

Biomedical Science Policy & Advocacy (BSPA)

BSPA 6523 Quantitative Mthds for Sci Pol 3 Credits

This course would cover the basics of data collection/selection, database setup, quantitative analysis basics using Excel and R, and data visualization in Tableau to give students a broad base for policy analysis and development. Students will have the opportunity to work on a project of their choosing and can use the classwork to develop a proposal for their capstone. This course covers distribution, bayesian analysis, regression and multiple regression, chi-square, T-test, ANOVA, Pearson correlation, and more.

Level: Graduate

Grading: Main Campus (UGrad, Grad)

Course registration restrictions:

Enrollment is limited to Graduate level students.

BSPA 6562 Shaping National Science Policy 3 Credits

This course will cover science policy, science advocacy and domestic politics. We will discuss and review current and evolving topics shaping national science policy and their impacts on domestic and foreign policies.

Level: Graduate

Grading: Main Campus (UGrad, Grad)

Course registration restrictions:

Enrollment is limited to Graduate level students.

BSPA 6570 Clin. Apps. of the Microbiota 2 Credits

Microbiomics touch upon a broad range of disciplines, including microbiology, immunology, biochemistry, and bioinformatics. This new discipline can elucidate further our understanding of the complex interactions among host, immune system, and health at every stage of life. This course will introduce the broad and important roles that the microbiota can play such as in human immune systems, wellness and aging, environmental health, neurological functions, and population health. The course will consist of lectures, including invited guest speakers, hands-on sessions, and a panel discussion. We will also cover study design, statistical considerations for microbiomics, and critiques of the microbiome literature. Students will learn about the role of next generation microbial sequencing, including indications for, and how to interpret the results of the taxonomic and metagenomic analyses.

Level: Graduate

Grading: Main Campus (UGrad, Grad)

Course registration restrictions:

Enrollment is limited to Graduate level students.

BSPA 6587 Global Health Policy Governance 2 Credits

This course introduces the idea of a global health system focusing on global health architecture, the role of different global health actors in health policy, and its governance. We discuss the plurality and complexity in global health architecture and a few major global health actors in detail. We engage with the mandate and role of each of these actors in global health policy and governance and examine the trends in the influence of major global actors over the last few decades.

We also critically engage with the idea of global health governance contextualizing it in health systems governance and globalization debates. We examine the current issues in global health governance surrounding equity, accountability, and transparency. The course concludes by introducing the idea and practice of decoloniality in global health systems governance, bringing in the issues of power, hierarchy, and politics of knowledge in medical and health systems and its impact on inequities in health care policies and outcomes.

Level: Graduate

Grading: Main Campus (UGrad, Grad)

Course registration restrictions:

Enrollment is limited to Graduate level students.

BSPA 6589 Environmental Health Policy 2 Credits

A recent White House report emphasizes the importance of "Big Data" in the science and health care fields. Managing big data in health sciences requires understanding of much broader areas of the field. Experts in various disciplines of health sciences need to develop wide understanding to ride this paradigm shift and need to help create new sets of health care policies for policy makers through collaborations and interdisciplinary approaches in emerging fields, such as environmental health. Across a broad range of health sciences, this course focuses on the field of environmental health and policy. The course will prepare students in both health sciences and public policy to quickly adapt to this emerging paradigm shift, while cultivating and directing their fresh innovative ideas in areas of environmental health policy. Environmental health is defined by the CDC's Environmental Hazards and Health Effects Program (EHHE) as a discipline of health sciences focused on improving "quality of life by preventing or controlling diseases or deaths that result from interactions between people and their environment." This course will cover a broad range of environmental health issues world-wide, for example: air pollution and respiratory problems, climate change on health effects, cancer clusters, various cause of asthma, toxic waste, radioactive effects, mold, water related environmental health problem, food security, and nuclear biological and chemical weaponry. The course will also bring the field's top experts from NASA, USAID, USDA, NIH, FDA, FBI, Ecological Society, and Chemical Society to the classroom. Through their lectures and friendly interactions with students, the students will learn about cutting edge research projects in environmental health and policy implications. Students will be given an opportunity to take field trips to see actual actions in the field. The goal for this course is to create both environmental science-savvy policy experts and environmental policy-savvy health science experts at the end of the semester.

Level: Graduate

Grading: Main Campus (UGrad, Grad)

Course registration restrictions:

Enrollment is limited to Graduate level students.

BSPA 6599 Survey of International Policy 3 Credits

Students will learn the history and application of international policy from 1917-present, with an emphasis on understanding current events and the changing political climate. The course will focus on primary documents and sources rather than a text. Students will explore policy from the perspective of another country for the semester, and will participate in discussions from the perspective of that nation.

Level: Graduate

Grading: Main Campus (UGrad, Grad)

Course registration restrictions:

Enrollment limited to students in the MS-BHTA, MS-BSPA, MS-MICB or PHD-MICB programs.

Enrollment is limited to Graduate level students.

BSPA 6603 ST in Global Arena 3 or 4 Credits

This interdisciplinary course will provide an introduction to contemporary science policy in theory and practice. This 3-credit course meets every Monday from 1-3:30pm. The course will review the roles of U.S. government executive, legislative, and judicial branch entities that make and shape national science policies; the evolution of science advocacy; and the impact of Federal policies on funding of research activities, science-industry interactions, and international collaborations. Students will gain a multi-faceted understanding of how science and scientists inform the development of policy frameworks (science for policy), and the ways in which policy decisions influence the environment for research and development (policy for science). This class uses case studies, flipped classroom approaches, and student-led discussions. Everyone is expected to read, watch, or listen to all assigned materials and be prepared to participate in all activities.

Level: Graduate, Undergraduate

Grading: Main Campus (UGrad, Grad)

Course registration restrictions:

Enrollment is limited to Graduate level students.

BSPA 6606 Public Policy for Scientists 3 Credits

This interdisciplinary course will provide introductory lectures in a variety of fields that pertain to biomedical science policy & advocacy. Lectures will cover relevant federal agencies, prominent science advocacy groups and techniques, principles of health economics, funding of research activities, the interaction of science & industry, as well as some controversial issues in science policy such as biodefense, stem cell research, and climate change. Students will be left with a multi-faceted understanding of the environment that shapes biomedical science policy and the scientists' role in this arena.

Level: Graduate, Undergraduate

Grading: Main Campus (UGrad, Grad)

Equivalent to BHTA 6606

Course registration restrictions:

Enrollment is limited to Graduate level students.

BSPA 6607 Pharm/Biotech/Med InnovReg 2 Credits

Rapid technological advancement and convergence of fields such as molecular biology, immunology, computer science and AI are leading to revolutionary progress in medical care. For example, the new Hepatitis B drugs and new immunotherapies for some cancers are revolutionary treatment compared to a decade ago. As emerging technologies and corresponding innovation lead to new products, services, businesses, and service models, governments must consider policy and regulatory ramifications. As needed, we need to create, modify, and enforce regulations. Significant challenges exist for regulators who struggle to maintain a balance between promoting innovations, protecting consumers, and addressing the potential unwanted consequences of technological advancements. The course reviews regulatory and public policy approaches for pharmaceutical, biotech and medical devices and regulatory challenges for new and emerging technologies. Technologies and innovations reviewed and considered include CRISPR, mRNA innovation and cancer immunotherapies, AI, robotics and miniaturization, and software and medical devices including associated cybersecurity.

Level: Graduate

Grading: Main Campus (UGrad, Grad)

Course registration restrictions:

Enrollment is limited to Graduate level students.

BSPA 6700 AI: Hlth, Defense, Ethics Pol 2 Credits

This course is taught with lectures 50% and discussions 50%. The first class is to introduce a specific AI technology by an experts and the second class we designate for discussion how to regulate the specific technology. The course is taught by faculty members with interdisciplinary backgrounds in AI, health care, defense, ethics and biomedical science policy with decades of experiences. Both instructors have advised at a US federal agency, teamed with a international expert in biomedical technology and healthcare economy. In 2023, AI faced a new paradigm shift that brought much concern to AI technologies, especially due to concerns of the use of the chat GPT in educational system. However, in the health care and health science fields in general, AI has indeed revolutionized patients care to scientific research . In this course, we hope students to learn that AI in biomedical fields and defense capabilities, while we will discuss how to fine tune policies considering ethical concerns and racial and other discriminations. Due to the AI, medical imaging has accelerated the diagnostic processes for discovering hidden cancers. The drug-designing process has become much more rapid and enhanced with AI. As we need to process big data in biomedical sciences, we cannot manage without the help of AI tools. Chimeric antigen receptor (CAR) T-cell therapy for cancers is a revolutionary approach to targeted personalized immunotherapy for cancer patients, In spite of many advances through AI technologies, the accuracy of AI work is still not reached 100%, and hidden biases in AI technologies. Especially young generations need to understand the inside of the "black box" before fully take advantage of the technologies. In this course, while introducing a variety of AI technologies, we will have through discussion on ethics, policy and concerns of regulating this technologies to fully utilize their capacities.

Level: Graduate

Grading: Main Campus (UGrad, Grad)

Course registration restrictions:

Enrollment is limited to Graduate level students.

BSPA 6705 Brain Initiative 2 Credits

The original brain initiative concept “aims to develop new high-resolution tools and data science approaches to precisely quantify behaviors and synchronize them with brain activity data, build new conceptual and computational frameworks of behavioral systems, and disseminate new tools to the research community.” This seminar series will explore various aspects of brain initiative with cutting edge emerging technology tools and key questions to manage various health and security issues using these technologies. The class is consists of guest speakers who are investigating variety of brain research technologies from advanced studies in gut and brain axis to motor neuron manipulations all the way to defense capabilities. The team of instructors have unique diversity of backgrounds from biomedical policy to neuro-ethics to engineering. Students will learn cutting-edge brain sciences while critically evaluate these technologies from ethical points of view and create policy proposals for appropriate regulations.

Level: Graduate

Grading: Main Campus (UGrad, Grad)

Course registration restrictions:

Enrollment is limited to Graduate level students.

BSPA 6710 Emerging Global Health Threats/Ethics 3 Credits

This course aims to provide a comprehensive understanding of the complex ethical dimensions of managing emerging global health threats. It will explore ethical issues concerning three dimensions of emerging global health: practice, policy, and research. It will address chronic and contemporary ethical issues in the field by unpacking the power imbalances in global health and examining the history and current practices in the field. Part 1 will provide a historical background of the evolution of the field of global health and clarify the rationale for practicing global health ethics. Part 2 will focus on understanding the ethical issues concerning the practice of global health. It will present the ethical dilemmas inherent in global disease-specific global health programs such as HIV, Malaria, Cancer, and the ongoing COVID-19 pandemic, focusing on unequal access to quality technologies and treatment as well as issues concerning the disproportionate burden of the diseases in LMICs. Part 3 will focus on Global health policy and governance and will examine the ethical implications of the evolving global health governance landscape. The students will study the role of different global health actors in global health governance, including multilateral organizations, financial institutions like the World Bank, Civil Society Organizations, and commercial actors, and will explore issues such as ‘philanthrocapitalism’ to understand the ethical issues regarding philanthropy in global health. Part 4 will focus on ethical issues concerning global health research and engage with concepts like ‘parachute research’, author reflexivity in addition to covering topics related to informed consent, preserving data privacy, and engaging with communities, while also contemplating the ethical obligations of investigators towards the communities they investigate. Finally, students will learn about approaches for ethical global health practice by studying models of global health accountability such as the Framework for Tobacco Convention and People’s Health Movements. They will also read about new initiatives like the Global Health 50/50 report as an accountability mechanism for improving global health. Students will end the course with a speculative design exercise where they will develop a model for an ethical global health system to handle emerging global health threats.

Level: Graduate

Grading: Main Campus (UGrad, Grad)

Course registration restrictions:

Enrollment is limited to Graduate level students.

BSPA 7001 Regulatory Science I: LawSci 3 Credits

US Government Agencies use science to regulate everything from pharmaceuticals to pollution. What is the extent of their authority to regulate? What scientific requirements must they follow? How do Congress, the White House, and courts influence the outcome of their regulations? The course will drill down on the science and law of US government regulations.

Level: Graduate

Grading: Main Campus (UGrad, Grad)

Course registration restrictions:

Enrollment is limited to Graduate level students.

BSPA 7003 Regulatory Science II 3 Credits

The course highlights the key tools of regulatory science, including cost/benefit analysis and mathematical modeling. Students will jointly perform research with the objective to author a paper on a regulatory science topic that will be submitted for potential publication in a science journal. The course will introduce students to a range of regulatory science disciplines including regulatory toxicology, regulatory microbiology, regulatory pharmacology, and regulatory ecology presented in the context of case studies to emphasize regulatory science principles including their applications.

Level: Graduate

Grading: Main Campus (UGrad, Grad)

Course registration restrictions:

Enrollment limited to students in the MS-BHTA, MS-BSPA, MS-MICB or PHD-MICB programs.

Enrollment is limited to Graduate level students.

BSPA 7005 Science DiplomacyWorld Health 2 Credits

Science diplomacy is the use of scientific collaboration among various countries to address common problems and to build constructive international partnerships and policies. With greater globalization in business and other activities, public health concerns have become more urgent. Implementing appropriate policies and distributing accurate information on emerging diseases, health hazards, and health related terrorist threats are an eminent goal for health policy experts. In this seminar course, students will establish 1) a fundamental understanding of science policy and diplomacy by learning key components such as principles of bioethics, technology transfers, science literacy, funding merits for basic and applied research, and biomedical ethics; 2) an understanding of the practical development and application of science policy by examining how science policies are drafted and implemented by Congress 3) a knowledge of recent emerging diseases and other public health concerns including radiation effects as will be presented by the instructor or guest speakers who are leading experts in the fields. A thorough understanding of science is the crucial component for policy makers and those who are involved in preparing policies. By the end of the course, students will be able to draft policies for science diplomacy in order to address current emerging infectious diseases as well as other global health concerns.

Level: Graduate

Grading: Main Campus (UGrad, Grad)

Course registration restrictions:

Enrollment limited to students in the MS-BHTA, MS-BSPA, MS-MICB or PHD-MICB programs.

Enrollment is limited to Graduate level students.

BSPA 7800 Globl Infectious Dis:Int Pers 2 Credits

This graduate seminar is a unique combination of presentations by experts in biomedical sciences, policy, and social science that are united by key topics in global infectious diseases. The purpose of this seminar series is to provide a venue for the discussion of interdisciplinary research and development that acknowledges how the world has become a global system for the propagation of infectious disease.

Level: Graduate

Grading: Main Campus (UGrad, Grad)

Course registration restrictions:

Enrollment is limited to Graduate level students.

BSPA 7801 Sem:Global Infectious Diseases 2 Credits

This graduate seminar is a unique combination of presentations by experts in biomedical sciences, policy, and social science that are united by key topics in global infectious diseases. The purpose of this seminar series is to provide a venue for the discussion of interdisciplinary research and development that acknowledges how the world has become a global system for the propagation of infectious disease.

Level: Graduate

Grading: Main Campus (UGrad, Grad)

Course registration restrictions:

Enrollment limited to students in the MS-BHTA, MS-BSPA, MS-MICB or PHD-MICB programs.

Enrollment is limited to Graduate level students.

BSPA 7906 Biomed SciPol Capstone Project 3 Credits

This course is intended to allow students to prepare for a legislative capstone project in the spring semester. Students develop a science policy topic of choice (chosen with instructor assistance) into a comprehensive legislative strategy and executive branch proposal. Students will begin with case studies of executive branch policies and discussions of what legislation led to those policies. As the semester progresses, they will build their own legislative proposals and advocacy plans. Students choosing to take on a capstone project through BSPA must take a capstone course in both the fall and spring.

Level: Graduate

Grading: Main Campus (UGrad, Grad)

Course registration restrictions:

Enrollment limited to students in the MS-BHTA-SM, MS-BSPA-SM or MS-MICB-SM programs.

Enrollment is limited to Graduate level students.

BSPA 7907 Biomed SciPol Capstone Project 3 Credits

The BSPA Capstone Project provides an opportunity for students to engage in high-level inquiry focusing on an area of specialization within their professional goals. Capstone projects will be inquiry and practice-centered and draw upon areas of interest to the student from the program, such as environmental health, national security, and regulatory science, among others. All capstones aim to bridge theory and practice and are desired to impact the future professional life of students upon graduation. Students are encouraged to apply and expand the knowledge gained throughout the BSPA program as part of this process. Through this course, students will develop a solid foundation of “science policy-making” step by step, including critical tools (literature search, use of congress.gov, interview techniques with STM experts) and methods (standards for creating science policy proposals) that need to create a comprehensive bill proposal.

Level: Graduate

Grading: Main Campus (UGrad, Grad)

Course registration restrictions:

Enrollment is limited to Graduate level students.

BSPA 7949 BSPA Tutorial 0-5 Credits

Level: Graduate

Grading: Main Campus (UGrad, Grad)

BSPA 9991 Continuous Registration

Continuous Registration

Level: Graduate

Grading: Main Campus (UGrad, Grad)