

Home Architecture

mjc 01/05/2009

Pedagogical intent and catalog description

The Home Architecture track immerses students in the sector of architecture and construction that is concerned with single-family homes. The topics of the track are comprehensive across phases of the procurement process to include land development, regulation, design, construction, marketing, and habitation. Students will design and construct a house, and in the process gain knowledge of construction materials, methods, supply chains, and management. They will employ advanced information technologies that enable them to integrate knowledge of these diverse areas that into their design decision-making process.

The track is a senior year focused experience. In the fall semester, students' major courses are all focused around the construction of a house. Three courses are coordinated to address detailed design and integration, structures, and building systems necessary to the construction. In the spring semester a final design studio emphasizes the design and virtual construction of a house. One of the spring semester designs will then become the subject for the following fall semester construction effort. This "backwards" sequence where a student first participates in construction and then participates in design is meant to confront the student with the demands of materials, logistics and complete documentation before a final undergraduate design studio experience and transform the student's attitudes and confidence as a designer.

The Home Architecture track focuses upon integrated project delivery and experimental design methods supported by advanced information technology. It emphasizes two unconventional learning modes: hands-on construction, and computer-aided simulation. Its focus is in contrast to design-bid-build delivery, conventional design methods, and conventional studio educational patterns that are the default assumptions within the Architecture Studies track. As such, the Home Architecture track is an experimental curriculum that may prove to be an exemplar for future general architectural studies.

Background

The design of residences is different in many ways from design of commercial and institutional buildings. While a compelling need to protect public welfare has resulted in strict licensing of architects who work on public buildings, residential design is less regulated and more responsive to the wishes and desires of private individuals. Because structural and fire safety constraints are lower in residences, the materials and methods of construction are different. Yet homes are often complex and sophisticated in terms of lighting, acoustic, visual, communications, garage, energy production, and functional requirements in comparison to many commercial building types, such as office buildings or retail spaces. Home designers may need particular knowledge of security systems, AV systems, lighting systems, landscaping, kitchen and hygiene facilities, and various recreational facilities that may be overlooked or subcontracted by registered architects in typical practice. Finally, the residential construction industry is organized differently from the commercial and institutional industry. In contrast to the highly specialized and

fragmented form common in commercial and institutional construction, companies in residential construction are often organized as vertical monopolies in which a builder assumes responsibility for land development, design, major construction, sub-contracting, project management, financing and even marketing.

The renewal and production of homes has been identified as a major social challenge for the next several decades. Within the United States, increasing populations, migration of populations, and rising standards of living will lead to a new housing boom in the next few years. The recurring devastation of regions due to natural perils, such as hurricanes, earthquakes, and floods, places a stark imperative upon society to accommodate those overtaken by emergency needs for shelter. Our region has suffered disastrous hurricanes that have largely destroyed two major cities. Globally, the challenges are even more intense due to rapid population increases and rising living standards. Reduction of energy use in homes and residential communities is a critical factor in ameliorating the impacts of global warming.

In recent years, a new stylistic movement has emerged in the residential sector. Modernism has resurged and been renewed with 21st century technology, as popularized in magazines such as *Dwell* and *Metropolis*. Prefabrication, industrialization and mass customization have become practical alternatives to site construction that is slow, expensive and wasteful of materials. Technological innovations and increasing energy costs have changed the cost equations and public awareness to create new markets for energy efficient, green home building. Through the Home Architecture track Texas A&M Department of Architecture is establishing a position to lead advances and innovations in this sector at a moment when the sector is in flux.

Texas A&M Department of Architecture has both particular obligation and special opportunity to provide leadership in home architecture for our region and global regions that have similar characteristics. The program is thus a strategic initiative.

The Home Architecture track can also be perceived as a codification and institutionalization of previous pilot efforts by the Department of Architecture, such as the Solar Decathlon competition entry and the Galapagos Research Station project. These projects pioneered within the department full-scale design and construction projects with extensive logistic, fabrication, cost containment and design components. The Home Architecture track will distinguish students who undertake this alternative curriculum from those who pursue a more conventional curriculum.

Syllabus notes

408. Experimental Home Architecture. (2-6). Credit 5.

Exploration of advanced and experimental topics in home architecture including off-the-grid homes, design for disassembly, industrialized construction, smart architecture, sustainable community design, and other topics.

Prerequisites: ARCH 407, 431, 434.

As the final studio in the undergraduate Bachelor of Environmental Design curriculum, ARCH 406 and ARCH 408 are intended to complete the educational sequence. By integrating material from previous courses and introducing new material the courses can serve as a basis for professional employment or

further advanced studies. The student who successfully completes one of these courses will be ready to make a transition out of the undergraduate academic world into new, and more challenging endeavors.

ARCH 408 is conceived as the culmination of the home architecture track in which students apply the various skills and abilities acquired throughout their education into a final project focused on the design of a home. It is also intended to introduce advanced and innovative topics that could become the motivation for further graduate study. The course is designed to achieve the following objectives:

1. Develop awareness and skills within students of the broad aspects and topics of the home building industry, including land development, community planning, design, construction, marketing, and habitation, drawing contrasts and similarities to other branches of architecture. This objective will intensify the knowledge and awareness of the practice of architecture and alternative ways of conceiving professional services.
2. Increase skills and abilities in advanced design and decision-support tools for simulation and analysis. Building Information Modeling, energy simulation, engineering and construction analysis software, and virtual construction software collectively provide comprehensive representations of architecture that can be used to predict performance across an extensive range of functional concerns.
3. Develop skills in management of design and construction addressing constraints of time, money, resources and scope.
4. Demystify construction and engender confidence in one's ability to lead a project team that consists of a wide range of domain experts.
5. Conduct a design project that demands integration of the other four objectives and accredits the student who completes the course as well-prepared for practice or graduate studies.

These objectives will be accomplished through a series of preparatory exercises and assignments that culminate in a comprehensive design assignment.