Landscape Architecture Foundation
Fall 2017 Landscape Performance Education Grant

Instructor Reflection for **LARC 230: Site Systems I – Materiality in Landscape Architecture** (Fall 2017)
Core course offered by University of Nebraska – Lincoln, College of Architecture, Landscape Architecture Program
Class: Tu/Th, 12:30–2:20pm, 3 Credits
Instructor: Catherine De Almeida, Assistant Professor (cdealmeida2@unl.edu)

COURSE INTRODUCTION + BACKGROUND

Landscape architects must have the ability to understand, design, assess, and oversee the implementation of material assemblies that compose landscapes. Each assembly requires the designer to combine a range of heterogeneous materials within a specific context for particular performative criteria, and communicate their design intent to other professionals through drawings and specifications.

This first required core course in the Site Systems sequence is an introduction to the range of materials landscape architects use, and their performative capabilities and applications in the built environment. It serves as an introduction to an extensive body of knowledge and techniques related to the performance of landscape materials and material assemblies for undergraduate sophomore landscape architecture students.

The focus of the course is three-fold: material characteristics (lifecycle and performance assessment including sourcing materials, structural behavior, textural and phenomenological qualities); material assemblies (agglomerations of different materials operate and perform as systems); and technical and qualitative representation (investigating and communicating design intent and landscape performance metrics through drawing). Conventional and innovative materials and assemblies are examined in the context of sustainability using landscape performance metrics to evaluate their environmental, economic, and social benefits.

10 students were enrolled in the course for the Fall 2017 semester. Through the coursework, students engaged in landscape performance in their selection and visual description of innovative details, the performative comparison between innovative and conventional details covered in class, field trips to local material manufacturing plants, and the design of their own performative, innovative detail in coordination with their studio course.

COURSE LEARNING GOALS + OUTCOMES

The primary goal of this course is to provide students with a foundation to landscape materials and assemblies, and their performative benefits through detailing, research, and technical and qualitative representation.

Learning Goal One:

Knowledge of Materials and their Assemblies
Students gain a broad understanding of materials, material applications in designed landscapes, how individual materials are assembled into heterogeneous material systems, and the landscape performance of material systems by using metrics to convey the environmental, economic, and social/cultural benefits of contemporary and innovative details.

Learning Outcomes:

1. Describe characteristics (rot resistance, water resistance, etc.) and qualities (texture, color, strength, behavior, etc.) relevant to the performance of landscape materials and assemblies.
2. Understand the significance of material lifecycles by synthesizing issues related to social, cultural, and environmental dimensions in their selection, assembly, and detailing.
3. Identify the material components above and below the surface within an assembly system.

Learning Goal Two:
Research Methods and Applications of Materials and Detailing to Design
Students develop research methods and skills for understanding, documenting, and analyzing material applications, material and assembly performance, technical detailing, and construction as part of an iterative design process.

Learning Outcomes:
1. Develop a vocabulary and proficiency in conventional, sustainable, and innovative landscape materials and construction techniques through the lens of landscape performance, and apply this knowledge to design proposals.
2. Ensure design intent with an accumulated technical knowledge of material innovation and selection, construction detailing and assembly performance, and basic structural theory.

Learning Goal Three:
Skills and Methods in Technical and Qualitative Representation
Students build a literacy of technical detailing as a visual language for investigating design ideas and communicating design intent using AutoCAD and other programs as digital tools.

Learning Outcomes:
1. Demonstrate an understanding of the conventional visual language of technical detailing in material assemblies, consisting of drawing types, line weights/line types, textures and poche, labeling and annotation, dimensioning, and scaling.
2. Utilize drawing as a communicative tool to convey design intent, and as an investigative method exploring assembly performance.
3. Apply AutoCAD as a tool for drafting and technical detailing, and InDesign as a tool for integrating qualitative and quantitative information to produce professional quality technical drawings.

COURSE FORMAT

This course uses illustrated lectures, readings, class discussions, experimental model-making, cumulative assignments, field trips, independent research, analysis, drawing and computer drafting, design development, experimentation and evaluation to accomplish the above learning goals and outcomes.

COURSE STRUCTURE + SCHEDULE + ASSIGNMENTS

This course is organized into 3 Phases with Subphases. The Phases are structured as a cumulative sequence, in which each assignment builds on the previous one(s). Detailed project briefs are provided at the beginning of each Phase. Below is an outline of the course structure with general assignment summaries describing how landscape performance is integrated throughout the course:

Phase 1: Introduction to Landscape Performance through Material Assemblies;
Technical Representation and Detailing [3 weeks]
This Phase consists of 2 Subphases:
A – Material Assemblies as Performative Systems
[8/22-9/7]
B – Introduction to AutoCAD [8/31-9/5]

In this first phase, students analyze innovative details that perform as green infrastructure. Following the first webinar provided by LAF, which introduced students to concepts of landscape performance, students select an assembly on or around UNL campus, such as Love Library Learning Commons Plaza or P Street. On-site observations guide students to select a performative landscape strategy (i.e. stormwater filtration, native plantings, placemaking, etc.) that is explored throughout the exercise.

The outcome of this Phase is an introduction to AutoCAD as a drafting tool and students' first detail sheet. Detailed material assemblages are drawn using scaled plans and sections, with diagrams that convey and evaluate the quantitative and qualitative benefits of the material assembly, combining environmental and technical performance.

Phase 2: Materials, Lifecycles, and Assemblies–Performance + Applications [9 weeks]
This Phase consists of 4 Subphases:
A – Aggregate + Asphalt + Cast-in-Place Concrete [9/12-9/21]
B – Pre-Cast Concrete + Brick + Stone [9/21-10/10]
C – Metal + Wood [10/10-10/26]
D – Soils + Plantings + Earthworks [10/26-11/9]

Phase 2 exposes students to materials used in constructed landscapes, and how assembled materials perform as systems. Material groupings in each subphase are paired with assemblies, both building in complexity. This phase also introduces students to material lifecycles and their landscape impacts in the context of designing sustainable landscapes. This ranges from extraction/sourcing and manufacture, to their performance and landscape applications, to their end-of-life fates. Students develop an understanding of the range of conventional materials and techniques used to construct landscapes, paired with innovations and technologies associated with those materials and assemblies. Emphasis is placed on highlighting the material components that make up detailed assemblages, and their performative benefits.

For each Subphase, students select and draw details of 2 conventional material assemblies that relate to both the materials and the assemblies covered in lectures and readings. Each student selects a conventional assembly to pair with an innovative counterpart. Students select a landscape performance benefit criteria (social, economic, or environmental) to evaluate and compare the innovative detail's benefits to those of its conventional counterpart using illustrated axonometric drawings.

Phase 3: Synthesis of Landscape Materiality–Designing a Performative Material Assembly [4 weeks]
This Phase consists of 3 Subphases:
A – Designing Details [11/9-11/16]
B – Constructing Assemblies [11/16-11/28]
C – Landscape Performance Evaluation of Material Assembly [11/28-12/7]

Phase 3 grants students more freedom in the detailing process, and tests students' understanding and application of landscape materiality, material assemblies, and their performative capacities in constructed landscapes by designing a construction detail for their design studio projects.

Students draw and model a design detail referencing conventional and innovative materials and assemblies that were covered throughout the course. The designed details emphasize material components, tectonic relationships, and how the assembly performs as a system. After drawing and modeling their details, students use landscape performance metrics to evaluate their benefits in the context of their studio design proposals in LARC 210.

REFLECTIONS ON COURSE CONTENT + TEACHING

Many aspects of the course were very successful, and others require further development for next year based on my observations, conversations with students, and student reflections. The following is a summary of both student and instructor reflections that assess the course's strengths and areas for development, with a specific focus on landscape performance.

Strengths

- Based on reflections, students enjoyed and greatly benefitted from the webinars, guest lectures from industry professionals, material lectures provided by me, and the field trips to local material manufacturing plants. One student noted the importance of understanding the greater social benefits and impacts of regional material selection, and the laborers that contribute to the materials landscape architects select. Another student noted the benefits of the material lectures, and the importance of understanding how to source materials, the performance of the individual materials, and how they function as a system within an assembly. It was also noted that students came to quickly realize the importance of what occurs within the detail below grade, and the differences between conventional and innovative details that contribute to their performance, for example the size and amount of aggregate in permeable paving versus impermeable paving details.

- Overall, students enjoyed and appreciated the introduction and application of landscape performance in the course. Many noted that their interests in landscape architecture parallel sustainability, and appreciated LAF's approach to quantifying landscape benefits and sustainability. Students also noted that exposure to landscape performance through the course enabled them to develop a greater understanding of sustainability in design and the importance of material selection and assembly by using landscape performance as a lens and framework. The comparisons students made between conventional and innovative details in Phase 2, and understanding how an innovative detail performs based on landscape performance benefits, was noted as a helpful approach to understanding materials, assemblies, and their differences.

- Many students noted the benefits of coordinating the course with their studio for their final project in Phase 3. It allowed them to not only design and develop a performative detail within the course, but in doing so, also allowed them to develop stronger design proposals by using the detail to inform their design process and vice versa. In this sense, the detail became a design tool that was developed in parallel with their overall design, ultimately informing their designs, rather than an afterthought in the design process. Evaluating the performance of their detail also proved to be helpful and insightful for the students, and enabled them to make stronger material palette and assembly decisions that resulted in higher-performing projects and a greater awareness of the performative benefits of their designs. This allowed both their details and design projects to be more performance-driven.

Areas for Further Development

- Some students noted the difficulty and learning curve of applying AutoCAD as a new digital tool. In Phase 1, students received a tutorial and handout that describes how to set up and draft in the program, export drawings to scale, and annotate and lineweight their drawings. By the end of Phase 2, students were much more comfortable with the program by practicing through the drafting of details. Students noted that having some background information about the tool before beginning a drafting exercise would be beneficial. Based on feedback and conversations with students, I plan to dedicate more time to the AutoCAD tutorial by extending it to be a week-long workshop. The first day would generally go over tools, setting up drawings, and exporting their drawings. The second day would be what I presented this semester. I also provide students with standards for their drawings, and they noted that a graphic standard template with sizes, margins, and spacing would be helpful and is something I plan on providing with greater detail. I also plan to provide an optional session outside of class to answer questions about the program. Developing more efficiency in learning the program will allow for more time to explore material and assembly performance.

- Although students gained a strong breadth of knowledge in regards to landscape performance, some referenced LAF's websites and materials more than others, and is reflective of the level of performance analysis completed by students in their assignments. As a College, we are currently exploring information literacy across curriculums and programs, and the ways in which students can develop stronger research skills in coursework. Students were provided with general knowledge and access to evaluating landscape performance benefits through both lectures I gave and LAF's webinars. To strengthen this, I plan to adjust the Phase 1 and 2 assignments to include more information about how landscape benefits are quantified (particularly in the context of material selection and assembly), access and use of reference documents, such as LAF's Landscape Performance Series Case Study Briefs, and more directly apply this information to the project. Providing more rigor in this process will likely strengthen the integration and application of landscape performance within the course.

CONCLUSION

Formal and informal feedback collected from both students enrolled in the Materiality course and peers suggest that the course's organization, delivery, content, format, and integration of landscape performance were effective in achieving the learning objectives and outcomes of the course. Overall, students greatly enjoyed the collaboration with LAF and benefitted greatly from the integration of landscape performance within the course, particularly within their first semester of discipline-specific coursework. This has given students a better understanding of what makes a landscape architecture project sustainable and how to evaluate its performance benefits, and as many noted, is an aspect they plan to continue developing in their work.

As a major goal of this course, integrating landscape performance within technical coursework enabled students to understand and develop a greater appreciation for how material selection and material detailing contributes to the performance of a project. I plan to keep many aspects of the course intact, such as its structure, sequence, and assignments, but plan to strengthen them by providing more clarity in both learning a new digital drafting program and more detailed instructions and outcomes for integrating and applying landscape performance to the assignments. Some students noted that the integration of landscape performance "sets a progressive tone for the curriculum" and that they would like to see more topics related to landscape performance integrated into other coursework. I plan on doing so in both my upper-level studio and professional research seminar. As a program, we are also beginning discussions for how to integrate stormwater management more strategically within our BLA curriculum, and through these discussions, also develop more opportunities to integrate landscape performance within other coursework.