

### **48-432 Design Integration of Active Building Systems (undergrad)**

If there is a benefit to the global and national upheavals in the past year, it may be that we are even more keenly aware of the importance of equity, of social justice, and of working towards a more sustainable future. That sustainability must cover the full range of the UN Sustainable Development Goals and your understanding of how you can contribute to that future through design in the built environment is a primary goal of this course. High performance buildings are achieved with designs that effectively integrate passive and active systems. You have been introduced to passive systems in prior semesters, so within 48-432, we will focus on active systems in commercial buildings and strategies for their successful integration with passive components. We will also consider building codes that address outside air requirements for ventilation, and energy and water efficiency, and discuss where related US building codes lead or lag in promoting exceptional building performance. Environmental sustainability and buildings within the United States will receive the greatest emphasis in our work, but as we gain perspective on how buildings use resources, and how high-performance buildings substantially reduce this use, we will also consider how performance definitions may change where resources like energy or water are limited or unavailable. The course will focus on design approaches and technologies within buildings where metered performance indicates effective design and on emerging strategies that appear to be well-suited to a net zero energy and net zero carbon future. The active systems covered include lighting, ventilation, heating/cooling, water distribution and water heating, vertical building transportation, renewable energy production & storage, and active fire protection and smoke control.