Warren Wilson COLLEGE

MS in Applied Climate Studies Curriculum (flow of courses over two years)

Summer 1: Residency #1 Introduction to Applied Climate Studies (June 15-27) - 8 credits

Fall, year 1

The Science of Climate Systems (Term 1) - 2 credits

Climate Change Mitigation, Resilience, and Adaptation (Term 2) - 2 credits

Research Project #1, part 1 - 1 credit

Professional Skills Modules #1 - 1 credit

Spring, year 1

Climate Data Analysis, Management, and Visualization (Term 1) - 2 credits

Climate Data: Geographic Information Systems (Term 2) - 2 credits

Research Project #1, part 2 - 1 credit

Professional Skills Modules #2 - 1 credit

Summer 2: Residency #2 Advanced Practice and Inquiry in Applied Climate Studies (June 14-26) - 8 credits

Fall, year 2

Climate Justice, Economics, and Policy (Term 1) - 2 credits

Climate Action Planning (Term 2) - 2 credits

Research Project #2, part 1 - 1 credit

Professional Skills Modules #3 - 1 credit

Spring, year 2

Research Project #2, part 2 - 1 credit

Professional Skills Modules #4 - 1 credit

Summer 3: Residency #3 Leading Practice in Applied Climate Studies - 4 credits

Climate Action Management and Leadership - 2 credits

Program structure summary (focus by category):

Three 12-day in-person residencies over two years: Residencies are intensive learning opportunities that engage students in deep learning through experiences, classes, lectures, discussions, projects, presentations, demonstrations, workshops, and more. They provide 1) a foundation for the program, 2) a setting to learn new knowledge, 3) a platform to demonstrate skills acquired, 4) a community connection for deeper engagement and application, and 5) opportunities to synthesize ideas, knowledge, values, skills, applications, and insights.

Four semesters of on-line courses that include:

1) Core classes, 2) Team Research Projects, and 3) Professional Skills Modules

Seven on-line core content classes at 2 credits each:

- The Science of Climate Systems
- Climate Change Mitigation, Resilience, and Adaptation
- Climate Data Analysis, Management, and Visualization
- Climate Data: Geographic Information Systems
- Climate Justice, Economics, and Policy
- Climate Action Planning
- Climate Action Management and Leadership

Two research/community partner projects, each lasting two semesters, with two presentations each (mid-point & final), and each with a professional report. These will take place on behalf of and in collaboration with community partners and are integral for applied, experiential learning. The topics will vary each year, and teams are expected to include 4-5 students each.

Four professional skills module courses (delivered on-line): varied by semester.

Semester 1 will highlight project management, consulting, collaboration, conflict management, science communication, self-care, leadership, decision-support, Climate Interactive Ambassadorships, and more.

Semester 2 will highlight science/data communication; greenhouse gas reporting frameworks; general comm. Strategies; land-use dynamic simulators; NOAA tools, map support; report writing, and more.

Semester 3 will highlight empathy; self-awareness; systems thinking; EPA EJ Screen; framing; storytelling; vulnerability assessment; resilience; community engagement; collective visioning, and more.

Semester 4 will highlight career/vocation planning, job hunting, resume/CV building (experience translation); values clarification; interviewing; networking; teaching and learning; leadership; and more.

MS In Applied Climate Studies Curriculum

MCS 501 Residency #1 Introduction to Applied Climate Studies (8 credits) – 12 days

The 12-day residency includes lectures, seminars, discussions, workshops, research group meetings, field trips, and mentoring sessions. The schedule will typically run from 9:00am to 9:00pm each day of the twelve-day residency, and allows for approximately 2 hours for unstructured time and transitions during the day. The first residency covers an introduction to climate studies, an introduction to climate data analysis and management, and an introduction to climate justice. The residency will also include important steps for the project team formation (for applied projects during the rest of the year), with an emphasis on project management, team skills, and collaboration. Students will engage in learning and practicing facilitation & leadership exercises that are best developed in-person. In addition, the residency will involve field work, demonstrations, and excursions to engage climate-related projects, practices, and plans. The residency will include a multiple-day regional climate summit that students will attend, engage, and reflect upon. Overall, the first residency sets the stage for the rest of the program. This set of experiences will include evaluations across multiple dimensions. Graded as: Pass/No pass.

MCS 511 The Science of Climate Systems (2 credits)

In this course, we provide an overview of the physical mechanisms in climate systems and variables by which climate change occurs. The science behind current and projected climate change scenarios, consequences, and interactions is examined. This includes ways in which climate systems interact with other natural and social systems. We explore and critique some of the tools decision-makers use to quantify damages caused by climate change impacts and gain a foundation in communicating complex science to a range of audiences.

MCS 512 Climate Change Mitigation, Resilience, and Adaptation (2 credits)

This course explores responses and strategies to address climate change. We examine energy systems and focus on clean, renewable energy systems and how they work. We also explore climate smart building with an emphasis on building materials, lighting, and green building standards. The class highlights a variety of nature-based solutions in multiple contexts. We also consider transportation, mobility, and shipping considering a variety of strategies to address climate impacts. We also consider impacts from climate-related migration. We explore climate resilience and adaptation approaches across a range of scales and applications and highlight strategies that work simultaneously on mitigation and resilience.

MCS 561 Professional Skills Module 1 (1 credit)

The skills module courses occur on-line in either a synchronous or asynchronous format depending upon the topic or skill being introduced. Career-focused in orientation, these modules help students develop

tangible skills and competencies for work in climate and environment related fields. Skill modules will vary depending on the projects students will be working on, and may include: project management, consulting, collaboration, conflict management, science communication, self-care, leadership, decision-support, Climate Interactive Ambassadorships, habits of reflection; humility; presentation skills, and more.

MCS 551 Applied Research Project #1 (1 credit)

In this course, students will work in project teams to complete an introductory study and analysis of a defined problem or issue in partnership with an organization, company, or community partner. Faculty/community mentors are assigned to each project team and will guide the students through a project-based learning structure and curriculum leading to an on-line presentation at the end of winter term and a final research deliverable and presentation to the client/partner during the summer residency.

SPRING, YEAR #1 (6 CREDITS TOTAL)

MCS 521 Climate Data Analysis, Management, and Visualization (2 credits)

In this course, students gain the necessary knowledge and expertise to effectively address climate-related issues through the use of data management, analysis, and visualization techniques. Students explore a wide range of publicly available climate data sets and also consider strategies for collecting data. Students gain proficiency in statistical analysis and visualization processes, and learn how to convert raw data related to climate challenges into visually appealing and informative graphics, charts, and interactive dashboards. Moreover, they understand the potential of these visualizations to raise awareness, shape public opinion, and stimulate action towards addressing climate change.

MCS 522 Climate Data: Geographic Information Systems (2 credits)

In this course, students continue to build skills in data management, analysis and visualization through the utilization of Geographic Information Systems (GIS) software. Students build an understanding of how to most effectively process vector and raster data to analyze spatial relationships related to climate change. Students learn how to build maps and create story maps. Topics include data structures and basic functions, methods of data capture and sources of data, and the nature and characteristics of geospatial data and objects. Instruction and hands-on exercises cover a range of application areas and disciplines, reflecting the climate issue application relevance of this tool. Moreover, students deepen their understanding of the potential of GIS to engage a range of audiences and decision makers in addressing climate-related concerns.

MCS 562 Professional Skills Module 2 (1 credit)

The skills module courses occur on-line in either a synchronous or asynchronous format depending upon the topic or skill being introduced. Career-focused in orientation, these modules help students develop tangible skills and competencies for work in climate and environment related fields. Skill modules will vary depending on the projects students will be working on but will likely include: science/data communication; greenhouse gas reporting frameworks; general communication strategies; land-use dynamic simulators; NOAA resilience planning tools; map support; report writing; and more.

MCS 552 Applied Research Project #1, part 2 (1 credit)

In this course, students will work in project teams to complete an introductory study and analysis of a defined problem or issue in partnership with an organization, company, or community partner. Faculty/community mentors are assigned to each project team and will guide the students through a project-based learning structure and curriculum leading to a final research deliverable and presentation to the client/partner during the summer residency.

MCS 502 Summer Residency, #2 (8 credits) – JUNE 14-26 2026

MCS 502 Residency #2 Advanced Practice and Inquiry in Applied Climate Studies (8 credits) – 12 days

The second residency involves new topics and a new frame. It also provides an opportunity for second-year students to present their project outcomes and recommendations to their community partners in person. They will also engage in leadership roles and build on skill sets acquired thus far. For instance, teams of second-year students will be expected to lead some facilitation exercises for the first-year students. In addition, summaries of the previous year's residency will be introduced by second-residency students. Certain residency skills will be built progressively, adding new approaches and different frames onto practices introduced in year one. The residency again includes a climate summit, with engagement and reflection. Students will again engage in hands-on research demonstrations and presentations. Students will lead facilitation methods and learn and practice new modalities. Students will engage in project team choice, formation, and orientation for the second year. Students will also participate in a residency project that is completed while at the residency. Graded as: Pass/No pass.

Fall, year #2 (6 Credits total)

MCS 531 Climate Justice, Economics, and Policy (2 credits)

In this course we study justice and equity as they relate to climate change. We examine how governance, policy, and economics have created inequitable climate change impacts on communities of color, immigrants, indigenous, and low-income earners. We analyze transnational case studies from the US and international perspectives that demonstrate the intersection of environmental hazards and climate change with migration, displacement, surveillance, and identity. We deepen our understanding of these issues and study examples of successful strategies for climate change mitigation and adaptation that ensure equity & justice. Policies and other approaches that can lead toward more justice are explored.

MCS 532 Climate Action Planning (2 credits)

This course examines climate action planning processes and their intersection with justice and equity. Students learn how to develop climate action planning that can lead to more resilient and regenerative communities, institutions, and organizations. The course involves strategies for collective visioning, design, and implementation, including stakeholder engagement, community participation, collaboration,

evaluation, and adaptive management. Students learn about community-based social marketing, diffusion of innovations, principles of negotiation, and the potential to reduce barriers to participation.

MCS 563 Professional Skills Module 3 (1 credit)

The skills module courses occur on-line in either a synchronous or asynchronous format depending upon the topic or skill being introduced. Career-focused in orientation, these modules help students develop tangible skills and competencies for work in climate and environment related fields. Skill modules will vary depending on the projects students will be working on but will likely include: empathy; self-awareness; systems thinking; EPA EJ Screen; framing; storytelling; qualitative research methods; focus groups; vulnerability assessment; resilience; community engagement; collective visioning, NOAA resilience planning tools; and more.

MCS 553 Applied Research Project #2, part 1 (1 credit)

In this course, students will work in project teams to complete an analysis of a defined problem or issue in partnership with an organization, company, or other community partner. Faculty/community mentors are assigned to each project team and will guide the students through a project-based learning structure and curriculum leading to an on-line presentation at the end of winter term and a final research deliverable and presentation to the client/partner during the summer residency.

SPRING SEMESTER, YEAR #2 (2 CREDITS TOTAL)

MCS 564 Professional skills Module 4 (1 credit)

The skills module courses occur on-line in either a synchronous or asynchronous format depending upon the topic or skill being introduced. Career-focused in orientation, these modules help students develop tangible skills and competencies for work in climate and environment related fields. Skill modules will vary depending on the projects students will be working on but will likely include: career/vocation planning; life design; job hunting; resume/CV building (experience translation); values clarification; interviewing; networking; teaching and learning; leadership; and more.

MCS 554 Applied Research Project #2, part 2 (1 credit)

In this course, students will work in project teams to complete an introductory study and analysis of a defined problem or issue in partnership with an organization, company, or community partner. Faculty/community mentors are assigned to each project team and will guide the students through a project-based learning structure and curriculum leading to a final research deliverable and presentation to the client/partner during the summer residency.

MCS 540 Organizational Climate Action Management and Leadership (2 credits) - at Residency (June 2027)

This course provides integrated frameworks to better understand how to effectively take action on climate issues in a variety of contexts. We study organizational management, decision-making, business perspectives, reporting mechanisms, and advanced strategies for addressing climate change mitigation, adaptation, and resilience. We explore materiality, transparency, organizational networking, community engagement, employee engagement, and practices for managing climate programs inside many organization types (business, governments, hybrid organizations, non-profits). We place attention on responsibility in business and map perspectives across multiple stakeholders. The course also highlights life cycles, accountability, cradle-to-cradle approaches, circular economies, biomimicry, systems thinking, partnerships, and advocacy. Students revisit reporting frameworks--and explore how these can inform strategy and governance—as well as the nature of leadership and change management needed to refocus an organization.

MCS 503 Residency #3 Leading Practice in Applied Climate Studies (4 credits)

The third residency is the final experience in the program. This residency is paired with the 2-credit Climate Action, Management, and Leadership course and will involve in-person presentations to community and organizational partners for the projects as well as the demonstration of leadership and management across multiple aspects of the residency. Third-residency students will be expected to team-teach a class period to first-year students. Third-residency students will not participate in the introductory parts of the residency (outside of teaching) and will debrief with their project teams. The focus for this experience includes the final project presentation; teaching; the Climate Summit engagement and reflections; leading and teaching facilitation; and progressions in other skill building. This is graded as: Pass/No pass. The final residency also includes **Graduation!!**

42 TOTAL CREDITS

The **learning outcomes** are:

1. Develop scientific knowledge of climate change's causes and impacts, and the current range of viable mitigation and adaptation responses

2. Understand how principles of justice, equity, and inclusion integrate into science- and policy-based strategies for climate change mitigation and adaptation

3. Demonstrate an ability to use data science skills and apply climate data to mitigation and adaptation planning and communication

4. Demonstrate competencies in teamwork, project management, and communication essential to effective climate leadership.