

Sustainable Building Design

Into which MS degree will this Graduate Certificate convert?

This certificate can lead into the current MS Arch degree. M Arch students may also take the courses of the certificate as elective courses and apply them for both (the certificate and their M Arch degree).

In what industries might a holder of this Graduate Certificate find employment?

While sustainability standards in the architecture industry is increasing many firms are making large investments in addressing climate change. This certificate will attract professionals in the architecture industry that want to update their skillset with cutting edge tools, techniques to address sustainability goals.

In what job titles might a holder of this Certificate fit?

Architect, Architecture Consultant

Is this certificate fully available online (all courses)?

Yes

Description of certificate program

Advanced technologies allow architects to address climate change by designing a more environmentally friendly built environment. Courses in this certificate provide an understanding of the environmental impact associated with the construction and energy consumption of buildings. You will learn how to tackle sustainability challenges at the scale of a building and learn about energy efficiency, passive house standards, life cycle assessment, and how design decisions impact the environment. This certificate will help designers to make strategic design responses to lower the environmental footprint of buildings and respond to global warming.

The 12 credit Graduate Certificate in Sustainable Building Design is comprised of 4 courses for those who wish to gain the foundational skills and knowledge to address sustainability in the design of buildings.

What are the Required Courses?

(12 credits) Students have to select 4 courses from the following course offerings:

ARCH 621 Net Zero Building Design; 3 credits, 3 contact hours

This course explores principles and technologies governing net-zero building design to achieve the outstanding performance that goes beyond minimum green requirements. Case studies of existing high-performance green buildings around the world will be analyzed in terms of their design, system integration, renewables, and environmental performance, which will be accompanied by lectures about the principles and tools applied to the projects. The use of existing net-zero energy standards will be also discussed. Using the techniques and tools learned in this class, students will practice how to design/redesign a net-zero energy building, which will form the final project of the class.

Arch 622 Life Cycle Assessment and Design; 3 credits, 3 contact hours

This course tracks Life Cycle concepts as first applied to inanimate objects and systems by the U.S. military in the mid 20th Century through their development as an important part of the modern global environmental movement. It also provides opportunities for design students to integrate data driven design decisions through methodologies and tools that translate formal Life Cycle Assessment into their own design workflows.

ARCH 623 Building Energy Modeling for Sustainable Design ; 3 credits, 3 contact hours

This course introduces the students to Building Energy Modeling (BEM) and energy optimization techniques using the EnergyPlus whole-building energy simulation program to develop student competency with whole-building energy simulation. Students will practice whole-building energy simulation, including the hourly modeling of dynamic thermal envelope loads and system simulations; and explore various green and sustainable design strategies and systems to optimize the envelope and system performance of their projects. This will allow them to be better prepared for interdisciplinary collaboration and integrated design practice for energy efficiency.

ARCH 625 Passive House and Beyond; 3 credits, 3 contact hours

This course explores leading edge green building programs designed for highly efficient buildings and regenerative design, including Passive House, Living Building Challenge, and Enterprise Green Communities Certification Plus. Each program's requirements and application for single family, multifamily and commercial building typologies will be investigated through in-depth case studies and presentations. A cross-program comparison will analyze overlaps, gaps, strengths and weaknesses of the programs - and challenge students to discern where their own sustainability values lie.

ARCH 626 Building Dynamics; 3 credits, 3 contact hours

This course focuses on theories and practice of adaptive architectural solutions. It will examine architecture in relation to the latest research in biology, material science, embedded systems and robotics. Students will research technologies, review case studies, and design adaptive proposals for architecture. In general, they will consider the role architecture as a discipline plays in climate challenges we are facing today. This class is interested in the territory where new technological and scientific advances, and architecture meet. It explores the importance of new technologies in contemporary design and their implications on architectural attitudes.

ARCH 684 Topics in Sustainable Urbanism; 3 credits, 3 contact hours

Cities are growing at an unprecedented speed. Cities currently account for about 70 percent of global carbon emissions and over 60 per cent of resource use. We have to develop a vision for more sustainable cities and new protocols and processes to implement more sustainable vision for urban areas. This course will provide an inside into challenges we face (growing number of slum dwellers, inadequate infrastructure and services) and on solutions to address them.