ENME 635 COURSE SYLLABUS, SPRING, 2019
Energy Systems Analysis

Instructor:
Dr. Yunho Hwang, Room 4164 Glenn Martin Hall Bldg., x55247, yhhwang@umd.edu

Course Description:
Sustainable energy utilization demands the analysis of current and future energy conversion systems. This course is a technical design elective and pulls together the background knowledge in real life examples of design and evaluation. The course will address and discuss in detail on the indoor environmental engineering, various energy conversion cycles, energy system integration and annual energy estimation methods. Students will carry out multiple design projects for modeling such energy conversion cycles and analyze their performance potentials when they are either integrated or powered by renewable energy sources or waste heat from various processes.

Course Objectives:
- Learn the application of thermodynamics and transfer processes as studied in the prerequisite classes to an important application: indoor environmental engineering and cogeneration
- Learn the importance of indoor-air quality, air-conditioning concepts and air-distribution in buildings
- Learn the analysis, design and functioning of energy conversion cycles as they pertain for building, campus and industrial applications
- Understand the integration of the concept of cogeneration and the implications of load curves of overall system integration challenges.
- Become familiar with software (Engineering Equation Solver, Spreadsheets), deepen the application of thermodynamic laws and diagrams (psychometric charts, pressure-enthalpy diagrams, temperature-entropy diagrams) and other simulation software

Time & Place: Tue..... 4:00 pm - 6:40 pm (JMP 2222)
Office Hours: Tue…….2:30 pm – 3:30 pm

Textbooks: None

Recommended Reference:
- Hwang, Radermacher, Vapor Compression Systems with Refrigerant Mixtures, Taylor and Francis, Boca Raton, FL, 2005. ISBN 0-8493-3489-6
- Alefeld, Radermacher, Heat Conversion Systems, CRC Press, ISBN 0-8493-8928-3, Boca Raton, FL, 1994
- Herold, Radermacher, Absorption Heat Pumps and Chillers, ISBN 0-8493-9427-9, Boca Raton, FL, 1996

Prerequisites by Topic: Thermodynamics, Transfer Processes

Course Outline:

1. Moist Air Properties and Processes
2. Properties of Working Fluids
3. Energy Conversion Systems
    a. Vapor Compression Cycle
    b. Absorption Cycle
    c. Desiccants
    d. Adsorption
    e. Power Generation
4. Bin Method
5. Integrated Systems (CHP)
6. Trigeneration

Grading:
Projects (60%)
Capstone Projects (40%)

Due Dates:
The course has no final exams. Each assignment (power point presentation with additional text in note-field0 must be submitted through email to the instructor no later than 12 noon on the due date.

Expectations for Students:
Each student is expected to be actively involved in group work including writing reports and presentations. A peer evaluation may be conducted to determine the participation and contribution of each member to the group effort. Peer evaluation results will be applied to each student's grade.

Code of Academic Integrity
The University of Maryland, College Park has a nationally recognized Code of Academic Integrity, administered by the Student Honor Council. This Code sets standards for academic integrity at Maryland for all undergraduate and graduate students. As a student you are responsible for upholding these standards for this course. It is very important for you to be aware of the consequences of cheating, fabrication, facilitation, and plagiarism. For more information on the Code of Academic Integrity or the Student Honor Council, please visit http://www.studenthonorcouncil.umd.edu/whatis.html.

Method for Communication with Students outside the Classroom
Any cancellation of class, change of classroom or other timely announcement will be provided to students through email as early as possible.

Emergency Protocol
Classes will be cancelled in case of an emergency that closes the University. If the emergency lasts for an extended period of time, means of continuing / completion the course will be sent to students via email.

Copyright Notice
Course material may be under copyright protection. Students may not copy and distribute such materials except for personal use and with the instructor's permission.

Students with Disabilities
The course will provide appropriate accommodations for students with disabilities. To receive the accommodations, students must first have their disabilities documented by the Disability Support Service Office. The office then prepares an Accommodation Letter for course instructors regarding needed accommodations. Students are responsible for presenting this letter to their instructors by the end of the drop/add period.