

University Senate

Proposed: November 18, 2016

Adopted: 67 of 68 senators in attendance
voted in favor; one opposed

**RESOLUTION TO ESTABLISH A PROGRAM LEADING TO
A MASTER OF SCIENCE IN SUSTAINABILITY SCIENCE (SPS)**

WHEREAS, there is a growing need for professionals who are trained as sustainability practitioners and stewards, and

WHEREAS, the proposed program aims to develop graduates who can help organizations better understand and manage their environmental impacts and the systemic risks emanating from environmental change, and

WHEREAS, the proposed new cross-disciplinary program emphasizes key concepts in applied earth science and ecology, observational and analytical methods, and scientific tools to address the complex interactions between natural and human systems, and

WHEREAS, graduates will gain the skills to contribute to the development, implementation, and monitoring of environmental policies, and analyze the organizational and political contexts to determine opportunities for and obstacles to integrating scientific knowledge in policy and management, and

WHEREAS, this program harnesses the Earth Institute's world-class expertise in sustainability science and the most advanced research, methods, and tools being used at the Lamont-Doherty Earth Observatory to address the world's most pressing environmental challenges, and

WHEREAS, the program takes advantage of Columbia's vast intellectual resources to integrate knowledge across disciplinary boundaries and leverage partnerships with leaders in business, industry, and government, and

WHEREAS the proposed degree program neither duplicates nor replaces programs or courses already offered at the University,

THEREFORE BE IT RESOLVED that the Senate establish the Master of Science Degree in Sustainability Science, and

BE IT FURTHER RESOLVED that the Education Committee review the program in five years.

Proponent:
Committee on Education

Program Title

Master of Science in Sustainability Science (ASUS)

Program Purpose

The severity of the world's environmental problems indicates that a greater understanding and know-how of sustainability practices are necessary if we are to maintain society's capacity to provide the current levels of material resources (e.g., food, water, air) without jeopardizing the capacity of future generations. The purpose of the proposed program is to develop graduates who can help organizations better understand and manage their environmental impacts and the systemic risks emanating from environmental change. The MS in Applied Sustainability Science (ASUS) is a new cross-disciplinary program, drawing on expertise from across Columbia University to fill immediate scholarly and environmental needs. It emphasizes key concepts in applied earth science and ecology, observational and analytical methods, and scientific tools that sustainability practitioners must use in order to address the complex interactions between natural and human systems. In addition, graduates will gain the skillset to contribute to the development, implementation, and monitoring of policies that are targeted at the intersection of the environment and society.

Learning Outcomes

Graduates leave with the ability to:

1. Use scientific methods to observe and monitor the sustainability of natural systems.
2. Analyze and model scientific data to understand current and future environmental conditions and their effects on human systems.
3. Use scientific tools to detect and respond to pressing sustainability issues
4. Analyze the organizational and political contexts as well as identify the opportunities and obstacles for integrating scientific knowledge in decision-making processes of policymakers and managers.
5. Integrate and apply their knowledge of scientific observation and monitoring, analysis and modeling, as well as the use of scientific tools, to organizations and management in real-world situations.

Audience

The program is designed to develop students with a strong quantitative background, who have degrees in science, engineering, math, or related fields to become engaged industry professionals at various levels within the field of sustainability. The program is intended for practitioners who will apply these skills in organizational settings.

Program Design

The proposed MS in Sustainability Science is a **36-credit** on-campus program that can be taken on a full- or part-time basis. The program is structured into five areas of study:

1. ***Integrative Courses in Sustainability Science (9 credits)*** – These courses teach students the scientific principles that underpin the complex interactions between natural and human systems.
2. ***Methods of Earth Observation and Measurement (9 credits)*** – This area of study introduces students to scientific methods used to observe and monitor natural systems.
3. ***Analysis and Modelling Environmental Conditions and Impacts (9 credits)*** – In these courses, students learn to analyze and model scientific data to understand current and future environmental conditions and their interactions with human systems.
4. ***Scientific Tools for Responding to Sustainability Challenges (6 credits)*** - In this area, students learn how to use scientific tools in order to prevent, detect, respond and adapt to pressing sustainability issues, such as the loss of biodiversity, climate change impacts, soil and water contamination and threats to populations.
5. ***Sustainability Policy or Management (3 credits)*** – Finally, students examine the relationships among sustainability science, policy and management.

Program Quality and Evaluation

SPS is committed to ongoing assessment and improvement of our courses and programs. To that end, a comprehensive program evaluation plan has been established to ensure the continued rigor and quality of the MS in Sustainability Science.

As an integral part of the program design process, the following evaluation mechanisms have been defined to meet the specific needs of this program:

- Faculty and Curriculum Advisory reviews of syllabi and student output
- Course reviews/faculty debriefs with the SPS Instructional Design team
- Course evaluation reviews by the Academic Director and Curriculum Advisory committee
- Alumni surveys and focus group data
- Five-year review using the University Senate's evaluation framework
- Re-engagement with an Industry Advisory committee to ensure continued market relevance