the **Conway** School

Graduate Program in Sustainable Landscape Planning + Design

Description of Academic Program

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The Conway School is a small, ten-month graduate program in sustainable landscape planning and design. Conway grants a Master of Science in Ecological Design by the authority of the Massachusetts Department of Higher Education. The school is accredited by the New England Commission of Higher Education.

The Master of Science program is structured around classes and the production of near-professional-level projects for residential clients, municipal agencies, and non-profit organizations. To receive the degree, a student must demonstrate an understanding of design theory, of natural and built environments, of design communication, and of professional practice.

The academic year at the Conway School is based on three core design projects. Learning is applied in one small site-scale and two community projects (at the larger regional scale in the winter and at the scale of a large site master plan in the spring). Project work requires the student to inventory and analyze site conditions, work with clients, integrate information, apply concepts, communicate to various audiences for a variety of purposes, and synthesize, condense, articulate, and illustrate designs for a particular site and client.

Incoming students typically have a range of educational, professional, and other life experiences. How much each student achieves while at Conway depends in part on these prior experiences. Each student is expected to demonstrate a base level of achievement in the areas listed below; some students will attain higher level of achievement, depending on interest, career goals, project requirements, and other factors.

Through project and non-project work, Conway students…

- Demonstrate the application of theoretical and conceptual knowledge *at the same time as* they learn concrete applied knowledge.
- Demonstrate the application of a process for approaching a novel design/planning challenge. This process includes a certain sequence of investigations and habits of mind (for example, not attempting to solve a problem at first sight and on intuition alone). It applies broadly across scales (site to neighborhood to region) and across landscape types (urban, suburban, rural, wild). It requires the ability to apply analysis (inventory + assessment) across scales and to understand the relationship between patterns and processes across those multiple scales.
- Demonstrate the application of methods for defining goals and visions, helping individuals and communities articulate common goals, incorporating input from diverse stakeholders.
- Demonstrate the application of technical skills for analyzing landscapes at multiple scales.
- Demonstrate the application of technical skills for mapping landscapes at multiple scales, from taking points with Global Positioning System (GPS) units to digital mapping with laser imaging, detection, and ranging (LiDAR) and Geographic Information System (GIS) data.

- Demonstrate the application of technical skills for altering landscapes at multiples scales, including grading and other site engineering techniques.
- Demonstrate the application of integrated graphical, written, and spoken communication skills, producing planning and design documents and presentations appropriate to a diversity of audiences and purposes.
- Demonstrate the application of industry-standard design and planning software.
- Demonstrate ecological whole-system thinking by asking questions about, drawing links between, and making recommendations about the relationships between cultural practices, the built environment, geology, soils, hydrology, topography, vegetation, wildlife, sun, and other environmental conditions and processes.
- Demonstrate intellectual flexibility, emotional resilience, the ability to collaborate, and perseverance in the face of uncertainty and incomplete knowledge.
- Demonstrate the application of ecological design and planning principles to critical social challenges, including climate change and social and environmental injustice.

The Conway program's **experiential learning model** depends on **the integration of learning activities**, culminating in the production of professional-level planning and design documents for real-world clients. This holistic approach is central to the institution's pedagogy (and a major reason why many students want to come to Conway). For example, in their Site Engineering class one week students learn a technique for observing, mapping, and shaping landforms to shed stormwater runoff; they apply the observation tools in a subsequent field session, developing further conceptual understanding; during studio work with faculty they apply those techniques to their term-long projects; then present their work in one of the weekly presentations to receive feedback from faculty, leading to revisions that are incorporated into the final document for clients. In such a flow of learning activities, there are no clear delineations that allow neat compartmentalizations of student time into discrete credit allocations. Consistent with the school's mission, size, and pedagogy, this is a feature, not a flaw.

Central to this Conway pedagogical model is an emphasis on **authentic, individualized evaluation**. The program follows a "maximal formative, minimal summative" evaluation practice. Conway students receive almost daily formative feedback, evaluating *work* (a presentation, a class-related assignment, a draft of a section of a design or planning project, for example), rather than the *individual*, for the purpose of improving the work and facilitating further learning. Students pass or fail coursework each term and their term-long design/planning projects are also summatively assessed as passing or failing; students must pass each term to successfully graduate.

Students also receive feedback from their term-long project clients, from guest reviewers who are professional designers, planners, or ecologists—and from each other. Because the pedagogical model uses real projects with engaged stakeholders to develop students' professional skills, Conway invests considerable effort into incorporating external perspectives into the evaluation of student work and surveying graduates

about their post-Conway work (and non-work) experiences. Faculty revise the academic program in response to multiple sources of feedback. This ensures the program prepares students well for the important tasks at hand in the world beyond the school.

The overview below separates concepts, skills, and subject matter into categories corresponding to the weekly course, presentation, and studio schedule; in practice, learning occurs across activities.

FALL TERM (15 to 16 weeks)

The year begins with three to four days of orientation fieldwork in which students begin the process of reading various landscape conditions; identifying patterns; separating observation from interpretation, evaluation, and generation of design solutions; presenting; working in teams; and relating patterns and processes across scales. Through orientation, students experience a condensed version of the design process they will use throughout the term. After orientation, each student is assigned an individual design project for a small site (a quarter-acre to five acres), usually within a half-hour drive of the campus. Project sites range from rural to suburban to urban locations, though "urban" in our region may include highly developed landscapes in small cities or large towns.

Projects are chosen by faculty to present a range of educational challenges, including sites in need of remediation or ecological restoration, clients seeking a feasibility study for change of use, recommendations for siting a building, or a design to increase food production or wildlife habitat or to improve drainage and universal accessibility. Projects are assigned based in part on student interest (e.g., if they express interest in urban stormwater or a difficult grading challenge). Roughly two-thirds of the project clients are typically local homeowners and one-third are non-residential, including municipalities, schools, farms, or nonprofit agencies. Through these projects, students apply the theory, techniques, and technology learned through the classes, and faculty evaluate individual student progress. Project recommendations are summarized in a printed plan set, which includes analysis drawings, design alternatives, and a final detailed plan.

Project Site Mapping (20 hrs total)

Introduction to surveying and mapping concepts: contours, measurement, triangulation, XY coordinates, azimuth. Using GPS units and triangulation to map project sites. Using QGIS to create a project base map by combining GPS, LIDAR, and other data.

Site Design Studio (16 hrs/wk)

Includes work in studio with faculty, project site visits, and client meetings.

Student Presentations (4 hrs/wk)

In weekly individual presentations to at least three faculty and classmates, students demonstrate their progress in project work, in design thinking, and in oral and graphic communication skills. Faculty and classmates give immediate oral and written feedback after each presentation.

Ecology (1.5 to 2 hrs/wk)

- Landscape ecology: fragmentation, connectivity
- Landscape ecology: wildlife, conservation
- Factors that influence species composition
- Physiography, bedrock geology, and their influence on vegetation composition
- Surficial geology and landforms, soil catenas, soil development, vegetation toposequences
- Winter plant identification
- Historical ecology: vegetation and wildlife history, disturbance dynamics
- Species autecology, trophic dynamics

Ecological Design Workshop (2 hrs/wk)

- Field trips to built environments, including those with green stormwater infrastructure, public gathering spaces, etc.
- Visiting speakers representing a range of professions (landscape architecture, ecological restoration, regenerative agriculture, research, etc.)
- Broad topics include ecological design theory and practice and mitigation and adaptation to climate change using site-scale interventions

Design Graphics (1 hr/wk)

- Drafting basics
- Axonometric drawings
- Contextual sections
- Infographics
- Diagramming
- Graphic hierarchy
- Ideal concept diagrams
- Designing the plan set
- Color rendering

Digital Design (3 hrs/wk)

- Scanning and layering in Photoshop for mapping
- Introduction to MASS GIS data layers and QGIS
- Presentation software (PowerPoint, PDFs, InDesign) and introduction to Acrobat
- Simple geoprocessing using QGIS
- QGIS for sun and shade analysis.
- InDesign: basics, color, laying out and labeling a plan
- Photoshop rendering
- Illustrator introduction
- Fonts, layouts, and table

Site Design/Site Engineering (3 to 4 hrs/wk)

- Site analysis: climate and landform; access & circulation; sun & shadow (using SketchUp and hand techniques); slopes; drainage; hydrology: wetlands, waterways, watersheds, potable water; soils; vegetation; wildlife; microclimates; renewable energy potential; buildings, infrastructure; legal; zones of use; summary analysis diagrams
- Design and nature
- Form and function
- Schematic design alternatives
- Design precedents and case studies
- Materials, plants
- Planting dynamics and planting plans
- Pattern language and designing for experience
- Grading fundamentals: driveway & parking design

Humanities (3 hrs/wk)

- Seminar discussion of readings. Typical topics include: Cultural and Historical Understandings of Space and Place; Indigenous and Colonial Histories of New England; Aesthetics and Ecology; Climate Change Mitigation and Adaptation; Creativity and Design Thinking; Children, Space, and Nature
- Design thinking: translating client requests; functional relationship diagrams (ideal and actual); generating design solutions
- Clarifying project goals
- Professional writing: project proposals
- Presenting techniques
- Sequencing in narrative construction
- Developing design criteria
- Techniques for revising text
- Techniques for integrating text and graphics

Field Work in Ecology and Design (4 hrs/wk)

- Observing landscape patterns; bedrock geology
- Wetland ecosystems
- Surficial geology, landforms, and related vegetation patterns
- Topography and water
- Soils development, soil webs, catenas
- Ecological gradients
- Land use history
- Wildlife and habitat
- Field skills sessions (e.g., GPS, map and compass, site sketch and description, aspect, slope, soil texture, plot sampling, tree cores, cruz-all, plot-based natural community field form)
- Culminating fieldwork: students individually demonstrate landscape analysis skills

WINTER TERM (12 weeks)

In the winter term, the projects increase in scope and complexity and are undertaken by teams of students (typically two or three per team) for public and nonprofit clients. The project scope necessitates study of natural systems within which the clients' requests must be accommodated or revised. Students produce a written report that summarizes the design and planning process a recommendations, and incorporate maps, drawings, photographs, charts, and other illustrations. Though GIS is introduced in the fall and used to some degree on fall projects, the winter term is when it is used most extensively.

Planning Studio (16 hrs/wk)

Student Presentations (4 hrs/wk)

Ecology (1.5 to 2 hrs/wk)

- Introduction to natural communities; conservation of large river systems
- Historical ecology: incorporating disturbance dynamics into conservation planning
- Climate change; assisted migration
- Regional conservation planning
- Conservation planning exercise: northern Maine
- Invasive species
- Landscape Ecology: Fragmentation & Connectivity
- Landscape ecology: wildlife, conservation
- Patterns of land use

Ecological Planning Workshop (3 hrs/wk)

- Visiting speakers representing public and private sector professions with a focus on planning-scale interventions
- Topics include stormwater management at the watershed scale, conservation planning, equity in planning, and climate change preparedness

Digital Design (3 hrs/wk)

- Introduction to GIS and ArcGIS: creating maps, adding and displaying layers, stylizing layers, basic geoprocessing
- Map types, projections, and context mapping
- Working with census data in GIS
- GIS analysis and data manipulation: working with data tables, running queries, QGIS and ArcGIS toolbox essentials, thematic analysis, creating strategic work plans
- Customized based on needs: using InDesign Books, working with geodatabases, web mapping, network and raster analysis, solar analysis, watershed analysis

Introduction to Planning (1.5 hrs/wk)

- Instructional course in topics critical to planning work.
- Topics include zoning, land conservation tools, stormwater management, affordable housing, and generating goals/objectives/action steps.

Site Engineering & Planning Graphics (3 to 4 hrs/wk)

- Review of grading fundamentals
- Grading a plane using cut, fill, and cut=fill
- Design and grading with models
- Design and build a model of a BF path to a gathering area.
- Diagramming/planning graphics: simplifying GIS with hand-drawn overlays
- Grading with formulas and spot elevations; roads, curbs, swales, and planes
- Parking lot design
- Perspective drawings; one- and two-point perspectives, and streetscape perspective
- Bird's-eye perspectives and three-point perspectives
- Axonometric drawings; courtyard axonometric
- Knock up drawings; planning scale axonometrics
- Grading roads and driveway review
- Grading swales and an infiltration basin

Humanities (3 hrs/wk)

- Seminar discussion of readings. Typical topics include: Planning: Conflicts & Concepts; Political Ecology; Environmental Justice; Food Security; Localism and Sustainability; Community Development;; Gentrification; Ecosystem Services and the Values of Nature.
- Professional writing: planning reports
- Presenting techniques
- Community engagement techniques

Field Work in Ecology and Design (4 hrs/wk)

- Wildlife ecology
- Pitch pine–scrub oak barrens of the CT Valley
- Floodplain dynamics
- Wetlands: beavers, indicator species, functions
- Boreal forest field session
- Historical ecology; disturbance and conservation management
- Natural community classification and rare species conservation
- Umbrella, indicator, and foundation species
- Connectivity; metapopulation dynamics; gene flow
- Climate change; assisted migration
- Regional conservation planning
- Ecological integrity

SPRING TERM (11 to 12 weeks)

Typically, the spring term projects are smaller in scale and more detailed in design than the winter projects. They present opportunities to learn about technical issues such as stormwater management, erosion control, ecological restoration, barrier-free access, and design detailing. Again, these are team projects (usually two-person teams), and result in a plan set that includes full site analyses, design/planning recommendations, design details, planting plans and schedules, and often include cost estimates and a phased plan for implementation.

Large-scale Site Design/Site Planning Studio (16 hrs/wk)

Student Presentations (4 hrs/wk)

Ecology (1.5 to 2 hrs/wk)

- The Illusion of Preservation
- Regional Conservation Planning: northern Maine
- The importance of trophic dynamics for ecological restoration and management.
- Ecological benchmarks. How to apply to ecological design?
- Landscape Ecology: Fragmentation & Connectivity

Ecological Design Workshop (3 hrs/wk)

- Visiting speakers representing a range of professions tackling large-scale site design and planning.
- Field trips to local sites (e.g., to observe accessible trail design or implemented campus master plans)
- Topics include designing in public contexts for different user groups, considerations for adaptive management (long-term maintenance), and urban design.

Digital Design (3 hrs/wk)

- Intro to 3D and Blender
- Basic modeling in Blender
- Using GIS data in Blender
- Advanced modeling and intro to textures
- Creating an exploded landscape diagram
- Self paced optional: Introduction to drafting with AutoCAD, AutoCAD drawing tools and layers, AutoCAD details and annotations, AutoCAD layouts, viewports, and layer states, Navigating an existing drawing

Site Engineering (3 hrs/wk)

- Planting trees, shrubs and ground covers.
- Courtyard design with planting plan, schedule and details
- Stormwater management part I: estimating storm run-off volume
- Stormwater management part II: designing an infiltration basin

- Retaining walls and seating walls; section with retaining and seating wall details
- Paving materials and construction details: streetscape section with paving details
- Renewable energy: identify and calculate on-site renewable energy resources
- Designing and planting green roofs; designing a green roof in plan and section
- Cost estimating

Humanities (3 hrs/wk)

- Seminar discussion of readings. Typical topics include: Affordable Housing; Walking & Walkability; New Urbanism and ; Traditional Urbanism Ecology and Economy; Utopianism and Environmentalism.
- Design strategies: visual metaphors vs. functional analogies; combinatorial play
- Visual explanations
- Resumes and portfolios

Field Work in Ecology and Design (4 hrs/wk)

- Trail Design
- New England Meadows: Ecology and Patterns
- Flooding Mitigation and Stormwater Management in Urban Environment
- Vernal Pool Ecology and Certification
- Urban Stream Restoration
- Wetland Restoration
- Rich Mesic Forests
- New England Bogs
- Ecology of Farms
- Climate change; assisted migration; urban ecology
- Wetland delineation & regulations
- Ecological integrity

GRADUATION REQUIREMENTS

In addition to successfully completing three major term-length design projects, each student must demonstrate communication abilities through illustrative and technical graphics, design presentations, project correspondence, and reports. The student must demonstrate understanding of design theory, natural and built environments, design communication, and professional development and practice. Students earn 30 graduate credits at the successful completion of the ten-month program.