CSTM 337: ELECTRICAL AND MECHANICAL SYSTEMS

Fall 2016  Instructor: Seong C Kim, Ph.D., LEED AP
TTH 2:00PM ~ 3:50PM  E-mail: S-Kim7@wiu.edu
Credit: 3 hrs  Office: 338 Knoblauch Hall
Location: 106 Knoblauch Hall

Department of Engineering Technology Goals for Student Learning
Engineering Technology (Construction Management, Graphic Communication, Manufacturing
Engineering Technology) is a field of study designed to provide students educational programs that allow
them to communicate effectively, design and apply technical solutions, use technology effectively, and
respond to project management tasks in an environment with continually changing and sophisticated
technology in an increasingly competitive global marketplace.

By graduation, Engineering Technology students should be able to:
1. Think critically and creatively;
2. Understand the theoretical principles of the profession;
3. Understand and apply relevant technology in the solution of technical problems;
4. Organize, manage, and maintain projects;
5. Develop an appreciation for ethical and professional practices;
6. Develop and refine oral, written, and visual communication skills; and
7. Demonstrate an overall competency in the program objectives.

Course Description
This course covers the theory and applications of electrical, plumbing, and HVAC system design,
selection, and utilization for energy conservation.

Course Objectives
Upon completion of this course, students will be familiar with:
1. Common mechanical terminology and system
2. Electrical terminology and system
3. Plumbing terminology and system
4. HVAC terminology and systems commonly installed in commercial and residential building.

Last Day to Drop Course with “W” grade
The last day to drop a course with “W” grade is Friday, Oct 30, 2016

Office Hours
Monday and Wednesday 9:00AM ~ 10:00AM, Tuesday and Thursday 1:00PM ~ 2:00PM or by
appointment. In order to schedule an appointment other than office hours, e-mail me (S-Kim7@wiu.edu).
I will respond to your e-mail within 48 hours.

Prerequisite
CSTM 334: Construction Concepts

Textbook
Wujek, J. & Dagostino, F. Mechanical and Electrical Systems in Architecture, Engineering, and
Construction 5th Ed. Prentice Hall.
Instructional Format
This course consists of lectures, lab assignments and exams. It is mandatory to attend all scheduled class
and lab sessions. Every student is expected to come to class prepared and to actively participate in our
learning environment.

Lab Assignments
Lab assignments are designed to understand calculation of peak residential-small commercial heating and
cooling loads, duct & pipe sizing, system selection, psychrometric calculations, lighting calculations, etc.
The lab assignments given in the lab session require self-working. Each assignment will carry a due date
and time.

1. To receive full point on the lab assignment, all required files should be submitted by the deadline;
   meeting the deadline is critical in the construction industry.
2. Late submission: 0.5 points will be deducted per day as a penalty. If a student turns in more than 5
days late, he/she will receive 0.5 points.
3. Make-up homework due to an excused absence will be accepted until 1 week past the due date. If a
   make-up assignment is turned in later than a week, he/she will receive 0.5 points. Documentation is
   required for an excused absence.
4. I don’t email the assignment. If you miss the class, you need to come by my office to get it.

Tests and Final Exam
There will be two tests and one final comprehensive exam. No books, notes or other materials are allowed
during the test.

Final Examination: Tuesday, Dec 13, 2016 @ 3:00 P.M.

Grading and Course Logistics
The final grade will be based on a combination of the lab assignment, midterm, project and the final exam
grade, attendance, as follows:

<table>
<thead>
<tr>
<th>Assigned Points</th>
<th>Grading Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lab assignments</td>
<td>25%</td>
</tr>
<tr>
<td>Test 1</td>
<td>25%</td>
</tr>
<tr>
<td>Test 2</td>
<td>25%</td>
</tr>
<tr>
<td>Final Exam</td>
<td>25%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
</tr>
</tbody>
</table>

Grading Scale

- A 93 and above
- A’ 90-92
- B’ 87-89
- B 83-86
- B’ 80-82
- C’ 77-79
- C 73-76
- C’ 70-72
- D’ 67-69
- D 63-66
- D’ 60-62
- F 59 and below
Class Attendance
Attendance is mandatory due to the nature of this class. You are expected to come to class with calculator and class notes. Regular class attendance is mandatory. Understandably problems can occur so TWO misses are allowed with no penalty; no need to explain reasons to me. However, any student with more than TWO unexcused absences will have their grade lowered by ONE point for each missed class. If you anticipate having problems making it to class, I suggest you modify your schedule or whatever it takes to make it work. If you miss class, it is your responsibility to contact me or a classmate and get the material/information from that day. Documentation is required for an excused absence to be recorded.

Attendance will be checked twice; at the beginning of the lecture and at the end of the lab hour for each class. Two late appearances to class equal an absence. If a student leaves early without finishing the lab assignment given that day, he/she will be considered attending only half of the class. Two half-class attendances will be considered as one absence.

Classroom Policies
Disorderly conduct is prohibited under the Code of Student Conduct (http://www.wiu.edu/provost/students). Disorderly conduct is defined as any behavior that can negatively affect the environment of a class including:

1) Eating, drinking, smoking or use of tobacco products during a class  
2) Usage of a cell phone during a class  
3) Sleeping during a class  
4) Inappropriate computer usage during a class  
5) Disturbing a classmate in any way during a class  
6) An equivalent activity with above

Each violation will result in negative points of 1.0 in your final grading and the instructor can ask the students to leave the classroom.

Computer Usage
In this class, computers are used ONLY for class lab activities or the instructor’s approval and the instructor will tell students when to turn on the computers. Computers have to be shut off during regular classes to prevent indiscreet usage of computers.

Class Materials and Grades
All class materials and grades will be posted at http://westernonline.wiu.edu. You need to print out the class materials before the beginning of the class or access to check your grades. The class note is partially completed with some key words/phrases omitted. It is the responsibility of students to fill in blank areas in the lecture notes.

Rules for Giving an Incomplete
WIU policy – A temporary symbol of I (Incomplete) for a course may be given only when a student, due to circumstances beyond his or her control, has been unable to complete the course requirements within the official limits of the term. The circumstances must be documented to the instructor’s satisfaction.
Academic Integrity

Preamble

Western Illinois University, like all communities, functions best when its members treat one another with honesty, fairness, respect, and trust. Students have rights and responsibilities (http://www.wiu.edu/provost/students/) and students should realize that deception for individual gain is an offense against the members of the entire community, and it is the student's responsibility to be informed and to abide by all University regulations and policies on Academic Integrity.

Plagiarism, cheating, and other forms of academic dishonesty constitute a serious violation of University conduct regulations. Students who engage in dishonesty in any form shall be charged with academic dishonesty.

It is a duty of faculty members to take measures to preserve and transmit the values of the academic community in the learning environment that they create for their students and in their own academic pursuits. To this end, they are expected to instill in their students a respect for integrity and a desire to behave honestly.

They are also expected to take measures to discourage student academic dishonesty, to adjust grades appropriately if academic dishonesty is encountered, and, when warranted, to recommend that additional administrative sanctions be considered. Grading policies are the exclusive prerogative of the faculty; administrative sanctions are under the authority of the Director of Student Judicial Programs. This document provides policies and procedures to be followed when academic dishonesty is encountered.

Definitions of Academic Dishonesty

The following definitions and examples are not meant to be exhaustive. The University reserves the right to determine, in a given instance, what action constitutes a violation of academic integrity. (See www.wiu.edu/policies/acintegrity.php for complete descriptions of the following topics:

1. Plagiarism
   Fabrication and Falsification
   Cheating
   Complicity in Academic Dishonesty
   Abuse of Academic Materials
   Multiple Submissions

Reporting Academic Dishonesty

All members of the University community share the responsibility and authority to challenge and make known acts of apparent academic dishonesty. Any student, faculty member, or staff person who has witnessed an apparent act of student academic dishonesty, or has information that reasonably leads to the conclusion that such an act has occurred or has been attempted, has an ethical responsibility for reporting said act(s). Confronting and reporting academic dishonesty can be done in a variety of ways, and people should choose the manner most appropriate for the circumstances. Acts of apparent academic dishonesty that occur in the classroom should be reported directly to the course instructor, and/or the course instructor's Department Chair, and/or the instructor's College Dean. The Council on Admission, Graduation, and Academic Standards (CAGAS) or the Graduate Council will not accept or act upon anonymous reports, but will hold in strict confidence the identity of any person reporting a suspected instance of academic dishonesty, unless that person consents to having his/her identity revealed.
Students with disabilities
In accordance with University values and disability law, students with disabilities may request academic accommodations where there are aspects of a course that result in barriers to inclusion or accurate assessment of achievement. To file an official request for disability-related accommodations, please contact the Disability Resource Center at 309-298-2512, disability@wiu.edu or in 143 Memorial Hall. Please notify the instructor as soon as possible to ensure that this course is accessible to you in a timely manner.

Sexual Misconduct & Gender Non-Discrimination Policy (Title IX)
University values, Title IX, and other federal and state laws prohibit sex discrimination, including sexual assault/misconduct, dating/domestic violence, and stalking. If you, or someone you know, has been the victim of any of these offenses, we encourage you to report this to the Title IX Coordinator at 309-298-1977 or anonymously online at: http://www.wiu.edu/equal_opportunity_and_access/request_form/index.php. If you disclose an incident to a faculty member, the faculty member must notify the Title IX Coordinator. The complete Title IX policy is available at: http://www.wiu.edu/vpas/policies/titleIX.php.

Web address for student rights and responsibilities
http://www.wiu.edu/provost/students.php

Resolution of Problems
Should a problem occur, students should speak to their instructor first. If the problem is not resolved, meet with the chair of the department. If the problem continues to be unresolved, go to the College of Business and Technology’s Dean.

Students should observe the following sequence for the resolution of problems:
Student --- Instructor --- Chairperson --- Dean

Special Course Costs
Students of this course are required to pay a special course charge of $25 for each lab-related course in the Engineering Technology Department. This money is used to support the consumable items used during the course.
Payment of the course cost is a required portion of the class and must be paid after the second week of the semester but prior to your final exam. If you fail to pay your course cost, you will receive a grade of "I" for the course until the lab fee is paid or the university automatically changes the grade from "I" to "F" according to the University Policy. If the grade is changed to an "F", the grade will remain an F on your permanent transcript, regardless of payment.
Payments can be made to the Engineering Technology department office (Knoblauch Hall 135) any time after the beginning of the third week of classes. Also, for the convenience of the students, the instructor will announce one date that a staff member will visit the classroom to collect course charges en masse. It is recommended that students pay by check made out to "WIU". Likewise, the student should expect a receipt to serve as proof of payment.
If you have questions or concerns, please direct them to the staff in Knoblauch Hall 135 or call 309/298-1091.
**Course Schedule**

*Due to nature of this class, the schedule is subject to change.*

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic Covered</th>
<th>Assignments</th>
<th>Assessment Methods</th>
<th>Dept. Goal Addressed</th>
<th>Program / Course Objective Addressed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Course Overview&lt;br&gt;Energy Overview</td>
<td>- Energy Overview</td>
<td>Lab &amp; Homework</td>
<td>1, 2, 3, 5, 7</td>
<td>1, 2, 3, 4</td>
</tr>
<tr>
<td>2</td>
<td>Thermal, Environmental and Comfort Concept&lt;br&gt;Psychrometric Chart</td>
<td>- Unit Conversion&lt;br&gt;- Basic Psychrometric Chart</td>
<td>Lab &amp; Homework</td>
<td>1, 2, 3, 5, 7</td>
<td>1, 4</td>
</tr>
<tr>
<td>3</td>
<td>Psychrometric Chart&lt;br&gt;Heat Transfer</td>
<td>- Advanced Psychrometric Chart&lt;br&gt;- Conduction Heat Transfer, R-value of Wall Assembly, etc.</td>
<td>Lab &amp; Homework</td>
<td>1, 2, 3, 5, 7</td>
<td>1, 4</td>
</tr>
<tr>
<td>4</td>
<td>Heat Transfer&lt;br&gt;Heating Load and Cooling Load</td>
<td>- Calculating Heating Load</td>
<td>Lab &amp; Homework</td>
<td>1, 2, 3, 5, 7</td>
<td>1, 4</td>
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<tr>
<td>5</td>
<td>Heating Load and Cooling Load</td>
<td>- Calculating Cooling Load</td>
<td>Lab &amp; Homework</td>
<td>1, 2, 3, 5, 7</td>
<td>1, 4</td>
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<tr>
<td>6</td>
<td>Exam Review&lt;br&gt;<strong>Test 1</strong></td>
<td>- Make up all the Lab Assignments</td>
<td>Lab, Homework, and Exam</td>
<td>1, 2, 4, 5, 6, 7</td>
<td>1, 4</td>
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<tr>
<td>7</td>
<td>HVAC Equipment&lt;br&gt;HVAC Distribution Components and System</td>
<td>- Sizing Equipment and Delivered Heating Cost&lt;br&gt;- Heating and Cooling Process on Psychrometric Chart</td>
<td>Lab &amp; Homework</td>
<td>1, 2, 3, 5, 7</td>
<td>1, 4</td>
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<tr>
<td>8</td>
<td>HVAC Distribution Components and System&lt;br&gt;Duct Design</td>
<td>- Perimeter, Aspect Ratio and De of Duct&lt;br&gt;- Duct Friction Loss Chart</td>
<td>Lab &amp; Homework</td>
<td>1, 2, 3, 5, 7</td>
<td>1, 4</td>
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<tr>
<td>9</td>
<td>Duct Design&lt;br&gt;- Duct Friction Loss&lt;br&gt;- Duct Design</td>
<td>Lab &amp; Homework</td>
<td>1, 2, 3, 5, 7</td>
<td>1, 4</td>
<td></td>
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<tr>
<td>10</td>
<td>HVAC Water Distribution System&lt;br&gt;HVAC Electric Heating System</td>
<td>- HVAC Water Distribution System&lt;br&gt;- HVAC Electric Heating System</td>
<td>Lab &amp; Homework</td>
<td>1, 2, 3, 5, 7</td>
<td>1, 4</td>
</tr>
<tr>
<td>11</td>
<td>Plumbing Fundamental&lt;br&gt;Plumbing Isometrics</td>
<td>- Plumbing Isometric&lt;br&gt;- Pipe Friction Loss Chart</td>
<td>Lab &amp; Homework</td>
<td>1, 2, 3, 5, 7</td>
<td>1, 3</td>
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<tr>
<td>Week 12</td>
<td>Building Water Supply System Exam Review Test 2</td>
<td>- Plumbing Code - Make up all the Lab Assignments</td>
<td>Lab, Homework, and Exam</td>
<td>1, 2, 3, 4, 5, 6, 7</td>
<td>1, 3</td>
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<td>Week 13</td>
<td>Electricity, Basics and Measurement Electrical Service and Wiring Design - Electrical System - Electrical Panel Schedule</td>
<td>Lab &amp; Homework</td>
<td>1, 2, 3, 5, 7</td>
<td>1, 2</td>
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<tr>
<td>Week 14</td>
<td>Thanksgiving Break</td>
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<td>Week 15</td>
<td>Architectural Lighting System - Terminology of Lighting System - Lighting System Design</td>
<td>Lab &amp; Homework</td>
<td>1, 2, 3, 5, 7</td>
<td>1, 2</td>
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<tr>
<td>Week 16</td>
<td>Acoustical Control System in Buildings - Terminology of Acoustical Control System - Acoustical System Design</td>
<td>Lab &amp; Homework</td>
<td>1, 2, 3, 5, 7</td>
<td>1</td>
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<tr>
<td>Week 17</td>
<td>Final Exam: <strong>Tuesday, Dec 13, 2016 @ 3:00 P.M.</strong></td>
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