

university of oregon – school of architecture and allied arts – department of architecture

Arch4/585 Advanced Architectural Design I

SYLLABUS

BIOSYNERGIES: Bringing the Ecodistrict Vision to Life

Prof. Nancy Yen-wen Cheng

Winter 2012

MWF 1:00-4:50pm, 8 credits

Prerequisites: 4/584 design studios and 4/507 Thesis Prep



The challenge of this penultimate architectural design studio is to develop a clear architectural concept for a building that addresses the thesis inquiry and fits its natural and urban context. From the premise that buildings must function within larger natural and constructed systems, the class will explore design ideas from the **micro** scale (bottom-up) and the **macro** scale (top-down). At the **micro**-scale, we will use a Biomimicry lens to look how natural structures, organisms and mechanisms can inspire designs that fit specific climatic and ecological conditions. Using the materials and visual textures of each location as inspiration, we will conjecture how a fresh look at connections and components can generate innovative building systems. At the **macro**-scale, we investigate how the site forces, ecology, culture, and history make each location unique. We will consider how EcoDistrict principles inform the site organization, building massing, movement connections and program distribution.

The class will challenge students to try new design methods that integrate rational and imaginative thinking in a productive process. Each student must translate site constraints and program requirements into architectural terms, defining the character of the proposed place using qualities of light | dark; dense | open; compressed | open; soft | hard; skeletal | massive; translucent | opaque; layered | cellular; etc.

LEARNING OBJECTIVES

- Develop a robust design process through creative experimentation and rational evaluation using iterative cycles.
- Integrate ideas of Biomimicry and Ecodistricts to create an architecture in harmony with nature
- Demonstrate competency in National Architectural Accreditation Board's student performance criteria student performance criteria (see below)
- Develop communication skills for engaging others in dialog about architectural ideas.

NATURE AND ARCHITECTURE

Think critically about the relationship of the built and the natural environment, considering on-site resources (i.e. sun, wind, water, vegetation), your building's requirements and existing resource flows. Using the Biomimicry approach, think about how natural strategies or metaphors can spur design innovations such as:

- Strategies for capturing rainwater,
- Shielding or welcoming solar exposure
- Efficient structural solutions

For EcoDistrict synergy, can your building contribute to or benefit from what is happening on adjacent sites? Move between scales of the city, district, building, room and architectural details so that discoveries at one scale can inform the others.

Every site context possesses unique spatial conditions that give cues to a thoughtful design. This studio heavily emphasizes constant design explorations through **sectional studies**. A design process utilizing site sections will reveal the spatial relationship between the inhabitants, built forms and nature. For example, in a seaside site, the movement of the waves and the shifting tide has implications for horizontal and vertical movement. Mapping the 10-, 25- and 50-year flood lines in plan and section can provide marks on the landscape that can be a starting point for a design that ties to natural phenomena.

While the project should be anchored in reality, actual constraints can act a point of departure for the imagination. The site needs to be documented through sections, plans, a physical model and a digital model that will necessarily abstract the on-the-ground conditions. Design ideas will be created by making intelligent assumptions based on information that can be efficiently consolidated and establishing clear design parameters.

PROCESS

FOSTERING DESIGN DEVELOPMENT

To develop a design direction, inventive and agile designers generate many options, explore their implications, select the best option and communicate its potential. Designers need to be efficient and effective at creating 3D sketches and study models in order to consider extremes and find the boundaries of possibilities. Initial development through physical means: lots of sketches on trace paper and quick models can foster fast ideation. As the ideas progress, digital studies will be important for studying and refining the work.

The structure of weekly themes, scheduled charrettes and assignments will give unity to the many individual explorations and maximize dialogue. Class time will be used for presentations, individual desk crits, small group discussion, internal pin-ups and formal reviews. The multi-formatted studio critiques are at times intense and fast paced. Each student needs to take responsibility for pushing boundaries in design exploration and production.

REQUIREMENTS AND EVALUATION

The coursework focuses on development of a conceptual architectural design at the micro and macro scales. The pinups and reviews serve as benchmarks to evaluate competency and readiness for the next phase. The ability to deliver and execute assignments in a complete and timely manner is critical to academic advancement.

HAND- SKETCHES: At the start of each Monday's class, you will need to turn in two freehand drawings that represent your design idea and vision. By the end of the Winter term, 20 sketches showing the evolution of your idea. You can use the drawing medium of your choice. Experiment

with different tools and techniques to represent your ideas; a standardized size format will make it easy to create a booklet of the set.

ANALYTIC BLOG WRITING: Along with presentations, the student blog provide an opportunity to demonstrate competency at architectural design to an external audience. Writing thoughtful, concise (~200 words) notes on your blog about your progress, challenges, questions and next steps will help your instructors and peers respond to your needs. This is your opportunity to develop a professional network to provide feedback on your work. You can make specific entries private with our common password. Every student will have a minimum of six posts on their blog for Winter term, with a summary of each pinup and review.

FINAL DOCUMENTATION: The end of the term, a project presentation summary as an Adobe PDF file plus a **3 minute audio or video introduction** must be accessible from the course website.

At the end of the Winter Term, the project's urban design and architectural conceptual design exploration should be completed at the level of an excellent comprehensive 4/584 studio project. A quality Winter Term project delivery sets a strong foundation developing the tectonics and building systems in the Spring term. By the June final review, all UO terminal studio projects must successfully address these National Architectural Accreditation Board's student performance criteria:

B. 1. Pre-Design: Ability to prepare a comprehensive program for an architectural project, such as preparing an assessment of client and user needs, an inventory of space and equipment requirements, an analysis of site conditions (including existing buildings), a review of the relevant laws and standards and assessment of their implications for the project, and a definition of site selection and design assessment criteria.

B. 3. Sustainability: Ability to design projects that optimize, conserve, or reuse natural and built resources, provide healthful environments for occupants/users, and reduce the environmental impacts of building construction and operations on future generations through means such as carbon-neutral design, bioclimatic design, and energy efficiency.

B. 6. Comprehensive Design: Ability to produce a comprehensive architectural project that demonstrates each student's capacity to make design decisions across scales while integrating the following SPC:

A.2. Design Thinking Skills

A.4. Technical Documentation

A.5. Investigative Skills

A.8. Ordering Systems

A.9. Historical Traditions and Global Culture

B.2. Accessibility

B.3. Sustainability

B.4. Site Design

B.5. Life Safety

B.8. Environmental Systems

B.9. Structural System

C. 1. Collaboration: Ability to work in collaboration with others and in multidisciplinary teams to successfully complete design projects. (The department will provide resources for terminal studio faculty to bring in consultants who can work with studios and provide students with the opportunity to collaborate with experts from other disciplines)

C. 6. Leadership: Understanding of the techniques and skills architects use to work collaboratively in the building design and construction process and on environmental, social, and aesthetic issues in their communities.

SPECIAL NEEDS

In the first week of class, students should alert the instructor of any requirements for an optimal learning situation.

STUDENT CONDUCT

All students are required to familiarize themselves with the UO Student Conduct Code (<http://conduct.uoregon.edu>) and follow academic honesty, copyright and fair use requirements. (http://w2.eff.org/IP/eff_fair_use_faq.php)

STUDENT ENGAGEMENT INVENTORY

Activity	Undergrad	Grad
Course attendance	113	113
Assigned Readings	18	18
Design homework	80	108
Writing assignments	10	15
Field work / experience	7	14
Independent Research	12	20
Total hours:	240	288

GRADUATE STUDENTS

Graduate students are expected to research and develop their work more thoroughly than undergraduates by spending more time and by using prior educational and professional experience. This will be reflected in stricter standards for grading graduate students as well as differences in specific requirements.

MATERIAL STUDY: Graduate students are required to give a brief verbal and visual presentation about a structural system or finish material relevant to their project. The material should relate to the site through a conceptual metaphor, visual properties or local origin. The report should describe design considerations, showing cutting-edge aesthetic possibilities and summarize technical constraints. The latter should explain performance characteristics, such as structural properties, and give an overview of assembly methods. It could provide background such as how the manufacture of the material shapes standard units or describe how new fabrication and assembly technology is changing contemporary practice.

Students will sign up for a date for their report and submit an outline two weeks prior and a draft report one week prior to the presentation. Each report needs to be posted online with key information sources cited.

WEEKLY THEMES

1 MICRO Detail: Using a natural inspiration, design a modular surface or structure with openings. Model variations & sketch architectural applications. Start image collection.

2 MICRO Room: Develop the building system by designing a space that sheds rain, shades summer sun and maintains heat. Show how a facade could be created by aggregating the rooms.

---- PINUP - MICRO ---- Fri Jan 20

3 MACRO Pre-Design: Analyze and document the Site in model, plan and section. Refine program, verify fit and code requirements.

4 MACRO Site Design: Develop role of building in city and nature through design criteria and conceptual metaphors. Create, test and document how solid / void options work with sun, wind, water and greenery.

5 MACRO Building Organization: Develop the spatial order to express the architectural idea. Show translation of site and program into a spatial hierarchy through plans and sections.

---- REVIEW MICRO / MACRO ---- Fri Feb 10 or Mon Feb 13

6 MACRO Facade: Explore how the building presents its urban identity to the public and mediates the indoor-outdoor relationship. Iteratively create variations or develop parametric a parametric definition. Develop images to scale with shadows.

7 MICRO Facade Kit of Parts: Zoom-in to show how the construction can bring together structure, enclosure, and light, considering material qualities.

- Represent a precedent through drawing or computer modeling
- Model a corner that includes floor, ceiling, walls and aperture.
- Show the construction system in context through 3D diagrams

---- PINUP - FACADE --- Wed Feb 29

8 SPACE + TIME: Show site evolving over time in terms of the architectural character and ecosystem development through sequential views or animation. Render perspective images with light and color to show daily and seasonal changes through user eyes.

9 MICRO / MACRO Integration : bringing it together. Pre-final mock-up in small groups as a dress rehearsal for refining both visual and verbal communication. 3-minute elevator talk for website.

10 ---- Review FINAL ---- Wed Mar 14

11 Final PDF project summary and 3-minute introduction must be posted by Monday, March 19.

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