms	Searches per Month
What is climate change	12.1k
Impacts of climate change	1.6k
Human impact on climate change	480
Climate change and health	390

We need informed and capable leaders to tackle these issues. There are opportunities to make an impact in private, non-governmental, academic and government sectors. The Climate and Health certificate program provides individuals with the knowledge and tools needed to be at the forefront of this transition in human health as it relates to climate.

The program will prepare current and future practitioners to assess highly-complex climate and public health challenges and to evaluate and mitigate their potential impact on human health.

Graduates will be equipped to drive the responsible application of new strategies to mitigate climate change and the adverse health effects caused by it to residents of Baltimore, Maryland, the United States, and throughout the world.

**2. Provide evidence that the perceived need is consistent with the Maryland State Plan for Postsecondary Education.**

The 2017-2021 Maryland State Plan for Postsecondary Education articulates three goals for postsecondary education: **1.) Access: Ensure equitable access to affordable and quality postsecondary education for all Maryland residents as costs can be distributed over completion of program. 2.) Success: Promote and implement practices and policies that will ensure student success. 3.) Innovation: Foster innovation in all aspects of Maryland higher education to improve access and student success. The proposed program addresses each of these goals.**

JHSPH aims to prepare highly trained scientists and healthcare professionals to work in organizations where they can contribute to the public health needs of society. The proposed program is intended to meet the growing need for skilled professionals trained

in the integration of in vivo and in vitro tools in assessing the risk associated with environmental exposures in Baltimore, the State, across the country, and beyond. This is consistent with Goal 3 (Innovation) of the State Plan.

By allowing students to complete the program either full-time or part-time, access is provided to those who wish to enter this field as well as those currently working in it who wish additional training. Additionally, students who move away from the Maryland region will still be able to complete the program; thus, supporting the State Plan's innovation and completion goals (Goals 2 & 3).

Types of funding include loans, scholarships, student employment, travel awards and grants. Successful individuals often utilize more than one of the sources identified and are watchful for additional opportunities. Funding is available for matriculated degree students at all levels of their academic pursuits (Goal 1).

The JHSPH Student Affairs office is a resource to counsel prospective students on funding. In addition, the Financial Aid Office provides assistance with federal and private loans and federal work study (Goal 1).

JHSPH offers an array of services for the continued success of the student learner. These services include career counseling, 1:1 (student: faculty) academic advising, disability services, mentored research and mentored practicums in the areas of public health (Goal 2).

Each student receives a program plan of study and a guidebook for their program upon matriculation to the School. Each program has a program specific orientation for incoming students and faculty and staff meet with students throughout their program to insure continued progress towards their degree (Goal 2).

Typically, part-time students with full-time jobs who enroll in JHSPH degree programs represent a broader range of diversity than students in full-time degree programs. In targeting these part-time students, this program addresses the Access goal (Goal 1) in the State Plan.

Similarly, the proposed program is consistent with Goal 3, innovation, which articulates Maryland's aspiration to be "a national leader in the implementation of creative and diverse education and training opportunities that will align with State goals, increase student engagement, and improve learning outcomes..."

Additionally, the program, through the preparation of highly qualified individuals engaged in risk assessment, contributes to the economic growth and vitality goal (Goal 3) by providing life-long learning to scientists and health professionals so they can maintain the skills they need to succeed in the workforce.

**C. Quantifiable and Reliable Evidence and Documentation of Market Supply and Demand in the Region and State**

**1. Describe potential industry or industries, employment opportunities, and expected level of entry (ex: mid-level management) for graduates of the proposed program.**

The impacts of climate change have never been clearer. In the past 17 years, 16 were the hottest on record (average annual global temperature). The shifting climate brings new public health problems. The faculty member who will be directing this certificate program in the Department of Environmental Health and Engineering receives frequent inquiries from individuals interested in training to battle this change. The program will provide students with a pathway to career opportunities in government, non-profits, academia, and the private sector. These and similar employment opportunities are available nationwide. A recent search (November 2018) for employment in the area of climate and health on the job site [Indeed.com](https://www.indeed.com) revealed over 10,975 active job postings in Maryland where training in climate and health are required.

**2. Present data and analysis projecting market demand and the availability of openings in a job market to be served by the new program.**

The Department of Environmental Health and Engineering receives 1-2 inquiries each month from prospective students interested in training on the connection between climate change and public health.

According to the Bureau of Labor Statistics (BLS), nation-wide employment of healthcare practitioners and technical workers is projected to grow 13.8 percent from 2014 to 2024. This is an imprecise job category, but one can expect that job opportunities for which this new degree will prepare students should grow at least as fast as the healthcare field overall. In addition to the national employment projections made by the Bureau of Labor Statistics noted above, the State of Maryland projects that employment opportunities for healthcare practitioners and technical workers will grow 18.2 percent from 2014 to 2024.

Pursuing a Certificate in Climate Change in Public Health is a significant way to maintain career viability. Job opportunities for the graduates of this program include positions in government, NGOs, private sector and healthcare organizations.

**3. Discuss and provide evidence of market surveys that clearly provide quantifiable and reliable data on the educational and training needs and the anticipated number of vacancies expected over the next 5 years.**

There is a demand for qualified people to address and understand the multi-faceted mechanisms and effects of climate on health. They must be able to predict adverse climate outcomes that lead to an unsafe environment, including impacts on water, food, and disease vectors. Such information is needed to support government not only at the federal, state and local level, but also globally.

**4. Provide data showing the current and projected supply of prospective graduates.**

There are no Maryland schools that currently offer a graduate program in Climate Change and Public Health.

**D. Reasonableness of Program Duplication**

**1. Identify similar programs in the State and/or same geographical area. Discuss similarities and differences between the proposed program and others in the same degree to be awarded.**

In Maryland, there are no similar programs approved or endorsed by MHEC. There are similar programs at Yale, Columbia, the University of California, Emory, and Harvard.

**2. Provide justification for the proposed program.**

The program will provide concrete training in environmental science, policy, and risk assessment, with particular focus on how these fields can be used to address the impact of climate on public health. Such knowledge and skills will serve as the basis for this certificate program, which can lead students directly to private sector or government positions, or to obtain promotions in positions already held.

The program will be grounded in real-world challenges and informed by cutting edge scholarship, with a diverse faculty of the leading experts in the field and a student body bringing lived experiences to the classroom.

**E. Relevance to High Demand Programs at Historically Black Institutions (HBIs)**

By definition, an appropriate student for the program would apply after attending and completing a baccalaureate degree at any undergraduate institution, including any of Maryland's Historically Black Institutions. The proposed program would not directly affect the implementation, maintenance, uniqueness, identity or mission of these institutions.

There are no known similar programs in any of the Historically Black Institutions in Maryland.

**F. Relevance to the identity of Historically Black Institutions (HBIs)**

**1. Discuss the program's potential impact on the uniqueness and institutional identities and missions of HBI'S.**

There is no comparable degree program offered at any Historically Black Institutions in Maryland. We believe the program would not impact the uniqueness and institutional identities and missions of HBIs.



**G. Adequacy of Curriculum Design and Delivery to Related Learning Outcomes (as outlined in COMAR 13B.02.03.10)**

**1. Describe how the proposed program was established and describe the faculty who will oversee the program.**

Given the level of interest received from current and prospective students, we recognize that this program would be unique in its format and curriculum. The faculty are primarily members of the Department of Environmental Health and Engineering. The faculty have produced leading environmental health research while generating scholarship and educating the next generation of leaders in public health and climate change. Megan Latshaw will serve as certificate director; Appendix B has a full list of faculty associated with this program.

**2. Describe educational objectives and learning outcomes appropriate to the rigor, breadth and (modality) of the program.**

Educational Objectives:

- a. Explain the basic science behind climate change;
- b. Describe the drivers of climate change including food systems, water systems, built environment, land use, and population growth;
- c. Understand the role climate plays in public health;
- d. Apply the tools of public health to address climate change;
- e. Evaluate policy options to mitigate the impacts of climate change;
- f. Understand energy, including where it comes from, what it does, how it works, and options for transitions;
- g. Explain the linkages between climate, ecosystems, biodiversity, and public health.

Student Learning Outcomes:

- a. Explain the connection between climate and public health, ranging from temperature-related mortality and increasing rates of disease, to mass migration, food & water shortages, and resulting conflict;
- b. Describe policies and practices in the US and around the world addressing the impact of climate change on health;
- c. Summarize the role of various sectors (government, private and non-profit) in addressing climate change's impact on public health;
- d. Distinguish between climate-related risks in wealthier countries and those in developing countries;
- e. Evaluate research related to climate change and health;
- f. Discuss and predict how climate change will affect economics and social structures, including inequities in the risks and benefits associated with climate change;
- g. Develop and discuss strategies that effectively mitigate and prevent adverse health effects caused by climate change.

**3. Explain how the institution will:**

**a. Provide for assessment of student achievement of learning outcomes in the program**

JHSPH's Center for Teaching and Learning has a staff of Instructional Designers that assists faculty in the design and delivery of their courses. These Instructional Designers assist the faculty in preparing learning assessments (projects, papers, exams) that are linked to the program and course learning outcomes. These assessments are graded by the instructors and the students' grades reflect their knowledge of the matter.

**b. Document student achievement of learning outcomes in the program**

Grades are kept in a gradebook in the school's CoursePlus system and grade distributions are shared with the department chairs and the Committee on Academic Standards (CAS). If learning outcomes are not met in a given year, the program is expected to address these issues for the next offering.

**4. Provide a list of courses with title, semester credit hours and course descriptions, along with a description of program requirements**

A full course listing, with course titles, credits and descriptions, is provided in Appendix A.

*Program Requirements*

Students will be required to successfully complete a minimum of 18 didactic credits. Students will enroll in a combination of required core courses and electives. The program can be completed over a minimum of four 8-week terms. Once enrolled, students will work with the certificate program director to develop an initial plan for their program of study and the director will continue to guide them throughout their studies.

Program coursework will allow students to engage deeply with topics including risk sciences, public health and environmental sciences. Students will complete 10 courses to obtain a certificate.

Take both of the following school-wide required courses:

No.	Course Title	Credits	Online Term	Campus Term
N/A	Introduction to Online Learning	0	1, 2, 3, 4, S	-
550.860	Academic & Research Ethics at JHSPH	0	Any	-

Take all three of the following required courses:

No.	Course Title	Credits	Online Term	Campus Term
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317.600	Introduction to the Risk Sciences & Public Policy	4	3	1
180.651	Energy, Environment, and Public Health	2	-	3
180.602	Environment and Health in Low and Middle-Income Countries	2	-	3

Complete one of the following introductory environmental health courses:

No.	Course Title	Credits	Online Term	Campus Term
180.609	Principles of Environmental Health I	4	-	1
180.601	Environmental Health	5	SI, 3	S

Complete one of the following climate and health courses:

No.	Course Title	Credits	Online Term	Campus Term
180.607	Climate Change and Public Health	3	S	-
180.611	The Global Environment, Climate Change and Public Health	4	-	1

Complete two of the following deeper dive courses:

No.	Course Title	Credits	Online Term	Campus Term
180.620	Food Systems and Public Health	4	2	-
180.625	Community-Driven Epidemiology and Environmental Justice	3	-	3
182.626	Issues for Water and Sanitation in Tropical Environmental Health	2	-	3
182.640	Food and Water Borne Diseases	3	-	3
180.653	Climate Change: Avoiding Conflict and Improving Public Health	3	4	-
180.628	Introduction to Environmental and Occupational Health Law	4	4	-
185.600	One Health Tools to Promote and Evaluate Healthy and Sustainable Communities	3	4	-
180.608	Public Health Responses to Environmental Incidents and Disasters	3	-	4
180.670	Introduction to Public Health Emergency Preparedness	3	-	4
224.689	Health Behavior Change at the Individual, Household and Community Levels (sustainability option)	4	-	2
330.665	Climate Change and Mental Health	1	SI	-

**5. Discuss how general education requirements will be met, if applicable.**

Not applicable

**6. Identify any specialized accreditation or graduate certification requirements for this program and its students.**

Not applicable

**7. If contracting with another institution or non-collegiate organization, provide a copy of the written contract.**

Not applicable

**8. Provide assurance and any appropriate evidence that the proposed program will provide students with clear, complete, and timely information on the curriculum, course and degree requirements, nature of faculty/student interaction, assumptions about technology competence and skills, technical equipment requirements, learning management system, availability of academic support services and financial aid resources, and cost and payment policies.**

JHSPH's CoursePlus system <https://courseplus.jhu.edu/core/index.cfm/go/home/> contains all the course offerings including a course description, requirements, nature of faculty/student interaction, assumptions about technology competence and skills, and technical equipment requirements. These details are listed on the syllabus for a course. All program related information (degree requirements, learning management systems, academic support, financial aid, records, and policies) can be found on the School's web site <https://www.jhsph.edu/> and in the Academic Prospectus [https://www.jhsph.edu/admissions/how-to-apply/prospectus-request/\\_pdf/2019-2020\\_prospectus.pdf](https://www.jhsph.edu/admissions/how-to-apply/prospectus-request/_pdf/2019-2020_prospectus.pdf)

**9. Provide assurance and any appropriate evidence of advertising, recruiting and admissions materials will clearly and accurately represent the proposed program and the services available.**

The JHSPH web site <https://www.jhsph.edu/> contains the same marketing, recruiting and admission materials that are used in print. The Academic Prospectus [https://www.jhsph.edu/admissions/how-to-apply/prospectus-request/\\_pdf/2019-2020\\_prospectus.pdf](https://www.jhsph.edu/admissions/how-to-apply/prospectus-request/_pdf/2019-2020_prospectus.pdf) is also available in interactive PDF form. We are transparent with students on requirements, services and policy at time of admission through the life cycle of a student to alum.

**H. Adequacy of Articulation**

Not applicable.

**I. Adequacy of Faculty Resources (as outlined in COMAR 13b.02.03.11)**

- 1. Provide a brief narrative demonstrating the quality of program faculty. Include a summary list of faculty with appropriate type, terminal degree title and field, academic title/rank, status, (fulltime, part-time, adjunct) and the course(s) each faculty member will teach (in this program).**

See Appendix B for a representative list of faculty who will teach in the proposed program. Each of the affiliated faculty are distinguished and experienced professionals and all have advanced degrees, many with multiple doctorates. Greater than 90% of the faculty are full time. They have produced leading environmental health research while continuing to generate path-breaking scholarship, educating the next generation of leaders in environmental science and public health. Most of the faculty have research programs funded by international and nongovernment agencies as well as the U.S. government, such as the NIH, CDC, EPA, and NSF. Together, hundreds of manuscripts have been published in peer reviewed journals by the faculty who are teaching in our program. Program faculty have also served on committees that are responsible for funding, regulation, and education. Overall, many of these faculty are considered to be the leading experts in their field of study.

- 2. Demonstrate how the institution will provide ongoing pedagogy training for the faculty in evidenced-based best practices, including training in a. Pedagogy that meets the needs of students, b. the learning management system and c. Evidenced-based best practices for distance education, if distance education is offered:**

The School's Center for Teaching and Learning (CTL) supports faculty in the design, development and delivery of courses and supports the teaching experience. CTL offers workshops and 1:1 faculty consultations on topics such as course consultations, Faculty and TA development and using CoursePlus. Such workshop topics include: using Case Studies and Case Examples, Getting the Most Out of Your Live Talk, Using the Course Management System to Its Fullest Potential in the Education Process and Authentic Assessment.

CTL has a staff of Instructional Designers that are assigned to faculty developing or teaching a course. Instructors receive direct support and guidance from the instructional designer and the multimedia staff, which may take the form of course design, course production support, and audio and video recording support. CTL supports faculty in the refinement of the course by updating content and the quality of the students' educational experience.

**J. Adequacy of Library Resources (as outlined in COMAR 13B.02.03.12)**

The book collections at the Johns Hopkins University number almost two and one-half million volumes, selected to support the studies of all departments and divisions of the University. The William H. Welch Medical Library collects current scholarly information, primarily electronic, which supports the research, clinical, administrative, and educational

needs of its clients. The collection covers health, the practice of medicine and related biomedical and allied health care disciplines, public health and related disciplines, nursing, research literature, methodological literature, reviews or state-of-the-art reports, and in-depth, authoritative analyses of areas influencing biomedicine and health care. The library's emphasis is on providing materials at point of need. As a result, the collection includes more than 7,200 electronic journals, more than 400 databases, and more than 13,000 e-books. The library has staff members assigned to each department to aid in research and best practices for library services.

**K. Adequacy of Physical Facilities, Infrastructure and Instructional Equipment (as outlined in COMAR 13B.02.03.13).**

- 1. Provide an assurance that physical facilities, infrastructure and instruction equipment are adequate to initiate the program, particularly as related to spaces for classrooms, staff and faculty offices, and laboratories for studies in the technologies and sciences. If the program is to be implemented within existing institutional resources, include a supportive statement by the President for adequate equipment and facilities to meet the program's needs.**

JHSPH has 26,567 square feet of classroom and student study space. Each classroom has a computer and LCD projector. The School has robust student support services, including a fully staffed information technology team and over 1000 computers located in computer labs and throughout main buildings for student use. The central computing resource for the School, the Office of Information Technology (IT), provides students with reliable computing infrastructure, location, and device independence, and critical software tools. Additionally, an enterprise service desk offers support for faculty, staff, and students. Assistance is provided over various channels, including phone, desktop, and FIPS 140-2 compliant remote-control support. Customer satisfaction is monitored and benchmarked against other higher educational institutions and industries. For this program, no additional facilities, infrastructures or laboratory or computer resources will be required.

- 2. Provide assurance and any appropriate evidence that the institution will ensure students enrolled in and faculty teaching in distance education will have adequate access to: a) an institutional electronic mailing system, and b) a learning management system that provides the necessary technological support for distance education.**

- a) All JHU students receive an Office 365 account including email capabilities (built on Outlook Live), as well as 25GB of online storage, and collaboration, blogging, photo-sharing, event-planning, instant messaging, and other tools. The email account is accessible from a variety of browsers on both the PC and Mac, including full support for Internet Explorer, Firefox, and Safari.
- b) Courses can be taken through JHSPH's CoursePlus course management system. These technologies are supported by the Center for Teaching and Learning (CTL) and the university's IT infrastructure and provide password-protected online

course sites and community management systems that enable ongoing collaborative exchange and provide convenient channels for synchronous and asynchronous learning. Johns Hopkins is also outfitted with suitable technical and professional staff and a help desk to provide technical assistance to the students taking online courses. All of the student services such as application processes, course registration, bookstore, ID service, advising, and the course “Introduction to Online Learning” are currently provided online as well.

**L. Adequacy of Financial Resources with Documentation (as outlined in COMAR 13B.02.03.14)**

See Appendix C for detailed financial information.

**M. Adequacy of Provisions for Evaluation of program (as Outlined in COMAR 13B.02.03.15)**

**1. Discuss procedures for evaluating courses, faculty and student learning outcomes.**

As part of the program design and approval process, student learning outcomes and assessments have been aligned with the academic goals of the School and approved by the School’s Committee on Academic Standards. Student course evaluations, conducted at the end of each term, provide feedback about both courses and faculty. The evaluations include questions addressing the course overall, the instructor and the assessments of learning.

The program director will annually assess course evaluations and other feedback provided by students, faculty and other stakeholders in the program. Program level evaluation activities will include an annual assessment of program inputs, processes and outputs to generate a report on program applicants and admitted students, course enrollment, faculty participation, pedagogical innovations and program accomplishments/recognition.

Evaluation of student learning and achievement will focus on the early identification of students’ goals/objectives and individualized learning outcomes; students’ acquisition of knowledge and skills and the degree to which the program is fostering students’ achievement of the certificate competencies. The Educational Program Committee in the department reviews student course evaluations and will reach out to program faculty when problems arise.

**2. Explain how the institution will evaluate the proposed program’s educational effectiveness, including assessments of student learning outcomes, student retention, student and faculty satisfaction, and cost effectiveness**

The procedures that will be used to evaluate these matters are noted in section M.1. The department Chair, working closely with administrative staff and the Associate Dean for Education, will routinely evaluate performance and initiate corrective action plans, if necessary.

**N. Consistency with the State’s Minority Student Achievement Goals (as outlined in COMAR13B.02.03.05).**

Any student meeting the admissions requirements can apply to the program, which will work to help all accepted students improve their workplace competitiveness and reach their professional goals, an aim consistent with the State’s minority student achievement goals.

**O. Relationship to Low Productivity Programs Identified by the Commission:**

Not applicable.

**P. Adequacy of Distance Education Programs (as outlined in COMAR 13B.02.03.22)**

**1. Provide affirmation and any appropriate evidence that the institution is eligible to provide Distance Education.**

JHSPH has decades of experience administering successful online courses and programs. This program will be supported in the same way our other programs are supported. JHSPH’s Center for Teaching and Learning (CTL) has the instructional knowledge and staff to support our faculty and successful student learning.

**2. Provide assurance and any appropriate evidence that the institution complies with C-RAC guidelines, particularly as it relates to the proposed program:**

**a) Online learning is appropriate to the institution’s mission and purposes:**

Refer to Section A.1 in the main body of the proposal.

**b) The institution’s plans for developing, sustaining, and if appropriate, expanding online offerings are integrated into its regular planning and evaluation processes.**

JHSPH has a commitment to online teaching as demonstrated by the resources of its Center for Teaching and Learning, which provides course development, instructional, and technical support to new and current faculty.

**c) Online learning is incorporated into the institution’s systems of governance and academic oversight.**

At JHSPH, any new proposed academic program is subjected to a review by the School’s Committee on Academic Standards, a faculty body with representation from all departments and school-wide programs. If approved by the Committee, the proposal is then forwarded to the School’s Advisory Council, comprised of the School’s leadership and Department Chairs, for review and approval. Once approved at the School level, new programs (both on-site and online) must be approved by Johns Hopkins University, which reviews all new program proposals using the same systems of governance and academic oversight. Before being shared with the deans of all JHU academic divisions, all proposals must first



undergo a review by internal academic bodies, including discussions of fit with the School's mission, program viability, program rigor, instructor quality, and redundancy with existing programs. Once a program is launched, its courses will enter the course evaluation system. Students in all JHSPH courses complete a course evaluation. These evaluations ask students to reflect on the course structure, the course content, and the instructor's performance. Summary reports are reviewed by the faculty member, the program chair, and the JHSPH administration to determine whether changes are necessary.

- d) Curricula for the institution's online learning offerings are coherent, cohesive, and comparable in academic rigor to programs offered in traditional instructional formats.**

The courses for this program may be taken in traditional format or on-line. Both fulltime and part-time (online) students will be held to same academic standards required to complete the program. The program is composed of courses that are appropriately sequenced to ensure students have the adequate background for courses that are required later in the program.

All online courses adhere to CTL's course development process with support from experienced instructional designers. Online coursework follows well-established curriculum development standards, tailoring delivery methods, content, and assessments to learning objectives. The electronic portfolio will be used to assess students' achievement of program competencies.

- e) The institution evaluates the effectiveness of its online learning offerings, including the extent to which the online learning goals are achieved, and uses the results of its evaluations to enhance the attainment of the goals.**

As part of the online course design process, course assessments are required to be aligned with stated courses learning objectives. The proposed program will incorporate authentic assessments that demonstrate students' application of learned skills. Program faculty have experience with developing individual and collaborative assessments for measuring the acquisition of relevant knowledge and skills through online learning.

- f) Faculty responsible for delivering the online learning curricula and evaluating the students' success in achieving the online learning goals are appropriately qualified and effectively supported.**

Online programs are supported by CTL, which offers a number of opportunities and resources for faculty instructors and teaching assistants to become more familiar with online teaching and best pedagogical practices. In addition to maintaining an extensive catalog of resources on teaching and learning via an online Teaching Toolkit, CTL regularly offers events, workshops, and one-on-one office hours to introduce and provide updates on the latest advances in teaching technology and pedagogy.

Prior to teaching their first courses, all new online instructors are required to participate in training that conveys, among other things, principles of best practices for online education.

The Bloomberg School, through CTL, maintains an innovative course management system and provides faculty support and training for online education through a staff of more than 30 individuals who specialize in instructional design, audio production, technical writing, web development, production management and quality control.

**g) The institution provides effective student and academic services to support students enrolled in online learning offerings.**

The Bloomberg School maintains numerous web-based resources to inform prospective students on the information they may need as an online student. These resources include the JHSPH website [www.jhsph.edu](http://www.jhsph.edu) and the Course Catalog. These resources offer detailed programmatic information, academic support services, financial aid, costs, policies, etc. and specific information for online learning. As new online students are admitted and enrolled, they receive timely emails with important information to help them prepare to become an online student. These emails include information on technical requirements, available academic support services, and a required orientation course (IOL) for new online students.

JHSPH online students have access to the following academic support services:

**Academic advising.** Students are assigned an adviser when accepted. Students work individually with the adviser to develop a course of study that meets the requirements of the program and the career goals of the student. The adviser regularly contacts the students to check on progress and answer questions. Courses that deviate from the program plan and have not been approved by an adviser may not count toward program requirements.

**Library services.** Students have online access to the William H. Welch Medical Library and the Milton S. Eisenhower Library on the Homewood campus. The interlibrary loan department allows students access to resources at any other university in the nation. The University's library system provides easy access to a wide selection of electronic information resources, including an online catalog, and numerous electronic abstracting and indexing tools. Many of the databases are accessible remotely. Librarians are available to assist students remotely and the library maintains an extensive web site to take visitors through all its services and materials.

**Disability Support Services.** The Johns Hopkins University is committed to making all academic programs, support services, and facilities accessible to qualified individuals. Students with disabilities who require reasonable accommodations can contact the JHSPH Disability Services' Senior Director.

**Career Services.** The Career Services Office at the Bloomberg School helps students, alumni, faculty, staff, and employers navigate the world of public health jobs.

**Johns Hopkins Student Assistance Program.** The Johns Hopkins Student Assistance Program (JHSAP) is a professional counseling service that can assist students with managing problems of daily living. Stress, personal problems, family conflict, and life challenges can affect the academic progress of students. JHSAP focuses on problem solving through short-term counseling. Accessing the service is a simple matter of a phone call to arrange an appointment with a counselor. Online students contact the service by phone for consultation and are directed to the appropriate resource or office. JHSAP services are completely confidential. The program operates under State and federal confidentiality legislation and is HIPAA compliant.

**Transcript Access.** Students may view and print unofficial transcripts at any time. Official transcripts will be mailed to students upon completion of the program; additional official transcripts will be mailed upon request of the student at minimal charge.

**Student Login IDs.** The University issues each student a Johns Hopkins Enterprise ID (JHED ID) and the School issues a JHSPH ID. The JHED ID grants students a JHU email address and secure access to many online services including course registration, bill payment, official grades, library services, and the online learning platform CoursePlus. Students are also issued a JHSPH ID that provides access to the School's intranet (My JHSPH) where students can locate additional resources including research and administrative tools as well as the School's policy and procedures manual.

- h) The institution provides sufficient resources to support and, if appropriate, expand its online learning offerings.**

JHSPH has a commitment to online teaching as demonstrated by the resources of its Center for Teaching and Learning, which provides course development, instructional, and technical support to new and current faculty. See Appendix C for detailed financial information regarding the proposed program. If additional sections of a course are needed to support the program, the department will offer an additional section.

Each year during the budget development period, additional resources such as faculty, staffing, teaching assistants and other instructional needs are taken into consideration with program growth. In turn, the CTL will devise budgets to increase personnel for the following fiscal year if needed to support the online course growth.

**i) The institution assures the integrity of its online offerings.**

The Higher Education Opportunity Act (HEOA) enacted in 2008 requires that an academic institution that offers distance education opportunities to students 1) has a process established to verify that the student who registers is the same student who participates in and completes the offering and receives academic credit for it, 2) has a process established to verify that student privacy rights are protected, and 3) has a process established that notifies the student about any additional costs or charges that are associated with verification of student identity. In JHSPH programs, the following actions have been taken to satisfy these requirements: 1) students may only enter the academic website for the online courses they take by providing the unique student ID and password assigned after admission, 2) all FERPA privacy rights are preserved by limiting access very specifically in the University student information system to only those permitted by law to have access to restricted student information, and 3) there are no additional costs assessed to the student for the measures we use to verify student identity.

As referenced all new JHSPH students are enrolled in a mandatory Academic Ethics and Research course -- a zero-credit, zero-tuition course that is geared towards helping students avoid behaviors linked to plagiarism, cheating and other violations of academic integrity.

## Appendix A

### Course List and Descriptions

#### **550.860 Academic & Research Ethics (0 credits)**

Examines academic and research ethics at JHSPH in a series of online interactive modules. Focuses on information about the academic ethics code and responsible conduct of research at the School. Explores issues of academic integrity such as proper ethical conduct and referencing, and discusses violations such as plagiarism and cheating, relative to case studies that illustrate situations faced by students and faculty in the academic setting. Addresses topics that include responsible conduct of research, authorship, data management, data ownership, guidelines for professional conduct, research fraud or scientific misconduct, federal and institutional guidelines related to research using human and animal subjects and ethical issues involving vulnerable subjects in research.

Prerequisite: None

#### **180.609 Principles of Environmental Health (4 credits)**

Presents concepts, principles, and applications forming the basis of the field of environmental health. Topics include contaminant sources, fate & transport, pathways of exposure, toxicology, health effects, policy, practice and systems. Discussions and exercises focus on current environmental health issues and opportunities for prevention and intervention. Students learn how to critically evaluate current environmental health literature and how to think about environmental health from a systems perspective.

Prerequisite: None

#### **317.600 Introduction to the Risk Sciences and Public Policy (4 credits)**

Provides an introduction to the basic paradigm for quantitative risk assessment and illustrates its application in the public policy process using case studies. Examines risk assessment in a broad societal context, considering social, economic, and political factors that affect risk decision-making; evolution of risk assessment; and the use of risk assessment in regulatory processes. Students complete a risk assessment exercise.

Prerequisite: Instructor's consent

**180.628 Introduction to Environmental & Occupational Health Law (4 credits)** Examines US and international environmental and occupational health laws and regulations. Covers significant US federal laws, such as the Clean Air Act, the Occupational Safety and Health Act, Superfund, the Toxic Substances Control Act, Safe Drinking Water Act, the Resource, Conservation and Recovery Act and significant international treaties and laws, such as the European Union's REACH legislation, with a particular emphasis on how they influence public health intervention strategies. Also introduces students to the agencies that administer worker health and environmental protection programs.

**180.611 The Global Environment, Climate Change, and Public Health (4 credits)**

Explores how global environmental issues such as global warming, urban sprawl, deforestation, mining, environmental refugees, biodiversity loss, and food security may cause increasing human harm. Provides an overview of the science and policy issues related to the changing environment, how environmental problems affect human health, and emphasizes potential solutions and sustainable development methods essential for resolving a myriad of environment-health problems.

**180.620 Food Systems and Public Health (4 credits)**

Introduces the complex and challenging public health issue of food security (sufficient, safe and nutritious food for all) in a world where approximately 850 million people are under-nourished while over 2 billion are overweight or obese. Explores the connections among diet, our food system, the environment and public health, considering factors such as equity, population pressure and the historical, economic and political forces that have helped shape food systems. Considers approaches to achieving both local and global food security. Explores the important role public health professionals can play. Guest lecturers include experts from a variety of disciplines and experiences.

**188.688 Global Sustainability & Health Seminar (1 credit)**

Students and faculty discuss the causes, consequences, and implications of key global environmental challenges that we are facing and that are likely to become more challenging over time. Specifically addresses how land use (e.g., patterns of urban growth and suburban sprawl), energy use, food production and distribution, water use, and population growth are causing climate change, ecosystem degradation, biodiversity losses, species extinctions, and other resource depletion, and how all this is in turn is a threat to human health as individuals, in communities, and globally. Focuses on discussion and not lectures and will utilize a mix of movies, guest discussants, and student directed discussions.

**180.601 Environmental Health (5 credits)**

Summarizes the concepts and principles underlying environmental health sciences, characterizes the major environmental agents and vectors affecting public health, and introduces major ecologic, scientific, and political issues from selected topical areas of environmental health. Presents the major concepts and principles that are environmentally mediated and that constitute a risk to humans —emphasizing the chemical, biological, and physical agents and factors. Then, considers sources, environmental pathways of transmission, exposure-dose relationships, adverse health effects, and particularly susceptible populations. Identifies the principles and methods of risk assessment and risk management, and uses these as a unifying theme.

**182.626 Issues for Water and Sanitation in Tropical Environmental Health (2 credits)**

Introduces major environmental health problems in the tropical areas of the world and discusses some solutions in detail. Covers engineering, human behavior, and public health approaches to providing potable water and sanitation including simple water supplies, sanitary latrines, the relationship of water supply and sanitation to diarrheal diseases, disaster sanitation, and techniques for disinfection. Demonstrates field treatment of water supplies and water microbiology. Each student develops a case study drawn from current events and designs a field project for an environmental control measure to reduce disease in a community.

**180.651 Energy, Environment, and Public Health (2 credits)**

Examines why energy policy choices are so important to human health and well-being. Explores how the impacts of energy exploration, generation, and usage patterns are tied directly to economic prosperity, the condition of the environment, the health of the population, and even aspects of national and international security, for developed as well as developing nations. Discusses and presents potential solutions to the three biggest energy challenges: (1) meeting the basic energy needs of the world's poorest people in a more healthful manner, (2) de-carbonizing electricity generation, and (3) reducing oil dependence. Emphasizes that energy is the core of the environment problem and environment is the core of the energy problem.

**180.607 Climate Change and Public Health (3 credits)**

Explores the science of how and why the climate is changing, as well as the likely and potential impacts of climate change on public health in developed and developing regions of the world. Discusses how rising sea levels; worsening air quality; frequency and severity of weather-related disasters; and scarcity of food and drinking water are all influenced by the changing climate. Examines strategies for mitigation and adaptation, and the role public health professionals can play in these decisions.

**188.682 A Built Environment for a Healthy and Sustainable Future (3 credits)**

This course is intended for anyone interested in learning about how the built environment affects our health and well-being. We will address some rural and agricultural land use issues, but the majority of the course will focus on the urban built environment and transportation infrastructure. We will explore ways to change the urban built environment to contribute fewer greenhouse gases and also to adapt to a changing climate. With more than half of the global population now living in cities, this is a timely topic.

Addresses the role that the built environment plays in public health. Specifically examines how building design, community planning and design, land use, and transportation networks contribute to energy use, water supply degradation, climate change, ecosystem degradation, and public health. Explores the contributions of suburban sprawl to adverse environmental and public health outcomes. Also examines how the built environment could and must change if we are to stabilize the climate and move into a sustainable future.

**180.625 Community-Driven Epidemiology and Environmental Justice (3 credits)**

Low income communities and communities of color have challenged public health scientists to conduct research on environmental and occupational hazards that may impact their health. Such community-driven research requires environmental health scientists, epidemiologists and other researchers to modify approaches used in more traditional research conducted for stakeholders in government and industry. In this course, an expert researcher of community environmental justice concerns will provide an opportunity to develop facility with concepts, analytic methods and practice topics.

Introduces principles, concepts, and methods in community-driven environmental justice research. Presents current environmental justice research and future research needs. Offers practice opportunities for active involvement in problem-solving in environmental justice

research. Provides students an opportunity to develop facility with analytic methods needed to conduct research into community environmental justice concerns.

**180.602 Environment and Health in Low and Middle Income Countries (2 credits)**

Introduces how environmental health hazards can affect human health in low and middle income settings. Core concepts are exposure assessment, environmental epidemiology, and mitigating exposure. Topics include: heavy metals, water sanitation and hygiene, waterborne and related diseases, energy resources and health, air pollution, and second-hand smoke.

**182.640 Food and Water Borne Diseases (3 credits)**

Discusses food- and water-borne intoxicants and infections, diseases linked to eating and drinking, and prevention of food and water-borne diseases. Topics include transmission of disease via food and water, disease processes in food- and water-related illness, microbial toxins, mycotoxins, chemical toxins, bacterial infections (salmonellosis, shigellosis, vibrio, listeria, etc.) virus and parasitic infections, organizing safe food and water supplies, and issues in food and water safety.

**180.623 Infectious Disease Threats to Global Health Security (3 credits)**

What will cause the next pandemic or other significant international public health crisis and how do we protect countries from such events? This course will introduce students to the major health security threats that face the US and other countries and the strategies, policies and organizations that are in place to defend against them. Throughout the course, we will make notes of areas where approaches to health security have evolved. We will also examine where important gains in health security preparedness have been made and identify areas in which progress is still needed. Given their challenges and frequency with which they occur, preparedness for and response to biological threats to health security will be a large focus of this class. Discussions of other health security threats and sharing of experiences from students are welcome.

**180.653 Climate Change: Avoiding Conflict and Improving Public Health (3 credits)** This course explores the potential for a changing climate to cause food and water shortages, forced migration, and conflict. Through a series of case studies of climate change-relevant crisis events around the world, we will examine the factors that led to the communities in question mustering resilience to survive and recover from the crisis vs. the factors that led to conflict. Through this analysis, we will identify a suite of resilience factors and strategies, such as community cohesion, ecosystem restoration, agricultural and water capture and storage, that could be built into policies to assist high risk areas in avoiding conflict.

**182.638 Environmental and Health Concerns in Water Use and Reuse (4 credits)** Provides an overview of environmental and public health issues related to water use and reuse, and describes the different strategies for treating both drinking water and wastewater to meet regulatory standards and ensure the health of both human populations and the environment. Since two key issues in public and environmental health are sustainable access to clean drinking water and safe reclamation of wastewater, respectively, students learn core principles of water quality engineering that are critical for protecting human populations from waterborne pathogens.



**185.600 One Health Tools to Promote and Evaluate Healthy and Sustainable Communities (3 credits)**

Students will learn and apply tools and principles of One Health, which is the interface of human health, animal health and environmental health, to promote and evaluate healthy and sustainable communities. Classes will cover methods central to the conduct of One Health research or programs, which includes study design, stakeholder participation, community engagement and program evaluation, and will cover topics of high relevance to One Health in a way that uses systems approaches and synthesis to join perspectives from the multiple disciplines. These topics include drivers—such as the food system and antimicrobial resistance—that can contribute to or detract from the health and sustainability of communities. Methods will be presented in the context of applications such as policy, regulation, and economics and will connect One Health techniques for knowledge integration and other approaches to the design of healthy communities.

**180.670 Introduction to Public Health Emergency Preparedness (3 credits)**

Introduces public health emergency preparedness procedures, including natural and technological disasters; terrorism; emerging threats; and methods to address these from planning and response perspectives. Content includes domestic and international public health emergency contexts, and integrates knowledge and skills learned from other courses within the Health in Crisis: Human Rights, Disaster Preparedness and Humanitarian Assistance MPH Concentration. Practical work focuses on small group participation in in-class scenarios and exercises. As a final project, each student individually prepares a press statement regarding a potential public health emergency threat scenario.

**180.608 Public Health Responses to Environmental Incidents and Disasters (3 credits)**

Focuses on population exposures to and health impacts of non-infectious agents. Prepares students for applying methodologies for public health response and acquiring skills in developing standardized protocols to effectively recognize, evaluate and respond to public health emergencies and reported clusters of disease. Presents basic aspects of applied environmental health and policy frameworks for decision-making in environmental health. Provides competencies in finding and using web-based data sources, applying geospatial and other methodologies in analyzing information on exposures and health outcomes; identifying resources for coordinated response to environmental incidents; and communicating findings to decision-makers and the public. Equips students to participate in responding to disasters, reported outbreaks and apparent clusters. Provides experience in establishing exposure registries.

**224.689.01 Health Behavior Change at the Individual, Household and Community Levels (4 credits)**

Provides students with conceptual tools to analyze health-related behaviors and the social, cultural and environmental context in which they occur. Draws concepts and theories from medical anthropology, psychology and sociology are applied to programmatic examples from Latin America, Africa and Asia concerning care-seeking, treatment of sick children, insecticide-treated mosquito nets, voluntary counseling and testing, sexual risk behaviors, intimate partner violence and other behavior change challenges in public health.

## Appendix B

### List of faculty associated with this program

<b>Faculty Lead(s)</b>	<b>Rank</b>	<b>Discipline</b>	<b>Status</b>	<b>Course/number</b>	<b>Degree</b>
Latshaw, Megan	Assistant Scientist, Director of Proposed Certificate Program	Environmental Health and Engineering	FT	180.609 Principles of Environmental Health I	PhD
Augustinavicius, Jura L.	Assistant Scientist	Mental Health	FT	330.665 Climate Change and Mental Health	PhD
Barnett, Daniel	Associate Professor	Environmental Health and Engineering	FT	180.670 Introduction to Public Health Emergency Preparedness	MD
Bressler, Joseph	Associate Professor	Environmental Health and Engineering	FT	187.610 Public Health Toxicology 180.601 Environmental Health	PhD
Chaitkin, Stuart	Senior Associate	Environmental Health and Engineering	PT	180.651.01 Energy, Environment, and Public Health	MA
Chakraborty, Subhra	Associate Scientist	International Health	FT	180.602 Environment and Health in Low and Middle Income Countries	PhD
Davis, Meghan Frost	Assistant Professor	Environmental Health and Engineering	FT	185.600 One Health Tools to Promote and Evaluate Healthy and Sustainable Communities  180.601.01 Environmental Health	PhD, DVM
Fry, Jillian Parry	Assistant Scientist	Environmental Health and Engineering	FT	-	PhD

George, Christine	Associate Professor	International Health	FT	180.602.01 Environment and Health in Low and Middle Income Countries	PhD
Heaney, Christopher	Associate Professor	Environmental Health and Engineering	FT	180.625 Community-Driven Epidemiology and Environmental Justice 340.680 Environmental and Occupational Epidemiology	PhD
Locke, Paul	Associate Professor	Environmental Health and Engineering	FT	180.628 Introduction to Environmental and Occupational Health Law	DrPH
Nachman, Keeve	Assistant Professor	Environmental Health and Engineering	FT	317.600.01 Introduction to the Risk Sciences and Public Policy	PhD
Neff, Roni	Assistant Professor	Environmental Health and Engineering	FT	180.655 Baltimore Food Systems: a Case Study of Urban Food Environments 180.605 Food System Sustainability Practicum	PhD
Parker, Cindy L.	Assistant Scientist	Environmental Health and Engineering	FT	180.611 The Global Environment, Climate Change, and Public Health 188.688 Global Sustainability & Health Seminar 180.607 Climate Change and Public Health	MD

				180.653 Climate Change: Avoiding Conflict and Improving Public Health	
Schwab, Kellogg	Abel Wolman Professorship in Water and Public Health	Environmental Health and Engineering	FT	182.626 Issues for Water and Sanitation in Tropical Environmental Health 182.640 Food and Water Borne Diseases	PhD
Schwartz, Brian	Professor	Environmental Health and Engineering	FT	180.611 The Global Environment, Climate Change, and Public Health 180.601 Environmental Health	MD
Silbergeld, Ellen	Professor	Environmental Health and Engineering	FT	180.608 Public Health Responses to Environmental Incidents and Disasters 180.631 Environmental and Occupational Health Policy Seminar	PhD
Willis- Karp, Marsha	Department Chair, Professor	Environmental Health and Engineering	FT	-	PhD
Yori, Pablo Peñataro	Senior Research Associate	International Health	FT	180.602 Environment and Health in Low and Middle Income Countries	MHP

## Appendix D

<b>TABLE 1: RESOURCES:</b>					
<b>Resource Categories</b>	<b>2020</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>	<b>2024</b>
1. Reallocated Funds	0	0	0	0	0
2. Tuition/Fee Revenue <i>(c + g below)</i>	\$57,449	\$59,172	\$60,948	\$62,776	\$64,659
a. Number of F/T Students	1	1	1	1	1
b. Annual Tuition/Fee Rate	\$57,449	\$59,172	\$60,948	\$62,776	\$64,659
c. Total F/T Revenue (a x b)	\$57,449	\$59,172	\$60,948	\$62,776	\$64,659
d. Number of P/T Students	0	0	0	0	0
e. Credit Hour Rate	0	0	0	0	0
f. Annual Credit Hour Rate	0	0	0	0	0
g. Total P/T Revenue <i>(d x e x f)</i>	0	0	0	0	0
3. Grants, Contracts & Other External Sources	0	0	0	0	0
4. Other Sources	0	0	0	0	0
<b>TOTAL (Add 1 – 4)</b>	<b>\$57,449</b>	<b>\$59,172</b>	<b>\$60,948</b>	<b>\$62,776</b>	<b>\$64,659</b>

1. Reallocated Funds: No reallocation of funds is necessary for this proposed program.
2. Tuition/fee Revenue: Resources are primarily full time tuition revenues. The expectation is that the equivalent of 1 FT student will take this certificate as they complete their degree program. The cost of the per credit tuition cost subject to a 3% increase each year. Tuition will be the only resource to support the revenue to this program.
3. Grants, Contracts & Other External Sources: Not applicable
4. Other Sources: Not applicable

**TABLE 2: EXPENDITURES:**

<b>Expenditure Categories</b>	2020	2021	2022	2023	2024
1. Faculty (b + c below)	\$20,499	\$21,114	\$21,748	\$22,401	\$23,072
a. # FTE	.10	.10	.10	.10	.10
b. Total Salary	\$15,298	\$15,757	\$16,230	\$16,717	\$17,218
c. Total Benefits	\$5201	\$5357	\$5518	\$5684	\$5854
2. Admin. Staff (b + c below)	0	0	0	0	0
a. # FTE	0	0	0	0	0
b. Total Salary	0	0	0	0	0
c. Total Benefits	0	0	0	0	0
3. Support Staff (b + c below)	\$15,812	\$16,286	\$16,775	\$17,278	\$17,796
a. # FTE	.20	.20	.20	.20	.20
b. Total Salary	\$11,800	\$12,154	\$12,519	\$12,894	\$13,281
c. Total Benefits	\$4012	\$4132	\$4256	\$4384	\$4515
4. Equipment	0	0	0	0	0
5. Library	0	0	0	0	0
6. New or Renovated Space	0	0	0	0	0
7. Other Expenses	0	0	0	0	0
<b>TOTAL (Add 1 – 7)</b>	<b>\$36,311</b>	<b>\$37,400</b>	<b>\$38,523</b>	<b>\$39,679</b>	<b>\$40,868</b>

1. Faculty: Faculty Program Director effort at 10% in coordinating and advising students in the program with a 3% increase in salary each year. Fringe benefit rate of 34%.
2. Admin Staff: Not applicable.
3. Support Staff effort at 20% in supporting faculty director and admission inquiries. Salary subject to 3% increase. Fringe benefit rate of 34%.
4. Equipment: No additional equipment resources are necessary
5. Library: No additional library resources are necessary
6. New or Renovated Space: No additional space is necessary
7. Other Expenses: No other expenses anticipated for this program