

## **University of Maryland School of Public Policy**

### **New Graduate Certificate in Science, Technology, and Innovation Policy**

with a focus on

Information and Communication Technology

The University of Maryland School of Public Policy has created a new Graduate Certificate in Science, Technology and Innovation Policy available beginning Spring 2023. The certificate provides the knowledge and skills necessary to understand, analyze, and implement policies related to science, technology, and innovation, including regulatory aspects related to new technologies and approaches for creating and commercializing new technologies and innovations.

The Graduate Certificate in Science, Technology and Innovation Policy is a four-course (twelve credit) program of study designed for mid-career professionals from public agencies, multinational organizations and relevant private and civil society organizations. It is designed such that it can work in and across a range of science and technology domains and can be customized to those domains – in this case, information and communications technology – as well as customized to the needs of any sponsoring industries or organizations.

#### **Courses**

The Graduate Certificate in Science, Technology and Innovation Policy with a focus on Information and Communication Technology (ICT) contains the following three courses and choice of a fourth (descriptions at document end).

1. Concepts of Technology Change and Innovation
  2. Influence of Science on Policy and Policy on Science
  3. Cyberspace: Legal and Policy Implications
- choice of –
1. Modeling Strategic Cybersecurity Risk in Critical Infrastructure
  2. Strategies for Managing Innovation
  3. Science, Technology, and International Security
  4. Course Newly Developed for Client Organization

#### **Learning Outcomes**

The courses listed above are designed to provide a set of learning outcomes that benefit individuals working in the ICT realm and the organizations sponsoring them for study.

- Quantitative analytical skills for analyzing and assessing empirical data related to technology and technology change.
- Analytical skills for designing and evaluating STI policies and programs, including innovation support mechanisms, and regulatory approaches aimed at addressing the social, environmental and other spillovers of new technologies.
- Exposure to the main types of STI policy documents and processes, including Congressional hearings, statutes, federal budgets, court decisions, National Research Council reports, and studies from advocacy groups.
- Communication skills in writing policy memos, preparing Congressional testimony, and making presentations.

## **Students**

The Certificate is designed for mid-career professionals from public agencies, multinational organizations and relevant private and civil society organizations. It is aimed at both students with STEM and ICT backgrounds who wish to acquire a deeper understanding and appreciation of the social and political processes that shape science and technology, and to students with a policy background who recognize that many issues are reliant on and shaped by science and technological advances.

To participate in this program, all students must have a regionally accredited Bachelors degree with a 3.0 minimum GPA and must apply and be accepted to the University of Maryland Graduate School. Students must finish with a G.P.A. of 3.0 or higher to graduate.

## **Program Format**

The Certificate will commence with a course in Spring 2023 entitled “Influence of Science on Policy and Policy on Science” (description below) taught by Dr. Rosina Bierbaum (Research Professor and Roy F. Westin Chair in Natural Economics) and Dr. S. James Gates (Distinguished Professor; Regents Professor; and Clark Leadership Chair in Science). The course will be offered Tuesday evenings. Subsequent courses will be offered in traditional semester-long courses also in the evenings. Courses will be taught on the College Park campus; students can also videoconference into classes by permission.

## **Customization**

The Certificate *format* can also be customized. Should an organization (eg. with geographically distributed workforces) wish to sponsor a cohort of students, the Certificate can be offered in a traditional semester format via courses in the Spring, Summer, and Fall terms and/or it may be offered in a non-traditional format, including condensed terms, and online or hybrid instruction.

The Certificate *content* can also be customized. The School can work with sponsoring agencies or companies to choose, or newly create, a fourth course that, for them, best complements the required three. In addition, the case studies, readings, student assignments, etc. of all courses can be tailored to the interests of students and sponsoring agencies.

## **Faculty and Other Resources**

The program has been developed through an intensive consultative process involving University tenured and professional faculty, and course instruction will utilize the University’s nationally renowned, resident practitioner scholars as well as adjunct practitioners who are preeminent in the field. The program is also aligned with the applied research, outreach, and other activities of the Center for Governance of Technology and Systems (GoTech) whose Director, Dr. Charles Harry, serves as co-Academic Director of the Certificate.

## **Credentialing**

The Graduate Certificate in Science, Technology and Innovation Policy offers a University credential that will be reflected in student transcripts.

## **Tuition**

Tuition for the program is \$3,500 per course (\$14,000 total). Limited fellowship opportunities may be available and the School will work with the tuition reimbursement policies of sponsoring companies and payment programs of federal and state agencies.

## Course Descriptions

### **PLCY 688J: Concepts of Technology Change and Innovation**

The course provides a thorough understanding of technology and innovation and the characteristics, determinants and drivers of technological change. The course introduces key analytical constructs such as technology and product life cycles and learning curves, and the range of institutional, market and social factors that affect the diffusion and adoption of technologies, including the concepts of national innovation systems, and innovation support mechanisms.

### **PLCY 689L: Influence of Science on Policy and Policy on Science**

This course explores how scientific and technical information gets used (or not used) in the formation of public policy, and how public policy influences science and technology development. Students will come away from this course with a fundamental understanding of the institutional landscape of S&T policy, the instruments of S&T policy implementation, and the processes of S&T policy decision-making. This institutional landscape encompasses government, business, academic institutions, and NGOs.

### **PLCY 688C: Cyberspace: Legal and Policy Implications**

This course explores the key issues facing policy makers attempting to manage the problem of cybersecurity from its technical foundations to the domestic and international policy considerations surrounding governance, response, and critical infrastructure risk management. Students will be exposed to the integrated technical structures that support modern society and the persistent governance challenges tied to securing critical data and core infrastructures

### **Modeling Strategic Cybersecurity Risk in Critical Infrastructure**

Governance of technology is often difficult for policy makers to holistically address due in part to the inability to assess the consequences of cascading failure in complex and interdependent systems. This course explores methods for modelling interconnected infrastructure and processes to quantify strategic risk and exposes students to advanced methods including graph theory, Markov Chains, agent modelling and monte carlo simulation as tools to assess static and dynamic risk.

### **Science, Technology, and International Security**

Examines the roles of science and technology (S&T) in the development of conventional (e.g., missiles, bombs) and unconventional (e.g., nuclear, chemical, and biological) weapons and their associated threats to U.S. and international security. Will introduce new ways of thinking about security-technology policy interaction, drawing on political science, security studies, and S&T studies.

### **Strategies for Managing Innovation**

This course emphasizes how innovative leaders can use strategic management of innovation and technology to enhance firm performance. It helps students to understand the process of technological change; the ways that firms come up with innovations; the strategies that firms use to benefit from innovation; and the process of formulating technology strategy. It provides frameworks for analyzing key aspects of these industries and teaches students how to apply these frameworks.