UTSA Architecture, Construction and Planning

ARC4156-909 Building Design Studio

FALL 2019

"Architectural design is typically carried out with little or no environmental consideration integral to the process. Once the design has reached a certain stage environmental considerations – whether material toxicity, water conservation, carbon emissions or energy conservation or something else – are then assessed. At this point decisions are made to revise and iterate the design for better environmental outcomes or to add 'environmental features'. We know the results of this disjointed design process and we know this has to change if buildings are going to be better for people and the planet!

Unfortunately many environmental standards reinforce this process in two ways. Firstly by being separate from the design process, often as an assessment procedure. Secondly by requiring 'environmental features' be added in order to score points or increase the rating of the design."

Elrond Burrell

"The Passivhaus Standard is different. Unlike most environmental standards for architecture, design is central to the Passivhaus Standard. And the Passivhaus Standard is central to the design process. The Passive House is the world's leading standard in energy efficient design. It started out as a construction concept for residential buildings in Central Europe. Today, the Passive House Standard can be implemented in all types of buildings almost anywhere in the world. The demand for Passive Houses as well as information on and experience with Passive Houses has been increasing at an enormous pace, reflecting the trend-setting developments in this field."

passipedia.org

The international Passivhaus Standard is most often associated with cooler climates. People assume it works best in climates like that of Germany and Northern Europe where the standard originates from. But physics works wherever you are. And people all over the world want to live in comfortable, energy efficient homes. Passivhaus is rapidly taking off in the United States. So what about South Texas? None…

1.0 GENERAL COURSE INFORMATION

Course Codes:	ARC4156
Course Title:	BUILDING DESIGN STUDIO
Course Credits:	6
Restrictions:	-
Course Co-ordinator:	Dr Antonio Martinez-Molina antonio.martinez-molina@utsa.edu
Teaching Staff:	Dr Antonio Martinez-Molina antonio.martinez-molina@utsa.edu Dr Neda Norouzi neda.norouzi@utsa.edu Dr Miltos Alamaniotis miltos.alamaniotis@utsa.edu
Tutorial Staff:	Helena Zambrano helenaz@overlandpartners.com Sam Rusek srusek@lakeflato.com Corey Squire corey@positiveenergy.pro

2.0 CLASS - OFFICE HOURS

- STUDIO: all Mondays of the semester, from 1:00pm to 04:50pm | 1.102 (Monterey Building);
- STUDIO: all Wednesdays of the semester, from 1:00pm to 04:50pm | 1.102 (Monterey Building);
- STUDIO: all Fridays of the semester, from 1:00pm to 04:50pm | 1.102 (Monterey Building);
- OFFICE: all Tuesdays and Thursdays, from 09:00am to 10:00am or by appointment | MNT 3.380G

3.0 COURSE DESCRIPTION

This studio will consist of one common major design project and out-of-studio learning experiences. While the project will be semester-long, it will be divided into several distinct phases including both group and individually-executed tasks. Project phases will include, but are not limited to: research, programming, site analysis, massing and site design, building design, building assembly and detailing, energy and daylighting design and evaluation, and other environmental performance analysis tasks, renewable energy system design, landscaping, construction planning and drawings.

The semester project will involve developing a common proposal for a small home meeting all the requirements of Passivhaus standard (see https://passivehouse.com for more information). The location of the Passivhaus will be next to the Monterey building.

Relevant reading material will be provided during the semester as needed. The material will either be distributed to students or provided in a digital format through Blackboard. All students are expected to participate in discussion sessions based on these readings. While a preliminary reading and reference list is included in this syllabus, other readings may be provided as needed.

Studio participants will be expected to commit to a high degree of work ethic both inside and outside of the studio. Participants will be expected to effectively accomplish reading and research assignments and to attend occasional lectures and other relevant cultural events beyond the studio activities. It is the responsibility of each studio participant to utilize the outcome of these assignments and activities to inform their designs. Working in the studio and participation in group critiques will be expected from all studio participants.

The design studio is primarily an interactive experience aimed at exposing the student to different ways of identifying, approaching, and solving problems in the design process. In this process, having different points of view and different alternatives is encouraged and considered helpful in developing the student's ideas. Peer teaching and learning are important elements in the studio experience. Students are encouraged to offer constructive criticism to their colleagues and to hold in-class discussions of relevant issues. Group criticisms of student work will be arranged regularly. Effective time management is required. Students should continuously explore possible alternatives by means of drawings and models. Ideas can never be fully evaluated or developed until they are put on paper.

In addition to the major semester design project, the studio will also involve lectures by Passivhaus professionals, field trips, and other out-of-studio learning experiences. Additionally, at the end of the semester, each studio participant will contribute to the Passivhaus building portfolio documenting both, the design process and the final design outcome of the project and its different components.

4.0 COURSE GOALS AND OBJECTIVES

- To enhance architectural programming abilities and contextual design methodologies.
- To enforce ethical responsibilities relative to ecological relevance and social consciousness.
- To introduce students to the basic issues involved in the design of high–performance buildings, in particular the Passivhaus standard.
- To incorporate digital building performance simulation tools in the design process as a means of informing design decisions in the early stages of the design process.

- To consider the incorporation of passive and active sustainable systems of design, including solar geometry, passive design strategies, renewable energy technologies, application of appropriate building materials, etc.
- To analyze daylighting strategies and develop and empirically evaluate daylighting solutions for typical spaces.
- To advance technical understanding of building systems within the framework of expanding on scientific and human behavioral disciplines as they contribute to the formation of space.
- To apply understandings of appropriate systems of structure, artificial lighting, acoustics, mechanical and electrical networks, detailing of building envelop and construction materials and assemblies relevant to workable architecture in meeting occupant needs and wishes.
- To advance appreciation of building code requirements relevant to occupant life safety enhancement.
- To enhance students' graphic communication skills for presenting design concepts, processes, and solutions.

NAAB Criteria

This course addresses the following NAAB Defining Perspective:

A.2 Design Thinking Skills: *Ability* to raise clear and precise questions, use abstract ideas to interpret information, consider diverse points of view, reach well-reasoned conclusions, and test alternative outcomes against relevant criteria and standards.

A4. Architectural Design Skills: *Ability* to effectively use basic formal, organizational and environmental principles and the capacity of each to inform two- and three-dimensional design.

A.5 Ordering Systems: *Ability* to apply the fundamentals of both natural and formal ordering systems and the capacity of each to inform two- and three-dimensional design.

B.1 Pre-Design: *Ability* to prepare a comprehensive program for an architectural project that includes an assessment of client and user needs; an inventory of spaces and their requirements; an analysis of site conditions (including existing buildings); a review of the relevant building codes and standards, including relevant sustainability requirements, and an assessment of their implications for the project;

B.2 Site Design: *Ability* to respond to site characteristics, including urban context and developmental patterning, historical fabric, soil, topography, ecology, climate, and building orientation, in the development of a project design.

B.3. Codes and Regulations: *Ability* to design sites, facilities, and systems that are responsive to relevant codes and regulations, and include the principles of life-safety and accessibility standards.

B.4 Technical Documentation: *Ability* to make technically clear drawings, prepare outline specifications, and construct models illustrating and identifying the assembly of materials, systems, and components appropriate for a building design.

B.5 Structural Systems: *Ability* to demonstrate the basic principles of structural systems and their ability to withstand gravitational, seismic, and lateral forces, as well as the selection and application of the appropriate structural system.

B.6 Environmental Systems: Ability to demonstrate the principles of environmental systems' design, how design criteria can vary by geographic region, and the tools used for performance assessment. This demonstration must include active and passive heating and cooling, solar geometry, daylighting, natural ventilation, indoor air quality, solar systems, lighting systems, and acoustics.

B.7 Building Envelope Systems and Assemblies: Understanding of the basic principles involved in the appropriate selection and application of building envelope systems relative to fundamental performance, aesthetics, moisture transfer, durability, and energy and material resources.

B.8 Building Materials and Assemblies: Understanding of the basic principles used in the appropriate selection of interior and exterior construction materials, finishes, products, components, and assemblies based on their inherent performance, including environmental impact and reuse.

C.2 Integrated Evaluations and Decision-Making Design Process: *Ability* to demonstrate the skills associated with making integrated decisions across multiple systems and variables in the completion of a design project. This demonstration includes problem identification, setting evaluative criteria, analyzing solutions, and predicting the effectiveness of implementation.

C.3 Integrative Design: *Ability* to make design decisions within a complex architectural project while demonstrating broad integration and consideration of environmental stewardship, technical documentation, accessibility, site conditions, life safety, environmental systems, structural systems, and building envelope systems and assemblies.

D. Stewardship of the Environment. The program must describe its approach to developing graduates who are prepared to both understand and take responsibility for stewardship of the environment and natural resources.

5.0 LEARNING RESOURCES

5.1 Textbooks

- Kwok, A. and Grondzik, W. (2011). *The Green Studio Handbook: Environmental Strategies for Schematic Design*, 3rd Edition. Routledge. **(Required)**
- Cotterell, J. and Dadeby, A. (2012). *The Passivhaus Handbook. A Practical Guide to Constructing and Retrofitting Buildings for Ultra-Low Energy Performance*, Green BooksLtd. **(Required)**

5.2 Recommended readings

- Pelsmakers, S. (2015). *The Environmental Design Pocketbook*, 2nd Edition. RIBA Publishing.
- Brimblecombe, R. and Rosemeier, K. (2017). *Positive Energy Homes. Creating Passive Houses for Better Living*. CSIRO Publishing.
- Trubiano, F. (2013). *Design and Construction of High Performance Homes. Building Envelopes, Renewable Energies and Integrated Practice*. Routledge.
- Corner, D; Fillinger, J and Kwok, A. (2018). *Passive House Details. Solutions for High-Performance Design*. Routledge.
- Hopfe, C. and McLeod, R. (2015). *The Passivhaus Designer's Manual. A Technical Guide to Low and Zero Energy Buildings*. Routledge.
- Maclay, W. (2014). *The New Net Zero. Leading-Edge Design and Construction of Homes and Buildings for a Renewable Energy Future*. Chelsea Green Publishing.
- Friedman, A. (2013). *Innovative Houses. Concepts for Sustainable Living*. Laurence King Publishing Ltd.

6.0 ASSESSMENT

Grades will be provided for each major phase in the semester. Research assignments will be evaluated based on the depth of research and analysis, the clarity of the diagrams and textual explanations, and the quality of the presentation. Evaluation of design projects will reflect the two major components of *process* and *product*.

The *process* grade will be evaluated at several points during the semester and will be based on the depth of exploration and development of alternative solutions and the improvement in the student's performance during the project. This process should be fully documented in sketches, models, and notes and clearly expressed in the studio portfolio.

The *product* grade will be based on the final project presentation and will include evaluation of:

Design: the resulting design should give evidence of the concepts or criteria central to the project. The design must incorporate those concepts and concerns covered in previous semesters. The resulting project should fulfill the design goals and intents.

Craft: students must achieve an excellence of execution in their drawings and models. Rough sketches should have character appropriate to their task. Drawings and/or computer plots must be clear and concise – they also must have visual impact and an underlying concept. A range of media should be used, as is appropriate to the task, including schematic diagrams, freehand development sketches, and 3-D computer modeling. Models should show a concern in selecting appropriate modeling materials; in cutting and joining; and in use of a base.

The studio grade will be distributed as follows:

• Semester project	90%
• Attendance, Participation & Development	10%
• TOTAL	100%

7.0 GRADING POLICY

The general meaning of the letter grades is presented below:

A+ (97-100); A (93-96); A- (90-92): Excellent: Exceeds minimum requirements and reaches a state of exceptional work produced. Strong initiative, attendance, participation, research and reading. Complete comprehension of course/project goals. Adds positively to the educational experience for the rest of the class. Tests and projects are well beyond the minimum requirements to expand the questions or problems assigned. Work is delivered by the due date and is of exceptional graphic quality.

B+ (87-89); B (83-86); B- (80-82): Good: Often exceeds minimum requirements for work produced – for quality and quantity, attendance, research and reading. Participates regularly in class discussions. Solid comprehension and above average demonstration of course/ project goals. Tests and projects are well composed, and make thoughtful original contributions to the questions or problems assigned. Work is delivered by the due date and is of good graphic quality.

C+ (77-79); C (73-76); C- (70-72): Average: Meets minimum requirements for work produced – for quality and quantity, attendance, research and reading. Little or no participation in class discussions. Tests answer the question as given and projects provide the required information. Work is delivered by due date and is of average or acceptable informational and graphic quality.

D+ (67-69); D (63-66); D- (60-62): Not a passing grade: Work produced is consistently weak with poor craft, absences, insufficient or no research, little or no reading, little or no participation. Demonstrates a weak comprehension of course/ project goals. Tests provide partial answers to the questions given and projects may also be partially complete. Work, if delivered by the due date, is of poor informational and graphic quality.

F (below 60): Not a passing grade: Work, if any, produced is very weak with poor craft, seven or more absences, little or no research, reading, and participation. Demonstrates that course/ project goals or test questions were misunderstood or ignored. Tests provide irrelevant answers to the questions given and projects may also be substantially incomplete. Work, if delivered by the due date, is of unacceptably sloppy graphic quality.

8.0 ATTENDANCE POLIY:

YOU MUST ATTEND CLASS FOR THE FULL CLASS PERIOD for every scheduled class.

There are two kinds of absences, excused and unexcused.

- Excused Absences are those for religious observance, illness, military service, or other official activity in which the student is required to participate. Appropriate documentation should be provided for all excused absences. For illness, a note is required and if necessary one can be obtained from the DT Campus Nurse free-of-charge. Work missed via excused absences will be accommodated by the instructor. (See HOP 5.09) However, should excused absences become excessive (excessive being defined as absences that result in the student's inability to adequately perform in class or those that effect the completion of assignments) then you and your instructor should discuss the possibility of recording an "IN" - Incomplete. (See General Academic Regulations).

- Unexcused Absences ARE ALL OTHERS. For all classes in the Department of Architecture, three (3) unexcused absences will result in the automatic reduction of your final grade by 5% (or 1/2 of a letter grade). Four (4) unexcused absences will result in the automatic reduction of your final grade by a total of 10% (or one whole letter grade). And five (5) unexcused absences will result in YOU FAILING THE CLASS.

Lateness Policy:
Arriving to class more than 10 minutes late or leaving more than 10 minutes early will count as 1/2 day of unexcused absence and will count as 1/2 day of unexcused absence and will count towards the maximum allowed times of unexcused absences discussed above.

Late submission:
Late work will be automatically reduced by one letter grade, and thereafter, lowered by one (1) letter grade for each subsequent 24 hour period the work is not submitted. All submissions are due at the BEGINNING of class at the due date unless otherwise announced. Students with excused absences, who will not be present to meet the submission deadline, MUST CONSULT with the instructor BEFOREHAND to make alternative arrangements for submitting their work. No exceptions will be made.

Blackboard Learn:
All course material, including syllabus, class presentations, project handouts, and other resources, will be made available as much as possible on Blackboard. Learn e-mail will be used by the instructors to communicate important information to students. Students are responsible to check their Learn e-mail account regularly or forward it to their main e-mail account (that they do check regularly). Learn will also be used to digitally submit projects and to post student grades as they become available.

9.0 STUDIO MANAGEMENT AND WORK ETIQUETTE

The following standards of studio upkeep and work etiquette will be strictly adhered to:

- Air-born paints, toxic adhesives, drawings fixatives, etc. are not allowed anywhere in the College of Architecture building or adjacent outdoor area.
- Desks, tables, floor surfaces, etc. cannot be used as cutting surfaces.
- Furniture shall not be removed from studios nor shall any new furniture be brought into the studios without instructor consideration. One appropriately sized, lockable storage container will be allowed per student.
- TV's will not be allowed to be turned on during the studio. Music devices shall be fitted with personal headphones.
- CELL PHONES MUST BE TURNED OFF DURING THE STUDIO.
- Meals should not be eaten during the studio. Light snacks and drinks will be allowed if they are carefully managed.
- Use of university computers shall be according to UTSA policies.
- Studio security is the responsibility of everyone in the class. Avoid leaving outside doors unlocked or blocked open. Lookout for one another as you come and go in late hours.
- Studio participants shall work together to keep the studio space as clean and orderly as reasonably possible. Emergency fire exit paths MUST remain unobstructed.
- The work of building janitorial personnel shall be respected. Please make every effort to facilitate cleaning activities by keeping work material organized.
- Power tools are not permitted within the studio as they pose a safety threat and cause excessive noise and dust.

10. REQUIRED EQUIPMENT

- A note book and a 3” binder for assignment, handouts, etc.
- A sketchbook
- Roll of sketch or tracing paper.
- Pencils, black and color markers, parallel bar, triangles, architectural and engineering scales and other drafting equipment as needed.
- Model building equipment and supplies.
- Laptop computer with appropriate software
- Department of Architecture computers, printing and manufacturing facilities are available for responsible student use.

11. GUEST LECTURES

Class activities may also include presentation by guest lecturers in relevant topics. Attendance of such lectures is mandatory.

12. PERFORMANCE SIMULATION SOFTWARE

The studio will utilize the cloud-based building performance modeling and simulation tool DesignBuilder. Through DesignBuilder, students will be able to pick the right design strategies through compare massing, layout and envelope options, study natural ventilation and daylighting, compare design performance against energy, daylight & comfort goals, and use compelling visual outputs to convince others of the performance benefits of the proposed design. DesignBuilder is a commercial software. The instructor will provide all students with access to the tool and guide them through its effective use. Other performance simulation tools as PHPP and Therm will also be discussed.

13. STATEMENT FOR STUDENTS WITH DISABILITIES

Students with special needs should see their instructor immediately at the beginning of the semester. Instructors cannot make accommodations for special needs such as disabilities until the student first registers with the Office of Disability Services, 2.03.18 Multidisciplinary Studies Building (MS), (210) 458-4157 or 458-2945 (downtown campus). That office will document the disability and recommend to instructors appropriate accommodations. Such accommodations are never retroactive to earlier in the semester. For more information, visit their office, call, or see http://www.utsa.edu/disability/

14.0 STATEMENT ON ACADEMIC INTEGRITY

http://catalog.utsa.edu/informationbulletin/generalacademicregulations/graduate/academichonesty/

15.0 COMMON SYLLABUS INFORMATION

http://provost.utsa.edu/syllabus.asp