Fall 2008: ARCH 130A: Introductory Design & Research
Monday, Wednesday & Friday 8AM to 11AM in 301 Eng. A & Eng. B Seminar Room (later in semester)

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Assignment of 10/3 & 10/6 for Monday 11/17 & Friday 11/21, and December 1 to December 12, 2008.

High Performance "Green" & Passive Solar Design Residence(s)

A Solar Research Facility and Solar Information Center has been proposed for a suitable University campus location with an integral surrounding village of passive solar design residences.

Proposed Context: The complex of the Center and residences has been conceived to be placed on campus in a fixed geometry of a 360 degree compass radial plan with a plaza oriented to true south for its solar aspect. The radial site plan's geometric form shall be focused on the centrally situated and proposed Solar Research Facility & Information Center. Refer to the attached illustration for site plan schematic. Motor vehicles will mainly be confined to the ingress and egress right of ways, outer perimeter road ways, and to the underground parking garage. A bus stop and an open plaza shall face south on outer perimeter entrance road. Private motor vehicles owned by residents shall be confined to the outer perimeter circular road, parking facilities or garage. The inner circular drive will be essentially free of motor vehicles, with exceptions for emergency vehicles and permitted service vehicles. The inner circular drive shall have a arboretum, solar gardens, a park like environment for open space enjoyment, recreation, scaled plantings and features to assure ample access for all to the sky for insolation.

Statements on Project Deliverable: High Performance "Green" & Passive Solar Design Residence
Each group design team shall:

1. Prepare a site plan (scale 1/20th inch = one foot) of the preconceived fixed radial geometry with site features, terrain, re-contouring, roads, and responses to site analysis findings on the selected locale.

2. Construct a terrain model for the selected site at a suitable scale (1/20th) showing contour form, village roads, walkways, lot lines, drainage swales, features, lots, etc. The model's craft shall allow space on the designed residential plot for your 1/20th scaled form models of the proposed residences.

3. Conduct design studies, solar analysis, program analysis, and reference research on "green" built architecture and related residential architectural topics to prepare one for planning & design of a "High Performance Green & Passive Solar Design Residence" on one of the provided village lots. The lots shall be distributed by lottery to group design teams to assure random and unique solar aspect for each.

4. Define and Articulate Building Program Concepts. As a Program given, each residence shall be designed to be an efficient factory manufactured custom built modular construction system, one that can be over the road truck carrier delivered and set on your design engineered foundation. The foundation structure may have inhabitable space or may not have space for a home workshop, den, or home office, etc., on the lower level. A vehicle garage may be deleted from the program, it may not be an attached structure; vehicle storage may be beneath in lower level. A detached vehicle structure and parking area shall be limited to the 20' strip of lot along the outer circular drive. Vehicles may be stored in the centrally located below grade garage. Consideration shall be given for possible existence of electrically charged vehicles in future ownership, or existence of an hydrogen based energy economy. Detached car ports & pavilion roofs may platform bases for photo voltaic panels and solar hardware. Passive solar design architecture shall be mastered and precede any active solar systems in the design process.

Continued.

5. Core Module Structure Program and Design:

Each residence shall have a team designed defined "core" modular structure that contains: one or more entrances, entry way or hall and related features, the "core" may contain a well dimensioned solarium and related features, most of the mechanicals including the plumbing core for the plumbing interface with the kitchen, 2 bathrooms, laundry, etc. The "core" may be more than one module to gain width, and may be bi-level or on one level with or without a foundation enclosing inhabitable space(s). The residence shall be barrier free, ADA compliant and have complete accessibility to all facilities.

The group design team shall comprehensively resolve the building site analysis issues, site factors and determinants for siting, solar analysis for insolation reception, solar controls and shading devices, and for climate issues. Drawings shall be prepared for plan, section and elevations at 1/4 inch = one foot scale (1:48) for the common "core" modular's architectural design. Drawings shall be prepared for preliminary design review and approval prior to tectonic building model of the core at the same scale: (1/4" = 1') and placed on a plot base model. The core model shall be designed crafted to receive the other individual room modules for the residence when attached and properly integrated into the whole.

The group design team shall have concept diagram attached to their drawing set to illustrate the master program plan design concept for all the other program elements of the kitchen, dining area(s) living room, master bedroom, second bedroom, 2 bathrooms, and a third flexible room for a den - home office - & guest room. Porches, terraces, stoops, breezeways, arbors, and so forth shall be included. As many as 10 or 12 spaces may attach to the "core" and to each other for a complete residence. This is on average, 2 pieces per AE student. The residence should have demonstrated potential to grow in size. Passive solar features shall be portrayed and evident graphically in plan, section and on the model

Site Considerations: The total impermeable hard cover on the site may not exceed 40 percent of the plot site area, or 50% with water collection and on-site retention. Permeable paving gives credit to calculation. Minimum set backs are 5 feet at sides, the front and rear set backs are 10 feet or more for structures. Side areas may include clear walkways. Front and/or rear may have protrusions of open structures of steps, stoops, low walls, planters and terraces. Total gross area of the residence built structure or ground footprint shall not exceed 1800 square feet. Uninhabited cellar foundation areas may not count in gross area. (Note: The modules may not exceed 14 feet in width for affordable highway delivery from manufacturer, and not more than 13.5 feet high including the over-the-road tractor trailer, length can be up to 40 feet or more. Factory built roof structures may be hinged folded and therefore pre-attached to the module. Modules may be stacked, if stacked, a stair structure in the lower level module shall be necessary, as well as a means of attachment. A building erection crane and sufficient site maneuvering area for it to function shall be necessary if module stacking is anticipated.

6. Room Space Modules Designed by Individual AE's: After the master design plan has been rendered and completed by the group design team, the selected room space structures shall be planned, designed and rendered by each individual team member with a set of prepared drawings and a constructed tectonic model. The model shall be engineered for integral demonstrated attachment to the "core" module model on the site plot model. Scale, 1/4 inch = one foot shall be used for the design model and lot base. All the drawings and tectonic model shall have structural construction details on the drawings and in the model tectonic. Basic furnishings and scale elements may be illustrated in final work.

DELIVERABLES (Time frame in weeks)

1. Site Plan: Existing conditions: Site and vicinity topography and features (1)
2. Terrain model of site and vicinity. Design layout of proposed circular village (1)
3. a. Nature of site and solar analysis, b. "Green" build analysis for "core" and whole house (1)
4. Definition of building concept, foundation engineering plan concepts, disposition of vehicle (1)
5. Design of "Core" modular structure: Drawings of preliminary design, approvals, core model (2)
6. Room space modules by individuals: Drawings and Tectonic model for each student AE (2)
7. Presentation Exhibits (1+)

Deadline Dates are as found on Syllabus and dates "to be announced" shall take precedence.