BioSynergies: Bringing the EcoDistrict vision to life

How can individual building designs contribute to the Ecodistrict vision of Civic Ecology? Tim Smith of SERA explains that "Civic Ecology is the integrated web of energy, nutrient, resource, financial, information, and cultural flows and interactions that are envisioned, created and managed by citizens acting for the common good within a geographically-defined community and its city-region. It is a human ecology of place, intimately integrating both natural and social/culture systems."

This studio will focus on visualizing the experience of Ecodistrict life, how architects could not only support district energy, water collection and habitat corridors, but also foster optimal social conditions. We will ask, "How could designers make engaging in a sustainable community feel smart, comfortable and attractive?" Students will find a site within one of the Portland Ecodistrict pilot areas (Gateway, Lents, Lloyd District, South Waterfront or Portland State University District). These Urban Renewal Areas span from bedroom communities to urban densities.

Classmates will work together to understand underlying planning principles and how Ecodistrict guidelines could be applied to their site. We will seek to understand where the Ecodistrict interdependence is most valuable and where autonomy is better suited and most efficient.

The BioSynergies focus means looking at the building’s role in the EcoDistrict in terms of its relationship to nature. Every location possesses unique geological formations, indigenous materials, adapted species and spatial conditions that give cues to a thoughtful design. Applying critical thinking about how natural processes and biological mechanisms can inspire design solution from the scale of city and neighborhood down to the building, room and architectural details.

http://ufolio.uoregon.edu/biosynergies 2010-11 studio blog taught by Nancy Cheng & Suenn
PROCESS

COLLABORATION
Like Ecodistricts, the studio is based on the idea that together we can do more than we can do separately. Through short collaborative research and design exercises, we will develop a collaborative learning culture that is a microcosm for the Ecodistrict community we wish to encourage. We will look at how to foster innovation and create groups that mature through its interactions, that is resilient to unexpected challenges through marshaling social capital.

FREEDOM WITHIN A FRAMEWORK
The studio will have a common framework of weekly topics to encourage dialogue and peer teaching. Within this framework, students have the opportunity to emphasize a personal area of focus. A structure of weekly themes, scheduled charrettes and assignments are provided to give unity to the many individual explorations in order to maximize dialogue. The studio format will vary from individual desk crits, small group discussion, and internal pin-ups to formal large-group reviews.

Each student is to identify the most compelling part of the project for further development. To encourage this, each student will do research in a topical focus area that relates to the studio topic of sculpting bioSynergies during Winter term. Undergraduates are required to post this research, graduate students will post the research and present their post in a verbal presentation.

FOSTERING DESIGN DEVELOPMENT
The studio is driven by the design as a process of discovery, that phases of development can be staged to encourage careful observation. To be inventive and agile designers, you should be able to generate many options for your design intent at every step, 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. Start by developing your ideas through physical means: lots of sketches on trace paper and quick models for fast ideation. As the ideas progress, digital studies will be important for studying and refining the work.
DELIVERABLES

FALL TERM ANALYTIC BLOG WRITING: Throughout Fall Term, every student will have a minimum of 13 posts on their blog for Winter term: nine weekly posts, three external lecture posts and a final summary. At the end of every week, we need you to take 20 minutes to consider your work and write about progress, challenges, questions and next steps. 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.

WINTER / SPRING TERM PROJECT SUMMARIES: Winter and Spring term will have a two midterm and one final review. To archive the design process and build towards the final thesis booklet and portfolio, each student will upload a summary of the presentation with reflective analysis.

HAND- SKETCHES: At the start of each Monday’s class in Winter and Spring term, you will turn in two freehand 3D drawings – that represent your design idea and vision.

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.

FALL TERM

The Fall prep course coaches students in finding a focus for inquiry and defining an architectural design problem to address that focus. Each student needs to find a question or series of related questions that can sustain his or her interest, that might be addressed through a series of projects over many years. The goal is to identify one’s life passion within the spectrum of environmental design possibilities and find productive ways of working that feed the creative spirit. Each student should cultivate productive work habits that include rigorous investigation and speculative invention.

To set the stage for the design investigation, the Fall term will be spent defining the design problem in terms of the question to be investigated, framing the conceptual approach by studying relevant ideas and precedent projects. The thesis statement should take a position about the question and explain the design method, that is, how the site and program will be approached to test that position.

The Fall term assignments lead the student through a step-by-step creation of the thesis booklet components, with iterative refinement of the major thesis statement. We will share required readings to frame our investigation and create a common vocabulary. Class periods will be used for lectures, discussions, discuss readings, assignment feedback and research and process skill development.
**WINTER TERM**

The emphasis of Winter Term is to challenge your design process and advance your design approach to arrive at a clear architectural concept for your overall urban design/building grouping of your thesis project; Spring Term will be focusing on developing the tectonics of a specific building.

You are to explore design ideas at the macro-scale and the micro-scale in Winter Term. At the **macro**-scale, investigate how the site forces, ecology, culture, and history make it unique. Consider how EcoDistrict guidelines inform the site organization, building massing, connections and program distribution. At the **micro**-scale, seek the relevancy of the site’s natural and man-made context (both soft- and hardscapes) and the relevancy of biomimicry to the architectural design principals. Express your ideas through architectural design principles (light | dark; dense | open; compression | release; soft | hard; skeletal | volumetric; translucency | opacity; layering | cellular sequences; solid | void; etc.). You are to define and craft the personality and architectural character of the place and space.

The goal is to be able to describe an urban architectural design project that is thoughtfully organized, beautiful and relevant. At the end of the Winter Term, your urban design and architectural conceptual design exploration should be completed at the level of an excellent 4/584 studio project. A quality Winter Term project delivery sets a strong foundation for development.

**SPRING TERM**

The spring term is about methodically developing the conceptual design. The class will examine how the integration of building systems and user considerations can provide aesthetic design opportunities. By the final review, all terminal studio projects must successfully address the National Architectural Accreditation Board’s Comprehensive Design student performance criteria:

*Ability to produce a comprehensive architectural project that demonstrates each student’s capacity to make design decisions across scales while integrating the following:*

  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 Systems
WINTER TERM TOPICS

MICRO / MACRO
Establish the conceptual role of the building in its EcoDistrict and define a BioSynergy. Your urban design must directly relate to your thesis proposal, site and program. What is your project's relationship to the site topography, natural forces and dynamics?

1 MACRO: 3D site sketches, dimensioned existing plan and section underlay drawings. Portland block overlay, site plan and section diagrams, articulation of the macro and micro concepts.

2 MACRO: schematic physical site models: working with sun, water, vegetation, wind. Massing model w/ vegetation, water, rough program distribution, circulation, etc.

3 MICRO: Develop an archetypal component or connection that explores a biomimetic metaphor through a relevant material study. Development of the relationship between the micro and macro.

------ REVIEW #1 ------

BUILDING CONCEPT
4 ORGANIZATION: Develop the spatial order expressing an architectural idea, Program and site response translated into a spatial hierarchy. Building plan and section with circulation and major spatial relationships.

5 EXPERIENCE: Articulate user profiles, test the spatial sequence through their eyes. Sheltered enclosure vs. openness to light. Study models, Interior & exterior perspective sequences (rendered with light to evoke the emotional tone) due at pinup.

6 FACADE: How does the building present itself to the public? How does it mediate the indoor-outdoor relationship through skins, canopies, transitions, etc. Multiple sketch iterations and at least three 2 1/2 D shadow studies. Great opportunity for parametric variation.

------ REVIEW #2 ------

BUILDING DEVELOPMENT
7 TECTONICS: Select the building system, sketch out the framing. Look at how a typical joint could bring together structure, skin and light, considering material qualities.

8 SPATIAL CHARACTER: How does it feel in that place? Depict key spaces in the daytime / nighttime, summer / winter.

9 INTEGRATION: bringing it together. Pre-final mock-up in small groups will be a dress rehearsal for refining both the visual and verbal information. Development of the 3-minute elevator talk

---- Review #3 FINAL -----

11 Final PDF project summary and 3-minute introduction must be posted by the last day of classes
**SPRING TERM - TOPICS**

**STRUCTURE / TECTONICS**
We will begin by considering how the fundamental aspect of resisting gravity and live loads can give bones to the building. We will consider how elements such as columns, piers, load-bearing walls, trusses and frames can clarify spatial order and enclosure vs. openness.

1 STRUCTURE : Diagram lines of structure, draw sections, then refine structural framing. Identify inspirations for structural expression, analyze them to find lessons.

2 TECTONIC EXPRESSION : Research Material assemblies, build Structural Bay model 1/2" = 1'0 or larger

3 BUILDING ENVELOPE
Wall Section and Developed Bay Model & Elevations

---- Review #4 ----

**ECO-DESIGN**
How does the project deal with natural elements of sun, water, wind at urban and building scales?

4 LANDSCAPE & RAINWATER DESIGN: user interaction with nature

5 PASSIVE Solar & Natural Ventilation, ACTIVE heating & cooling
How are the environmental systems integrated with tectonics and spatial experience?

6 ROOM DEVELOPMENT: Daylighting model, Rendering (Digital OR Digitally painted version of daylighting model)

---- Review #5 ----

**ARCHITECTURAL EXPRESSION**
The most intimate experience with a building occurs at the scale of the room, where the hand can touch materials and see how connections are made. Carefully considering the inhabitant values, aspirations and daily activities is important for detailed development. Consideration of how the building changes throughout a day, through changing seasons and through the year can give a building resiliency.

7 SPATIAL EXPERIENCE : Visual refinement, architectural hierarchy, proportions, choreographing of program activities. Perspective vignettes, particularly Entrance as expression of building identity. Orthographic drawings (Concept, urban design / architectural plan section and elevations)

8 LIGHTING: Night perspective & typical Reflected ceiling plan

9 PRESENTATION PREP including video-clip

---- Review #6 FINAL ----

11 Final PDF project summary and 3-minute video must be posted by the last day of the term.