1.044J, 2.66J, 4.42J
Design Project Number 2

MIT plans to build a new home for the Sloan School of Management. The building(s) will house offices for faculty, graduate students, and administrators along with classroom space. The buildings should be an outstanding sustainable design that is also financially sound. There have been designs studies undertaken by MIT on these facilities. Your job is to carry out an independent design for the buildings.

In design projects 1 and 2 you are asked to propose and assess innovative building designs, technologies and operating schemes that will yield an outstanding sustainable building. For design project 1 you should first collect basic information about the proposed building program: floor area, number of occupants, land area, etc. This information should be available from the MIT Facilities Department and/or the Sloan School. In addition, you should develop general conceptual designs and technologies for the building and qualitatively describe their importance. In phase 2 you will quantitatively assess the behavior of the proposed schemes and refine your designs.

Consider in particular the design of the envelope for one building on the site. You are asked to consider the design of the building envelope as it influences energy use and comfort within the building. These should include design concepts and operation that will enhance summertime comfort while minimizing the use of conventional air conditioning. Second: consider means to reduce the energy used by the building for heating and cooling throughout the year. This may involve innovative schemes for the building façade and operations. Calculations of the energy use for the year should be made and feasibility estimates of other concepts should also be included. Limit yourselves to one or two innovative concepts. You can use and the Web based tool that was demonstrated in class or you can use and an alternate calculation method. Under the latest ASHRAE standards typical electrical consumption for lighting is 1.5 W/ft^2 or less and office equipment consumption is 0.75 W/ft^2.

Students should work on this project in teams of two. The report should indicate the contribution of each student. Address your report to readers who have some technical background. This report should be the preliminary assessment of the proposed designs and operating strategies. The report should include an introduction, discussion of the above items with sample calculations (equations can be done by hand) and diagrams, and conclusions and recommendations. A sketch of the final concept would be helpful.

The final project is due by 11 AM Dec. 3 in 4-253. The grade will be equivalent to one quiz grade. You are free to consult the instructor and TA as well as your fellow students in 4.42. You are required to have at least one meeting with the instructor and TA to discuss your design concepts before the due date. Students will make a brief presentation of the design and it is the best design will be awarded a modest prize.

The grade for the design will be based upon:

- Creativity of the design
- Practicality of design
- The energy efficiency of your design
- Appropriateness of calculations
- Impact on the Architectural Form
- Punctuality (Late reports will lose substantial credit)