COURSE OUTLINE

Description

This course explores stewardship of the built environment and how decisions affecting the built environment benefit or detract from sustainable design. The course introduces thermal comfort, microclimatic analysis, passive thermal systems, heating/cooling loads, daylighting systems, energy codes, sustainable architecture, and architectural acoustics.

Objectives

The primary objective of this course is to teach the student how to develop the lifelong learning skills needed to interact and communicate with others that they will be in contact with in professional practice (e.g., architects, engineers, clients, consultants, etc.) when designing sustainable solutions based on stewardship of the built environment. To achieve this objective, the course goals include the ability to understand:

- microclimate analysis and design;
- environmental comfort criteria for human occupancy;
- impacts of design on thermal system selection and energy usage;
- architectural form and tectonics as environmental control systems;
- thermal and daylighting performance in sustainable architecture;
- basic passive thermal and daylighting strategies employed in buildings;
- methods for selecting sustainable thermal and daylighting systems;
- reuse and rehabilitation of buildings as a sustainable design strategy;
- impacts of energy incentives and codes on building design.

The underlying objective is to enhance the students’ awareness of the built environment in developing their visual literacy of understanding what has been successful in terms of environmental control and sustainable design.

Teaching Philosophy

The built environment acts as the students’ own living learning laboratory and provides a means to integrate course concepts into explorations in studio and professional practice. Lectures and readings form the foundation of the course. Recitations allow for deeper exploration of specific course materials and
concepts which typify situations that an architect encounters in practice. Projects are designed to sensitize students to the past, present, and future built world and how proven concepts of environmental control and sustainability can be integrated into the built environment.

Student interaction forms an important part of my teaching philosophy. The questions and the resulting discussions bring significant vitality to the course. Students are strongly encouraged to proactively ask questions to initiate discussions as well as seek clarity on materials presented in the lecture and recitations.

Outside the classroom, it is expected that students will also seek further inquiry that fosters the formation of their life-long learning skills. This includes completing class readings before each lecture, investigations at the library and other resources, working in study groups, and consultations with the teaching assistant and the instructor.

Organization

Instructor Robert A. Young, PE, FAPT, LEED ap; Room 240 AAC; (801) 581-3909; young@arch.utah.edu; Office Hours MW 9:15-10:30 AM; or by appointment. Students should periodically consult the instructor's web site (http://www.arch.utah.edu/young) for updates on class information.

Teaching Assistant Katianne Jones will be available for consultation and will set separate office hours as needed. The TA will assist in the recitations, site visits, and project grading.

Class Hours Class will be held be 8:10-9:10 AM, in Room 127 AAC, MW. Recitation/Lab will be 2:00-5:00PM in Room 127 AAC or other locations as announced, T.


There are selected readings on the class website or on reserve at Marriott Library. Refer to "Reserve Readings" section below for titles. Other readings will be added as need warrants.

Recitation There will be a recitation on Tuesdays from 2:00-5:00 PM. The recitation will meet in Room 127 AAC, the third floor studio, Bailey Hall, or at site visit locations as described in the course schedule. Recitations will be composed of interactive exercises, site visits,
discussions and review of course materials, and release time/desk consultations for projects.

Decorum & Attendance

Punctuality, professionalism, and leadership are valued by clients, employers, colleagues, and faculty. As such, students should be ready to begin class at the scheduled start time and be prepared to ask and answer questions. Pagers and cell phones must be turned off or set to non-audio mode. Do not eat in class.

Class begins with announcements and questions to and from the class and the resultant discussions. Participation goes beyond just coming to class and taking notes. Leaders ask questions and seek clarity to foster greater understanding for themselves and for the class. Leaders engage the class in learning course materials both inside and outside the classroom.

Due to the quantity of materials covered, it is recommended that students attend class lectures regularly, ask questions, and keep up with the reading. Students’ participation and leadership qualities in class lectures, recitations, and projects will be used in consideration of their final course grade.

Projects

These projects are to be submitted to complete the course:

(1) Stewardship of the Built Environment Project
(2) Vernacular Response Project
(3) Solar Geometry Project

Students are responsible for all in-class instructions on projects. Projects are due at the start of the presentation session.

Due to the size of the class, projects will be done in teams of five students per team or a maximum of twelve student teams. Team sign up will be completed by the end of the first week of the semester.

Project grades will be based on completeness, accuracy, technical comprehension, legibility, and originality. See grading form at the end of the syllabus for further information.

Late Policy

Late work will be penalized one full letter grade (e.g., an "A" will become a "B", etc.) for any part of the first calendar day and one full letter grade per day thereafter. All unsubmitted late work must be turned in by 5:00 PM on the last day of the regular semester classes (not finals week) to receive completion credit even though it may be too late for a letter grade.
Examinations
Examinations will be given in the third floor design studio and will be completed during the regular class period. The open book and open notes examinations will cover all readings, recitations, site visits, case studies, discussions, and lecture materials. Bring a #2 pencil, and a calculator. Questions should be answered on the grading sheet. Answer sheets and examinations must be turned in at the end of the examination. Students should leave when done so others may finish the exam undisturbed.

Results will be posted at a minimum of 48 hours after all students have taken the examination.

Arrangements for students with learning difficulties should be made prior to the examination. Makeup examinations will only be given for medical or legal related reasons. Students arriving late will be penalized for their tardiness (e.g., no extra time).

Children, pets, and guests are not allowed during the examination. Do not eat during the exam.

Grading
Final grades will be based on the following:

<table>
<thead>
<tr>
<th>Item</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental Stewardship Project</td>
<td>100 points</td>
</tr>
<tr>
<td>Vernacular Response Project</td>
<td>100 points</td>
</tr>
<tr>
<td>Solar Geometry Project</td>
<td>100 points</td>
</tr>
<tr>
<td>Examinations (3@ 100 pts. each)</td>
<td>300 points</td>
</tr>
</tbody>
</table>

Total Possible Points: 600 points

The cutoffs for final grades are:

- A: 558 points
- B+: 522 points
- B: 500 points
- A-: 522 points
- B+: 540 points
- B: 498 points
- C+: 462 points
- C: 438 points
- C+: 462 points
- C: 420 points
- D+: 378 points
- D: 360 points
- D+: 402 points
- D: 378 points
- E: <360 points

Accessibility
The University of Utah College of Architecture + Planning seeks to provide equal access to its programs, services, and activities for people with disabilities. If you need accommodation, prior notice needs to be given to the Center for Disability Services, 162 Olpin Union Building, 581-5020 (V/TDD). All written course information can be made available in alternative format with prior notification to the Center for Disability Services.

University Notes
Last day to drop classes: September 1, 2010
Last day to add classes: September 7, 2010
## COURSE SCHEDULE

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Topic [Lecture No.]</th>
<th>Chapter or Reading</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>8/23 M</td>
<td>Introduction [1]</td>
<td>Course Pack (CP)</td>
</tr>
<tr>
<td></td>
<td>8/24 T</td>
<td>Recitation 1: Site Visit (227 4th Avenue)</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>8/30 M</td>
<td>Environmental Stewardship-2 [3] ......</td>
<td>ES-1, 2, 3</td>
</tr>
<tr>
<td></td>
<td>8/31 T</td>
<td>Recitation 2: Site Visit TBD</td>
<td></td>
</tr>
<tr>
<td></td>
<td>9/01 W</td>
<td>Environmental Stewardship-3 [4] ......</td>
<td>ES-4, 5</td>
</tr>
<tr>
<td>3</td>
<td>9/06 M</td>
<td>Labor Day</td>
<td></td>
</tr>
<tr>
<td></td>
<td>9/07 T</td>
<td>Recitation 3: TBD</td>
<td></td>
</tr>
<tr>
<td></td>
<td>9/08 W</td>
<td>Environmental Stewardship-4 [5]</td>
<td></td>
</tr>
<tr>
<td></td>
<td>9/14 T</td>
<td>Recitation 4: Thermal Oasis ..............</td>
<td>RR-1</td>
</tr>
<tr>
<td>5</td>
<td>9/20 M</td>
<td>Microclimate [8]</td>
<td></td>
</tr>
<tr>
<td></td>
<td>9/21 T</td>
<td>Recitation 5: Environmental Stewardship Presentation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>9/22 W</td>
<td>Microclimatic Analysis &amp; Design [9]...</td>
<td>L: 11</td>
</tr>
<tr>
<td>6</td>
<td>9/27 M</td>
<td>Review &amp; Discussion</td>
<td></td>
</tr>
<tr>
<td></td>
<td>9/28 T</td>
<td>Recitation 6: Microclimate Site Visit</td>
<td></td>
</tr>
<tr>
<td></td>
<td>9/29 W</td>
<td>Examination #1</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>10/4 M</td>
<td>Passive Thermal Systems [10]</td>
<td></td>
</tr>
<tr>
<td></td>
<td>10/5 T</td>
<td>Recitation 7: Vernacular Response Release Time</td>
<td></td>
</tr>
<tr>
<td></td>
<td>10/6 W</td>
<td>Passive Thermal Systems</td>
<td></td>
</tr>
<tr>
<td></td>
<td>10/11 M</td>
<td>Fall Break</td>
<td></td>
</tr>
<tr>
<td></td>
<td>10/12 T</td>
<td>Fall Break</td>
<td></td>
</tr>
<tr>
<td></td>
<td>10/13 W</td>
<td>Fall Break</td>
<td></td>
</tr>
<tr>
<td></td>
<td>10/19 T</td>
<td>Recitation 8: Vernacular Response Consultations</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>10/25 M</td>
<td>Passive Thermal Systems</td>
<td></td>
</tr>
<tr>
<td></td>
<td>10/26 T</td>
<td>Recitation 9: Vernacular Response Consultations</td>
<td></td>
</tr>
<tr>
<td></td>
<td>10/27 W</td>
<td>Passive Thermal Response</td>
<td></td>
</tr>
<tr>
<td></td>
<td>11/02 T</td>
<td>Recitation 10: Vernacular Response Presentations</td>
<td></td>
</tr>
<tr>
<td></td>
<td>11/03 W</td>
<td>Solar Geometry</td>
<td></td>
</tr>
<tr>
<td>Week</td>
<td>Date</td>
<td>Topic</td>
<td>Chapter or Reading</td>
</tr>
<tr>
<td>------</td>
<td>--------</td>
<td>----------------------------------------</td>
<td>----------------------------</td>
</tr>
<tr>
<td>11</td>
<td>11/08</td>
<td>Review &amp; Discussion</td>
<td></td>
</tr>
<tr>
<td></td>
<td>11/09</td>
<td>Recitation 11: Solar Geometry Desk Crits</td>
<td></td>
</tr>
<tr>
<td></td>
<td>11/10</td>
<td><strong>Examination #2</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>11/16</td>
<td>Recitation 12: Solar Geometry Desk Crits</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>11/22</td>
<td>Daylighting-2 [16]</td>
<td></td>
</tr>
<tr>
<td></td>
<td>11/23</td>
<td>Recitation 13: <strong>Solar Geometry Presentations</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>11/24</td>
<td>Daylighting-3 [17]</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>11/29</td>
<td>Daylighting-4 [18]</td>
<td></td>
</tr>
<tr>
<td></td>
<td>11/30</td>
<td>Recitation 14: Daylighting Site Visit</td>
<td></td>
</tr>
<tr>
<td></td>
<td>12/01</td>
<td>Daylighting-5 [19]</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>12/06</td>
<td>Daylighting-6</td>
<td></td>
</tr>
<tr>
<td></td>
<td>12/07</td>
<td>Recitation 15: TBD</td>
<td></td>
</tr>
<tr>
<td></td>
<td>12/08</td>
<td>Review &amp; Discussion</td>
<td></td>
</tr>
</tbody>
</table>

**All unsubmitted late assignments due by 5:00 PM**

**Final** 11/15 W **Examination #3 (8:00-10:00 AM)**
READES

Instructor's Website http://www.arch.utah.edu/young
CP ARCH4350_6350 Coursepack

RR-2 Young, Robert. Climatic Factors in Regional Design
RR-4 Young, Robert Overhang & Fin Calculation
RR-6 Young, Robert Solar Geometry Worksheet

Marriott Library
DL3 Moore, Fuller, Concepts and Practice in Architectural Daylighting, Chapters 1,5,6,8.
DL4 Libby-Owens-Ford, "How to Predict Interior Daylight Illumination Conserve Energy and Increase Visual Performance by Effective Daylight Design"
DL5 Moore, Fuller, Concepts and Practice in Architectural Daylighting, Chapters 10,11.
DL6 Moore, Fuller, Concepts and Practice in Architectural Daylighting, Chapter 14, 16.

REFERENCE LIST


STEWARDSHIP OF THE BUILT ENVIRONMENT PROJECT

Introduction

Environmental stewardship enhances the built environment by recognizing how new construction and the reuse of existing buildings can have substantial impacts on sustainability. Age-old strategies that are being (re)discovered or “new” processes that are being developed are becoming seen as critically imperative to the sustainability of the built environment in the twenty-first century.

This project provides a broad range for exploration limited only by your imagination and encompasses an extensive spectrum. At the micro level are the range of specific individual building processes, materials, and fabrication methods that have recently (re)emerged. Some examples are photovoltaics, LEED and other “green” scoring programs, straw bales, double envelopes, recycled materials, and other emerging “green” products and strategies.

Moving along the continuum, we find buildings themselves used for environmental control by the inclusion of passive thermal design and daylighting. Examples of this are contemporary climate adaptive buildings that are gaining recognition worldwide and those that also integrate the micro level products and processes mentioned above.

Next are existing buildings, such as Audubon House in New York City and the Big-D building in Salt Lake City, that are being rehabilitated or adaptively used and contribute to sustainability by incorporating new green systems and products and are the highest form of recycling as they significantly reduce demands for new raw material for construction and landfill space for demolition wastes.

The ability to effectively communicate ideas and concepts in a concise manner is a valued skill for many practitioners. This project follows up on the work developed in the student forum sessions by enabling the student teams to assimilate their original information presented with the outcomes and information derived from the forum itself. Due to time constraints, the presentation will be limited to 10-12 minutes only.

Objectives

The objectives of this assignment are:
To introduce the student to the practice of evaluating how good stewardship can create sustainable spaces, buildings, and communities.  
To heighten the student's sensitivities to how the built environment (e.g., new and existing buildings) can be enhanced by these processes.

Procedure

In a team of four people, develop a case study or series of examples that illustrates the topic you are investigating which will (A) define the topic (500 words), (B) explain how you researched or developed the topic (250 words), (C) explain why an architect should be familiar with this topic (250 words), (D) explore examples and describe the implications for the future and continued use of existing buildings (1500-2000 words) and how they can be enhanced to improve building performance, and (E) provide your conclusions about this topic (500 words). The written summary should be approximately 3000-3500 words (e.g., 12-14 double- spaced 8-1/2” x 11” pages of text; note: images will lengthen this page count).

From the summary prepare a power point presentation for a 10-12 minute presentation. The presentation should consist of an integration of still images, drawings, and text, and video clips/ animations. Use captions to note sources of photographs, video clips, and animations.

Grading Criteria

Refer to the grading criteria on the class website. Presentations that do not conform to the expected time lengths will be penalized.

Schedule

This project will take the first five weeks of the semester. Teams should be working loosely along the following schedule:

Week 1: Form teams of 4 students; sign up team with instructor; select topic and begin research
Week 2: Continue research
Week 3: Research and prepare preliminary presentation
Week 4: Finalize research; prepare summary; and rehearse presentation
Week 5: Make presentation and submit final summary and power point disk to instructor

Products

Class presentations will be given during the recitation indicated on the syllabus. Submit a single pc-compatible disk that includes your summary and the final digital presentation. The disk should be labeled with team members’ names and be enclosed in a protective cover.
THERMAL OASIS EXERCISE

Introduction

The oasis suggests a place of choice, a respite, a thermal transformation across time or space. The oasis evokes images of a place in many contexts -- a grove or orchard, a market or crossroads, an arcade or courtyard, a sanctuary.

The thermal oasis is a place to go to for renewal, and is often experienced as one of life’s rituals. The inherent value of the oasis lies in the awareness that thermal transitions are essential elements of daily rituals. Special moments in life are often recalled through associations with sensual experiences - a certain smell, a warm wind, sunlight, or sound - which contributed to its uniqueness. Directly or subtly, we purposely seek the relief that an oasis provides. An awareness of the value of thermal differences in our daily experiences allows us to appreciate, and design for thermal variability in the built environment.

An oasis is:

- a relatively small but highly identifiable place in a large field that is characterized by its sense of homogeneity.
- a special kind of destination, a stopping place but not a permanent habitation.
- a place of thermal differences created by architectural or natural elements.
- a place of refuge from a primary environment.

Review the "Delight" chapter in Lisa Heschong's *Thermal Delight in Architecture* (on reserve at Marriott Library). Use the concepts Heschong talks about to enhance your awareness of the thermal oases in your life.

Throughout her book, Heschong uses examples of thermal variety to illustrate the pleasure and sense of renewal that is often associated with contrast, as compared to uniformity or saturation. These thermal transitions can be an
essential element of simple daily rituals in our lives. (A common example would be the morning ritual of leaving a warm bed, placing bare feet on a cold floor, taking a hot steaming shower, then stepping back into the chilly air - an experience that may start off painful but often leaves one with a sense of aliveness).

Heschong also gives many examples of experiences from our other senses that are associated with a sense of coolness or warmth. Visual, auditory, tactile, or olfactory clues can all provide information about corresponding thermal sensations. Rituals and associated senses can all be subcomponents of the oasis experience.

An Oasis of Current Experience

Find a separate example of your own warming or cooling oasis in the built environment that is part of your current lifestyle. These can be a place in your home, at work, where you go for entertainment or relaxation, etc. In completing the assignment answer the following:

- What architectural elements influence your perception of the thermal environment (e.g., the shape and size of the room, the color and light, the texture of surfaces, the circulation and entry points, the functional role of the room, and the source of the thermal variation)?

- What visual, auditory, tactile, or olfactory clues provide information about corresponding thermal sensation (see Heschong for examples)? Are they accurate or misleading with regard to the actual thermal environment of the space?

- What about environmental control? To what extent is change controlled by the person occupying the oasis? Is it low energy control - opening a window, removing a rug, adjusting a louver? Is it high energy control - mechanical ventilation, heating, or cooling?

- What about the ideas of ritual and daily seasonal variation. To what extent do these help create the sense of oasis in your chosen space, and how do the architectural elements of the space contribute to these ideas?

Prepare in 250-500 words (1 to 2 pages of 8 -1/2 x 11 double spaced, typed text) a personal narrative describing one of your oases. Bring your narrative to the recitation as scheduled on the syllabus. You will be using the narrative as part of the discussion exercise to be completed in the recitation. The narrative will be turned in at the end of the recitation for completion credit.
VERNALCULAR RESPONSE PROJECT

Introduction

The College of Architecture + Planning has a long history of looking at the built environment to gain appreciation for architectural design. Since buildings reflect the technology of the time when they were built, buildings built before the mid-twentieth century used a much different building vocabulary than those built in the past fifty years. Each construction was considered appropriate for its time however there are societal, technological, and natural design principles that shaped their formation and selection.

Objectives

The objectives of this assignment are:

- To explore the forces that affect climate responsive design.
- To develop skills in recognizing/designing climatic-responsive designs.
- To recognize climate responsive or rejecting designs.

Procedure

Continuing with the teams from the first project, the goal is to describe how environmental forces affect the vernacular architecture of a climatic region and analyze the thermal performance implications for two contemporary buildings. Explore the vernacular architecture of a non-Utah climate region. Identify the climatic determinants (e.g., earth, wind fire (sun), and water). Identify thermal strategies in the vernacular architecture. Document how architectural elements and site features enhance their effectiveness. If features were a reflection of available materials or local culture, analyze their thermal implications.

Next, find a contemporary building in that region which has adapted the vernacular concepts into its design. Then, find a building in the region which has rejected the responsive concepts. Develop conclusions about thermal performance from a climatic perspective and how the thermal systems are affected by climate adaptive and rejecting designs.

Climate Adaptive: Rocky Mountain Institute, Old Snowmass, CO

Climate Rejecting: Salt Lake City Public Library, SLC, UT
Develop a case study that illustrates the region you are investigating. The case study will (A) define the climate region (250 words), (B) explain the climatic forces that inform the vernacular climate adaptive buildings (750 words), (C) describe the modern climate adaptive building and how the climatic forces are expressed in the design (1000-1250 words), (D) describe the modern climate rejecting building and how the rejection reduces the sustainability of the building (1000-1250 words), and (E) compare and contrast the success or failures of the two buildings (500 words). The case study should be approximately 3500-4000 words (e.g., 14-16 double-spaced 8-1/2” x 11” pages of text; note: images will lengthen this page count).

Research and prepare the case study that provides the information requested above. From the case study prepare a power point presentation for a 10-12 minute presentation. The presentation should consist of an integration of still images, drawings, and text, and video clips/animations. Use captions to note sources of photographs, video clips, and animations.

Grading Criteria

Refer to the grading criteria on the class website. Presentations that do not conform to the expected time lengths will be penalized.

Schedule

Suggested activities for each week are as follows:

Week 7: Identify climate region, vernacular typologies, and example buildings
Week 8: Refine information; Finalize case study Research and prepare preliminary presentation
Week 9: Project consultations; Finalize information; Finalize summary; Rehearse presentation
Week 10: Make presentation and submit final summary and power point disk to instructor

Team desk consultations will be held in the design studio during the recitation. There will be a signup sheet for scheduled times. All team members must attend.

Products

Your presentation will be given during the recitation indicated on the syllabus. Submit a single pc-compatible disk that includes your case study paper, the final digital presentation, and your final presentation story board file. The disk should be labeled with team members’ names and be enclosed in a protective cover.
SOLAR GEOMETRY PROJECT

Introduction

This project involves the design of a solar geometry-based building detail. Throughout time, the sun has been used to denote the change of the seasons, to celebrate specific solar calendar events, and to track the passage of time. Ancient civilizations would erect monumental constructions (e.g., Stone Henge) or incorporate architectural details (e.g., the Pantheon) that would allow the sun to indicate either by a shadow (using a gnomon) or the passage of light (using an oculus) a specific time or date.

An oculus is an opening through which the sunlight, when the sun is at a specific angle in the sky, will pass through and illuminate a celebratory spot such as a niche, a carving, a portrait, or other important artifact or architectural detail. On the other hand, the gnomon is a solid material that is used to cast a shadow that terminated at a specific spot or along a specific line. The oculus and gnomon could be used in a horizontal or vertical orientation depending upon location and the nature of the design.

These details are still being reconsidered and re-expressed in contemporary designs in modern times (see Wil Bruder's Solar Candle at the Phoenix Library shown on next page).

Objectives

The objectives of this assignment are:

- To gain experience in designing a detail that uses solar geometry to activate or enhance the environment.
- To enhance analytical skills.
- To gain experience with modeling sun angles.
Procedure

As a team of four students, select a design strategy (either a gnomon or an oculus) and design a solar sculpture which celebrates the autumnal and vernal equinoxes at solar noon for a location at 40°N. For this exercise ignore daylight savings time and the solar time displacement due to longitude. The intention is to indicate the center of a spot that is located 16' due north of the vertical projection of the center of the gnomon or oculus onto the ground plane below the oculus or gnomon. Other elements of the support system for the solar detail should not obstruct the sunlight from the target point at the time of the celebratory “moment in time.”

Pick a CA+P faculty member and use her or his area of teaching or research as a source of your parti for the solar sculpture. Design the detail using materials and forms that abstractly personify your selection. Using hand calculations or computer modeling software, confirm that the celebratory spot is in fact indicated by the oculus or gnomon at the celebratory moment in time.

Using digital modeling, record the shading sequence or develop an accurate computer animation for a simulation of the performance of the detail from 8 AM to 4PM with the specific “moment in time” highlighted. As part of the documentation, develop a separate single still image from the computer that shows the solar detail works correctly at the celebratory moment in time listed above.

Next, based on your performance analysis, construct a physical model of your solar detail (Scale=1”=1'-0”). For simplicity, the model should fit within a 24” cube. Photograph your model in elevation, plan, and from two other different points of perspective. The model should maximize the use of found objects, materials with recycled content or materials that can later be recycled. The model should minimize the use of non-recyclable materials such as foam core.

Develop a video or power point presentation that identifies your chosen faculty member, explains your parti, and then provides a visual record of the
performance of the solar detail. The presentation should consist of an integration of still images, drawings, and simple text, and video clips/animations. Use captions to note sources of photographs, video clips, and animations. Finally, prepare a separate written summary description (750-1000 words) of your project.

**Grading Criteria**

The solar sculpture model will be used for a walk-around presentation. The media submission will be used to record your submission in the course archives and as a basis for grading the actual solar detail performance. Grading will be based on the completeness of submitted materials, the organization of the presentation media, the clarity of the animations and images that prove that the detail works correctly as well as the design and craft of the final physical model.

**Schedule**

Activities for each week are as follows:

Week 11: Identify faculty member and formulate parti; Begin preliminary design of solar sculpture
Week 12: Project consultations; Finalize design; Construct model
Week 13: Attend walk around presentation and submit media disk to instructor

Team desk consultations will be held in the design studio during the recitation. There will be a signup sheet for scheduled times. All team members must attend.

**Products**

The walk-around presentation will be performed as indicated on the syllabus. Submit a single pc-compatible disk that includes the images and simulations developed for the performance analysis and the final design, your presentation file, and your summary description. The disk should be labeled with team members’ names and be enclosed in a protective cover.