

## SUSTAINABLE DESIGN

5th Year Offering for the Academic Year by:  
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### ABSTRACT

The failure of architects to design and construct buildings that satisfy human needs and respond to forces in the natural environment is increasingly evident. Changing this trend will require a generation of practitioners who are educated in a whole systems approach to problem solving in environmental design. Students will need direct experience with design problems that present the challenges of (a) landscape as well as urban ecology, (b) collaborative interdisciplinary team problem solving, (c) contextual analysis as well as application of appropriate design strategies based on distribution and availability of materials and cultural resources, and (d) constructability of a well researched and carefully conceived design concept.

### A SUSTAINABLE DESIGN OPTION

This option is needed to **advance the profession** in the field of sustainable design and green architecture, to **strengthen the integration of architectural knowledge** especially in building systems, and to **build collaborative design skills** for practitioners to be effective communicators and leaders in their profession and community. Each of these areas, which will build student's knowledge, confidence, and skill in human as well as built systems, are described in more detail below in terms of the specific need for such an option, the expected outcomes from the course, the procedures and methodology to be used to achieve the outcomes, and the evaluation criteria to be used to determine whether the outcomes have been met.

## The Profession, Related disciplines,

### *NEED:*

- The changing profession of architecture has seen the emergence of new sub-professions (e.g., facade engineering, construction management, interior systems engineering). The need for experts in environmental building issues as well as generalists who are able to coordinate and participate in team-oriented design decision-making is most evident.

### *EXPECTED OUTCOMES:*

- Students will possess knowledge of the sub-professions and their relationship to architecture such that the integration of knowledge from consulting disciplines will combine with architectural design processing in a meaningful and effective way. Students will understand these disciplines in a context that includes the environment.
- Student will demonstrate confidence in working with other disciplines because of their direct experience to professionals in these fields.
- Students will acquire skills in working with sub-professions and make evident this through drawings, reports, and computer media which illustrate an understanding of broader issues surrounding the design problem. In particular, student's will be prepared to perform building environmental assessments and to guide future development that may occur in a sustainable fashion.

### *PROCEDURES/METHODOLOGY:*

The procedures for providing this experience with multiple disciplines will be achieved through the following.

- A seminar (Arch 491) on the theory of sustainable design will be offering during the first quarter. This seminar will focus on environmental design theorists who have embraced ecological principles, whole systems approaches to problem solving, and interdisciplinary team collaboration in design. Readings will include: Ian McHarg, John Lyle, Buckminster Fuller, Peter Calthorpe, and Kevin Lynch.
- Joint seminars with other departments in the college will also give students experience with bridging knowledge between environmental design expertise. Specifically, a joint Architectural Engineering and Architecture seminar on building systems integration which focuses on seismic and mechanical system design and retrofit and selection criteria for structural, mechanical, and finish materials will be offered in the second quarter in conjunction with design. This will be followed with a third quarter participation of construction management in the constructability of the design development proposal.
- Partnering with firms and agencies throughout the entire year. The mode of interaction with practitioners will include several such as visitations and electronic/video down-link to campus classrooms. The Cal State Hayward Executive Masters in Architecture Program is one possible source of professionals who are already connected to college activities. The instructors have also many professional and research contacts that will be offered to students.
- Students will be required to apply inductive reasoning and generate sustainable design principles from the specific interviews and information gathering that takes

place during the fall quarter. These principles will guide their design work throughout the remainder of the year.

- Students will use case studies during the first quarter as a means of developing assessment techniques for the evaluation of existing conditions and the suitability of their design proposal.

**EVALUATION CRITERIA:**

The assessment criteria to measure a student's achievement of interdisciplinary design process will be based on the following.

- How well the student is judged to integrate information sources provided by the interdisciplinary team members.
- How thorough the information received is in responding to the sustainable design criteria developed early in the course.
- How well the information is synthesized for defining the architectural project and its goals and criteria.
- How well the student simulates the responsibility of the architect to engage in the carefully planning of a whole building where structural, mechanical, electrical, and communications systems are fully described.

**PROPOSED MEETING TIMES & LOCATION**

ARCH 481    MWF            1pm-5pm      05-402  
 ARCH 491    TR                 3pm-4pm      05-106 or 03-/02-classrooms

**RESOURCES**

Access to IBM computers for energy analysis.  
 Classroom which has the ability to show slides and computer multi-media.

**SCHEDULE**

FALL			WINTER	SPRING
case study	design problem	program- ming	design development	design & construction documentation/presentation
ARCH 491 seminar: Sustainable Design Theory (P. Cooper (75%)/ McDonald (25%)) [recommended: D. Duerk Architectural Programming]			ARCE/ARCH seminar: Seismic/Mechanical Retrofit System Selection Criteria (J. Feldman)	CM participation: Constructability Env'l Value Engineering (H. Johnston)

*Participation of architecture/engineering/construction consultants will occur through out the year, during Fall (Programming and Schematics), Winter (Design Development), and Spring (Documentation/Presentation).*

## SELECTED BIBLIOGRAPHY

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