

# the **Conway** School

**Graduate Program** in Sustainable Landscape Planning + Design

## Description of Academic Program

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 Association of Schools and Colleges and its Commission on Institutions of Higher Education.

The Master of Science program is structured around classes reinforced by professional-level work for residential clients, municipal agencies, and non-profit organizations.

The academic year at the Conway School is based on three core projects. All courses begin in September and continue through June. Every student attends all courses and participates in field trips and guest lectures.

Learning is applied in one smaller site-scale and two community projects, one a regional plan and one a larger site or master plan. Each credit represents performance based on classroom or direct instruction and individual academic work. Each student sets individual goals to be achieved while in the Conway program. A student's graphic and technical documents represent not only instruction in drawing, lettering, graphic composition, and use of materials, but the crucial application of general design theory to a specific project. Work in all the categories requires the student to integrate information and ideas, design presentations as well as synthesize, condense, articulate, and illustrate design plans for a particular site and client.

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. Faculty typically meet at least three times per week to review, evaluate, refine, and revise the curriculum and to coordinate activities to ensure the necessary skills and concepts are introduced and reinforced at the appropriate time relative to the faculty's assessment of student learning, in particular in how that learning is manifest in weekly presentations and one-on-one faculty-student (or faculty-team in winter and spring) studio interactions.

To receive the Master of Science Degree, a student must demonstrate understanding of design theory, of natural and built environments, of design communication, and of professional development and practice. Performance areas are listed below and assessed according to graduate-level standards. Conway is a non-graded program. Individual evaluations, formal and informal, are given to students. Partial credits are not awarded. Standards and evaluation criteria are comparable to those applied in other graduate design programs where a pass/fail system is used. The core faculty's judgments on student work are buttressed, or challenged, by extensive use of outside experts (both professional practitioners and academicians) in the evaluation of student performance.

## Curriculum Overview

### FALL TERM (15 weeks)

The year begins with four to six 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) and in part on faculty’s assessment of each student’s surveying ability. 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 following classes, and faculty evaluate individual student progress. Project recommendations are summarized in a printed plan set, which includes all analysis drawings, design alternatives, and a final detailed plan.

### Topographic Survey Training (30 hrs total)

Includes training in transit and rod use, designing traverses, and creation and troubleshooting of base maps for the individual project sites. Students work in teams to survey each other’s site.

### 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
- Plant keying
- 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

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## **Ecological Design Workshop** (1.5 hrs/wk)

- Field trips to built environments, including green stormwater infrastructure, public spaces, etc.
- Ecological design theory and practice
- Various ecological design principles
- History of design
- Resilience and regenerative design in the face of climate change

## **Guest Lectures (integrated with Ecological Design Workshop)** (1.5 to 2 hrs/wk)

Professionals from a variety of fields are invited weekly to supplement core faculty teaching. A representative list of speakers and topics for a fall term:

- Charles Mann (author of *1491* and *1493*), “1491”
- Denise Burchsted (ecologist, Keene State), “Human Role in Aquatic Ecosystems”
- Joel Russell (president, Form-Based Code Institute), “Legal Issues in Site Design”
- Dave Jacke (landscape designer), “Design Process”
- Jesse Bellemare (biologist, Smith College), “Plants, Climate Change, and Assisted Migration”
- Renate Gebauer (ecologist, Keene State), “Sustainable community and climate change in Nepal”
- Alex Wilson (Resilient Design Institute), “Resilient Design & Passive Survivability”
- Sue Reed (designer, author of *Energy-Wise Landscape Design*), “Designing to Conserve Energy”
- Claudia Knab-Vispo and Conrad Vispo (ecologists, Hawthorne Valley Farmscape Ecology Program), “Agroecology”

## **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)

- Introduction to DDM
- Digital overlay methods for creating basemaps
- Creating a photo basemap with InDesign
- Aerial photos for context, basemaps
- Photoshop: digital rendering; panoramas
- InDesign I: Layout, Text Controls, Masters, and Layers.
- SketchUp: Building Models from Basemaps; Sun and Shadow on Flat Sites
- Google Earth Terrain
- InDesign II: Plan Sets, Paragraph Styles, Object Styles
- Integrating Adobe Creative Suite
- Photoshop II
- InDesign III: Layer Masks and Other Rendering Techniques
- Introduction to ArcGIS
- Suitability mapping

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## **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: Meanings of Home; Changes in the Land; Sense of Space; Aesthetics & Ecology; Tragedy of the Commons; Post-Hurricane Sandy: Planning for the Next Storm.
- 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 and

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recommendations, and incorporate maps, drawings, photographs, charts, and other illustrations. Though ArcGIS is introduced in the fall and used to some degree on fall projects, the winter term is when it is used most extensively.

**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 Design Workshop** (3 hrs/wk)

- Stormwater management
- Resilience and regenerative design
- Land-use planning
- Community meeting techniques

**Guest Lectures (integrated with Ecological Design Workshop)** (1.5 hrs/wk)

Representative winter term might include:

- Keith Ross (LandVest), Large-Scale Conservation Strategies
- Dana Tomlin (UPenn; Yale), The power of GIS and Raster Analysis
- Joel Russell, Form-Based Codes
- Greg Watson, Regional Food Security: Addressing the challenges of climate change
- Dana Roscoe (Pioneer Valley Planning Commission), Transportation Planning
- Robbin Peach (MassPort), Preparing for Climate Change at MassPort
- Kerri Culhane, (Two Bridges Neighborhood Council), Community Planning in NYC
- Catherine Tumber (author, *Small, Gritty, and Green*) and Marco Marrero (Planner, Holyoke), The potential of small post-industrial cities

**Digital Design** (3 hrs/wk)

- Introduction to GIS and Cartography I: File types; attributes; properties; symbology; finding, vetting and using data
- Introduction to GIS and Cartography II: Geoprocessing; ArcToolbox; creating and editing shapefiles
- GIS Analysis: Ecological Assessments I
- GIS Analysis: Ecological Assessments II: BIOMAP 2 and CAPS data
- GIS Analysis: Raster Analysis: Slopes analysis; network analysis; intersecting slopes with landcover
- GIS Analysis + Geoprocessing

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## **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; New Urbanism; Traditional Urbanism; Retrofitting Suburbia; Planning for Climate Change: Mitigation and Adaptation.
- Professional writing: planning reports
- Presenting techniques
- Large meeting techniques

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

- Wildlife ecology and tracking
- 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 narrower 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.

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**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)

- Design in public contexts
- Polemics in urban revitalization
- Considerations for Maintenance and Management
- Environmental autobiographies

**Guest Lectures (integrated with Ecological Design Workshop)** (1.5 hrs/wk)

Representative term might include:

- Elizabeth Farnsworth (NEWFS), “Spring Ephemerals”
- Peter Jensen (Peter S. Jensen & Associates), “Sustainable and Accessible Trail Design Workshop”
- Brian Donahue (Brandeis), “Transition to Agrarian Landscapes”
- Eric Toensmeier (author, *Paradise Lot* and *The Carbon Farming Solution*), “Carbon Farming and Climate Change”
- Myrna Breitbart (geographer, Hampshire College), “The Creative Economy and Community Development”

**Digital Design** (3 hrs/wk)

- Create contextual and working base maps for spring project sites
- Viewshed and proximity analysis, and importing GPS data
- Important data layers and where to find them.
- Raster in GIS and Illustrator; exchange between programs
- Excel techniques
- AutoCAD 1
- AutoCAD 2
- AutoCAD 3
- Photosimulation with Photoshop, Adobe Illustrator
- SketchUp 1
- SketchUp 2
- SketchUp 3: Complex Topological Modelling

**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

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- 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: Children, Space, and Nature; Walking & Walkability; Climate Change Denial; Creativity & Design Process; Utopianism and Environmentalism.
- Design strategies: visual metaphors vs. functional analogies
- Visual explanations
- Design strategies: combinatorial play (designing greenway)
- 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, written essays, 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.