

**Department of Architectural Technology**  
Bachelor of Technology in Architectural Technology

**ARCH 3691 ADVANCED DESIGN AND BUILDING INFORMATION MODELING**  
1 class hour, 4 lab hours, 3 credits. (Thursday 8:30 - 11:00 AM & Field Trips)

**Professor:** **Paul C. King** [pking@citytech.cuny.edu](mailto:pking@citytech.cuny.edu), [prof.paul.king@gmail.com](mailto:prof.paul.king@gmail.com)  
Office hours (Wednesday 12:-1:00 )

**Overview:**

In recent years BIM (Building Information Modeling) has been heralded as the wave of the future but it has not been fully integrated into the practice of Architecture. New and complex ways of doing things are often better tested with a tight knit team working on a small scale project before the methods can be scaled up to large projects

The key to BIM is not just the integration of the project in a smart model but the integration of the team. This semester you will have the opportunity to test and hone both your computer skills and your team building skills. You will be required to work as a group of competing team to think out how you best to progress through the design and development and construction of a project.

**The Solar Decathlon:**

As a vehicle for this semester we will focus on the Solar Decathlon - a competition among architectural schools to design, develop and build a solar-powered house. If your team is lucky enough to have their proposal to compete accepted the competition will ask you to design, build and assemble every component of the building and to then take it apart, ship and deliver it to the site of the competition where your team will re-assemble it for the competition.

A review of past projects will show that successful teams did much more than create an efficient house but created buildings which integrated additional strategies of sustainability as well as a highly developed sense of aesthetics.

This semester we will work on two phases of the project. The first goal is for each team to develop a detailed case study including a BIM model of an existing entry from the 2011 solar decathlon competition. The team will study and develop a detailed case study understanding every aspect of the project. As a class we will develop a set of key questions we should all look to answer in our case studies.

The second goal is for each team to design and develop their one new entry to the solar decathlon and build a second BIM model.

**Research & Process:**

**Day 1 - Introduction:** Each student will be assigned two projects to review and present to the class. As there are only 20 projects there should be some overlap - it is important that every project be presented. After this presentation we will divide up into your semester long teams. A second selection process will assign research projects to each team.

**Day 2 - Case Study Presentations:** - Define the key aspects of the project. What are the pros and cons of the project? What were the critical jury comments? What did you like the best and what would you revise? What were the criteria for judgment? What additional criteria should you consider?

**Day 3 - Day 15 Design Development and Project Delivery:** The schedule is to be determined by each team. After you analyze your case studies and those of your fellow teams, develop the key components of your proposed solar decathlon entry. Each team will post weekly progress twice a week on the open lab website.



## [www.solardecathlon.gov/past/2011/](http://www.solardecathlon.gov/past/2011/)



[www.solardecathlon.gov/past/2011/](http://www.solardecathlon.gov/past/2011/)



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◦ [Solar Decathlon 2005](#)

◦ [Solar Decathlon 2003](#)

### Highlights from Solar Decathlon 2011

In September 2011, 19 teams from colleges and universities in the United States, Canada, New Zealand, Belgium, and China competed in the fifth U.S. Department of Energy Solar Decathlon to design, build, and operate the most attractive and energy-efficient solar-powered house. On Oct. 1, the University of Maryland was declared the winner. Purdue University placed second, and Victoria University of Wellington (New Zealand) placed third.

Learn more about Solar Decathlon 2011:

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Read our brochure for an overview of Solar Decathlon 2011

## [www.solardecathlon.gov/past/2011/teams.html](http://www.solardecathlon.gov/past/2011/teams.html)



### Teams

[Appalachian State](#)

[Canada](#)

[Florida Int'l](#)

[Hawaii](#)

[Illinois](#)

[Maryland](#)

[Middlebury College](#)

[New Zealand](#)

[Ohio State](#)

[Parsons NS Stevens](#)

[Purdue](#)

[SCI-Arc/Caltech](#)

[Team Belgium](#)

[Team China](#)

[Team Florida](#)

[Team Massachusetts](#)

[Team New Jersey](#)

[Team New York](#)

[Tennessee](#)

[Tidewater Virginia](#)

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### Solar Decathlon 2011

#### Teams

The university-led teams that design, build, and operate the competition's solar-powered houses are the heart of the U.S. Department of Energy Solar Decathlon.

Learn more about each of these teams that competed in Solar Decathlon 2011:

- [Appalachian State University](#)
- [Florida International University](#)
- [Middlebury College](#)
- [New Zealand: Victoria University of Wellington](#)
- [The Ohio State University](#)
- [Parsons The New School for Design and Stevens Institute of Technology](#)
- [Purdue University](#)
- [The Southern California Institute of Architecture and California Institute of Technology](#)
- [Team Belgium: Ghent University](#)
- [Team Canada: University of Calgary](#)
- [Team China: Tongji University](#)
- [Team Florida: The University of South Florida, Florida State University, The University of Central Florida, and The University of Florida](#)
- [Team Massachusetts: Massachusetts College of Art and Design and the University of Massachusetts at Lowell](#)
- [Team New Jersey: Rutgers - The State University of New Jersey and New Jersey Institute of Technology](#)
- [Team New York: The City College of New York](#)
- [Tidewater Virginia: Old Dominion University and Hampton University](#)
- [University of Hawaii](#)
- [University of Illinois at Urbana-Champaign](#)
- [University of Maryland](#)
- [The University of Tennessee](#)



**Teams**

Appalachian State  
Canada  
Florida Int'l  
Hawaii  
Illinois  
Maryland  
Middlebury College  
New Zealand  
Ohio State  
Parsons NS Stevens  
Purdue  
SCI-Arc/Calech  
Team Belgium  
Team China  
Team Florida  
Team Massachusetts  
Team New Jersey  
Team New York  
Tennessee  
Tidewater Virginia

**Final Results**

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- Solar Decathlon 2005
- Solar Decathlon 2002

**Solar Decathlon 2011**

**Appalachian State University**  
**The Solar Homestead**

Team website: [www.thesolarhomestead.com](http://www.thesolarhomestead.com)

Appalachian State University was inspired by traditional Appalachian settlements for its U.S. Department of Energy Solar Decathlon 2011 entry. Solar Homestead is composed of multiple buildings that form a self-sufficient ensemble. Six outbuilding modules connect to form the Great Porch, an outdoor living space protected by an 8.2-kW trellis of bifacial solar cells. Inside, the 833-ft<sup>2</sup> (77-m<sup>2</sup>) house features two bedrooms, a day-lit bathroom, energy-efficient appliances, and a versatile living and dining area. The Solar Homestead also includes an independent 120-ft<sup>2</sup> (11-m<sup>2</sup>) Flex Space that can be used as a home office, art studio, or guest quarters.

**Design Philosophy**

The Solar Homestead embodies independence and ingenuity—qualities reflected in the heritage of traditional homesteads. The Solar Homestead fuses these values into an innovative, ultra-efficient house that is adaptable, self-sufficient, affordable, and attractive. The concept of the "modern homestead" is manifested throughout the house.

**Features**

The Solar Homestead embraces a traditional settlement lifestyle. It is focused around a central living core with collective buildings that adapt to the needs of modern families. Unique features include:

- Outbuilding modules inspired by lean-to sheds that link to form sheltered outdoor living and work space
- A generous outdoor living space called the Great Porch that embodies the lifestyle of early settlers
- The adaptable, conditioned Flex Space, which features a half-bath, outdoor shower, and outdoor kitchen and can serve as a home office, guest suite, or cabin retreat.

**Technologies**

The Solar Homestead merges traditional sustainable practices with modern clean-energy technology. Technological solutions include:

- Forty-two bifacial photovoltaic panels that supply solar energy while providing filtered daylight and protection from the elements
- An on-demand solar thermal domestic hot water system that uses phase-change materials to provide constant water temperature in compact storage
- A Trombe wall that is filled with phase-change material to store heat throughout the day and release it at night.

**Market Strategy**

The Solar Homestead is designed for residents of Asheville, North Carolina. The house meets the needs of this market by providing a secure investment for the experienced homebuyer through energy independence, modular adaptability, and long-lasting, sustainable materials. The combination of renewable technologies and sustainable design provides a distinctive dwelling for the new homesteader—an emerging group that values independence, the land, and the environment.

**What's Next**

After competing in Solar Decathlon 2011, the Solar Homestead will travel the state of North Carolina to promote renewable energy education. The team will teach visitors the value of sustainable technology and environmental preservation. When the tour concludes, the house will return to Appalachian State University to serve as an educational tool for future Mountaineers.

**Contact**

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**Jury Feedback**

**Team Deliverables**



[Enlarge image](#)

The Appalachian State University Solar Decathlon team (Courtesy of the Appalachian State University Solar Decathlon team)



[Enlarge image](#)

A computer-generated rendering of Appalachian State University's Solar Homestead (Courtesy of the Appalachian State University Solar Decathlon team)



A video walkthrough of Appalachian State University's Solar Decathlon house ([ZIP 110 MB](#))

**Jury Feedback**

- Architecture Contest [\[PDF\]](#)
- Market Appeal Contest [\[PDF\]](#)
- Engineering Contest [\[PDF\]](#)
- Communications Contest [\[PDF\]](#)

**Team Deliverables**

- Project Manual [\[PDF\]](#)
- Construction Drawings [\[PDF\]](#)
- Menu and Recipes [\[PDF\]](#)
- Architecture Presentation [\[PDF\]](#)
- Engineering Presentation [\[PDF\]](#)
- Sales Presentation [\[PDF\]](#)

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Content Last Updated: July 29, 2012

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