

## MEC 506 Energy Management in Commercial Buildings Spring 2016

**Course Description:** Basic Topics include basic heating, ventilating, and air-conditioning (HVAC) system design and selection for commercial buildings (includes both low-rise and high-rise buildings); selection of central plant components and equipment; calculation of space heating and cooling load; computer techniques for estimating annual energy consumption; design tools for reducing energy consumption; ASHRAE codes; building controls; BACnet.

**Course Instructor:** William Becchina, M.S. Mechanical Engineering. VP of Engineering at JP Certified LLC.

**Prerequisite:** B.S. in mechanical engineering or related fields

**Required book:** *Heating, Ventilating and Air Conditioning Analysis and Design, Sixth Edition, Author McQuiston/Parker/Spittle, Publisher Wiley, ISBN 978-0-471-47015-1*

**Activities:** HVAC Equipment and Configuration  
Heating and Cooling Load Calculations  
(Manual and Programmatic methods)  
3-D Equipment and Load Modeling Tools  
Indoor Air Quality  
Psychometrics  
Building Energy Calculations  
Fans and Duct Work  
Refrigeration

<b>Grades:</b>	Homework	20%
	Quizzes	20%
	Midterm Exam	30%
	Final Exam	30%

## COURSE OBJECTIVES

The overall objective of this course is to apply engineering science principles for analysis and design of energy- efficient systems for maintaining a comfortable, healthy, and productive indoor environment in buildings. Upon successful completion of the course student will have ability to

1. Identify the Specifications and metrics for a comfortable and healthy indoor environment. These criteria and metrics are determined by human physiology, including thermal comfort and visual perception. For practical design purposes, the criteria and metrics are also influenced by building codes and standards.
2. Analyze the HVAC requirements of buildings and facilities. Given the need to maintain a comfortable and healthy indoor environment, you will be able to determine HVAC loads (i.e., the requirements) as a function of a building's physical characteristics, its use, and its climatic location. The analyses will be performed by applying basic engineering knowledge with hand calculations and computer simulation.
3. Evaluate the impact of building design decisions on HVAC equipment size and cost, annual HVAC energy consumption and cost, and environmental impact of energy consumption on power plant emissions.
4. Analyze and evaluate the impact of alternative HVAC systems for saving energy and cost. Evaluate the behavior of the proposed systems to match those of a green building.
5. Involve in real project design identify and understand the mechanisms by which energy saving and minimize operation cost within buildings.

### **Americans with Disabilities Act**

If you have a physical, psychological, medical, or learning disability that may impact your course work, please contact Disability Support Services at (631) 632-6748 or <http://studentaffairs.stonybrook.edu/dss/>. They will determine with you what accommodations are necessary and appropriate. All information and documentation is confidential.

### DISABILITY SUPPORT SERVICES (DSS) STATEMENT

If you have a physical, psychological, medical or learning disability that may impact your course work, please contact Disability Support Services, ECC (Educational Communications Center) Building, room128, (631) 632-6748. They will determine with you what accommodations, if any, are necessary and appropriate. All information and documentation is confidential.

Students who require assistance during emergency evacuation are encouraged to discuss their needs with their professors and Disability Support Services. For procedures and information go to the following website: <http://www.stonybrook.edu/ehs/fire/disabilities> ]

## ACADEMIC INTEGRITY STATEMENT

Each student must pursue his or her academic goals honestly and be personally accountable for all submitted work. Representing another person's work as your own is always wrong. Faculty are required to report any suspected instances of academic dishonesty to the Academic Judiciary. Faculty in the Health Sciences Center (School of Health Technology & Management, Nursing, Social Welfare, Dental Medicine) and School of Medicine are required to follow their school-specific procedures. For more comprehensive information on academic integrity, including categories of academic dishonesty, please refer to the academic judiciary website at <http://www.stonybrook.edu/uaa/academicjudiciary/>

## CRITICAL INCIDENT MANAGEMENT

Stony Brook University expects students to respect the rights, privileges, and property of other people. Faculty are required to report to the Office of Judicial Affairs any disruptive behavior that interrupts their ability to teach, compromises the safety of the learning environment, or inhibits students' ability to learn. Faculty in the HSC Schools and the School of Medicine are required to follow their school-specific procedures.

## STATEMENT ON ACADEMIC DISHONESTY

Academic dishonesty is an extremely serious offense and will not be tolerated in any form. Academic dishonesty in general is the presentation of intellectual work that is not originally yours. Examples include, *but are not limited to*, copying or plagiarizing class assignments including homework, reports, designs, and other submitted materials; copying or otherwise communicating answers on exams with other students; bringing unapproved aids, either in physical (written) or electronic form to an exam; obtaining copies of an exam prior to its administration, etc. Academic dishonesty violates both the ethical and moral standards of the Engineering profession and all infractions related to academic dishonesty will be prosecuted to the fullest via the CEAS CASA committee. For you, the honest student, academic dishonesty results in lower class curves, hence a depression in your GPA and class standing, while cheapening the degree you earn.