Description / Objectives:

Design is an inherently rich process of resolving multiply constrained problems into elegant and integrated solutions. Because of the complexity of these multiple constraints, every design project poses its own inherently conflicting goals and priorities. In seeking resolution, the designer is tasked with bringing to bear all of the analytical thinking and systems knowledge acquired throughout an architectural education. The potential solutions need to be considered through many different lenses simultaneously to develop solutions that balance the various priorities. Ultimately, we want to create high performance architecture within the richness of a broader design context.

While not a design studio, this course is intended as a work-out in marshaling various forms of critical thinking, knowledge, and design sense in order to spot the design opportunities as they appear in the process. Our analysis will extend to the various means and methods currently used in the industry to measure performance, including the Living Building Challenge.

Areas of consideration include integrated approaches to:

- Siting, Massing, Orientation and Landscape
- Lighting and Daylighting
- Ventilation & Conditioning
- Structural Systems
- Materials Selection and Application
- Envelope and Thermal Performance

These topics will not be approached individually. Instead, the consideration will be on the building as a whole and on the ways in which these elements contribute to its overall composition and performance. The focus will be on the ways in which different integrated combinations of systems and components create different design opportunities and the resulting potential for aesthetics, economics and performance.

Guest lecturers from a variety of disciplines will share their expertise and insight on this inherently cross-disciplinary pursuit.

This course counts towards the Advanced Technology requirement.
Instructor:
As both a registered architect and mechanical engineer, John Breshears has focused his career on helping to integrate aesthetics and technology into seamless, elegant design solutions in the US, Canada, Italy, France and the United Kingdom. Early in his career, John spent several years researching integrated building technologies with ARUP and the Renzo Piano Building Workshop under support of the Peter Rice Memorial Prize.

As the founder of Architectural Applications, John is currently leading the development of a curtainwall-integrated air conditioning efficiency technology with funding from the US Department of Energy. His current design projects include a new, net-zero energy and carbon headquarters building for the Rocky Mountain Institute in Colorado.

Course Format:
Lectures and group discussions on various aspects of design, technology and integration, including guest presentations by a diverse array of professionals.

Requirements & Grading Criteria:

40% - Building Case Study project - students will work in small groups on an in-depth analysis of an existing building. The final product will expose, through written and graphic means:

i) the opportunities and constraints posed by the problem,
ii) the designer’s responses to the problem through choice of systems and their integration into holistic solutions
iii) resulting implications on performance, aesthetics, economics, and other issues, and
v) identification of opportunities not exploited by the designer.

The case studies will be presented in class near the end of term and submitted as a written and illustrated document.

40% - Short assignments

20% - Class participation in discussions and classroom work sessions.