Building Environmental Systems, ARE 346N    Spring 2020
The University of Texas at Austin
Department of Civil, Architectural, and Environmental Engineering

**Course Unique Number:** 15080 (3 hrs)

**Classroom and Time:** ART 1.110, Tuesday and Thursday 11:00 AM-12:30 PM

**Course Website:** [http://www.ce.utexas.edu/prof/Novoselac/classes/ARE346N](http://www.ce.utexas.edu/prof/Novoselac/classes/ARE346N)

**Prerequisites:** Physics 303L and 103N (ME 326 or ME 320 co-requisite)

**Professor:** Dr. Atila Novoselac
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Phone: 512 475 8175
e-mail: atila@mail.utexas.edu
[http://www.ce.utexas.edu/prof/Novoselac](http://www.ce.utexas.edu/prof/Novoselac)

**Office Hours:** Tuesday 12:30 PM-1:30 PM and Thursday 10:00 AM to 11:00 AM

**Course Catalog Description** Planning and design of heating, ventilation, and air conditioning systems; noise and vibration control systems; power distribution and lighting systems; introduction to plumbing systems.

**Course Objectives:** By taking this class you will be able to:
1) Describe the role of building environmental systems in building planning and design,
2) Research and critically analyze claims about building environmental systems made by salespeople, subcontracts, and building designers,
3) Calculate building heating, ventilating, and air conditioning loads and specify HVAC equipment for residential and light commercial construction,
4) Acquire design requirements for building electrical systems and design basic systems,
5) List characteristics of different lamps, describe building lighting designs and their consequences and demonstrate knowledge of lighting design principles.

**Textbooks (required):**

**References:** (optional – on 2 hour reserve at Engineering Library)

*2001 ASHRAE Handbook: Fundamentals.* IP or SI edition, hard copy or CD (in Reference section of Engineering Library, 1997 editions on 2 hour reserve at Engineering Library). Note that it is much cheaper to become a member of ASHRAE to get this text.


Topics:
1. Background and Introduction 0.5 wk
2. HVAC Systems – Motivation and Basics 2.5 wks
3. Heating and Cooling Load Calculations 2 wks
4. Heating and Cooling Equipment 1 wk
5. Air Systems and Delivery Equipment 1 wk
6. Electricity Theory 2 wks
6. Electrical Systems 3 wks
7. Lighting Introduction and Equipment 1 wk
8. Lighting Calculation and Design 1 wk

Grading:
- Quizzes 10%
- Midterm 1 15%
- Midterm 2 15%
- Projects 15%
- Homework Assignments 20%
- Participation 5%
- Final Exam 20% (see below in the exam section)

Course Letter Grades: (Numerical Grade)
- 90-93, >93 A-, A
- 80-83, >83-86, >86-90 B-, B, B+
- 70-73, >73-76, >76-80 C-, C, C+
- 60-63, >63-66, >66-70 D-, D, D+
- < 60 F

Exams and Quizzes:
All exams and quizzes are closed book, closed notes. Exams and quizzes will include material covered in reading assignments and class discussions. Exam make-ups will be given only in the event of a verified emergency or doctor-verified sickness.

The final exam for this class will be optional for those students who achieve a C grade or better (≥73/100) on both of the first two exams. Any student who meets the above criterion and chooses not to take the final exam will have their midterm exam grade represent 50% of their course grade.

Short quizzes will be given occasionally at the beginning of class. The average of these quizzes will constitute 10% of the final grade. No make-up quizzes will be given.

Homework:
You may discuss homework problems with other members of the class, but your write-up must be done individually. Copying of homework solutions from others is not allowed. You may turn in up to two homework assignments late (no more than one week after the actual deadline). Other than that, no late homework will be accepted. The late exception does not apply to the class project reports.
Behavior:
Please do not talk to your classmates during the lecture as this disrupts the learning environment. (Class activities organized by instructor are excluded). **Please always bring your Calculator.** Please keep your cell phone silent.

Attendance:
Although it is in your own best interest to attend class, I do not intend to check attendance. If for some reason you do not come to class, **it is your responsibility** to make sure that you are aware of any announcements that have been made and that you are familiar with the material covered in class. Please notice that **No make-up quizzes will be given.**

Office Hours:
I encourage all students to come and see me outside of class. This gives me an opportunity to explain concepts that may be unclear, to get feedback on how the class is going, and to get to know you. I have open door policy, but I encourage to use scheduled office hours.

Problems:
If you experience difficulty with the course material or encounter unexpected academic or personal problems during the semester that might impact upon your performance in the class, please let me know as soon as possible. I am always willing to help those who are honest and who accept responsibility for their own actions.

Special Needs:
The University of Texas at Austin provides, upon request, appropriate academic accommodations for qualified students with disabilities. For more information, contact the Division of Diversity and Community Engagement, Services for Students with Disabilities, 512-471-6259 or [http://diversity.utexas.edu/disability/](http://diversity.utexas.edu/disability/)

Academic Honesty:
Students who violate University rules on scholastic dishonesty are subject to disciplinary penalties, including the possibility of failure in the course and/or dismissal from the University. Since such dishonesty harms the individual, all students, and the integrity of the University, policies on scholastic dishonesty will be strictly enforced. For further information, please visit the Student Judicial Services web site [http://catalog.utexas.edu/general-information/appendices/appendix-c/student-discipline-and-conduct/](http://catalog.utexas.edu/general-information/appendices/appendix-c/student-discipline-and-conduct/)

Dropping the Class:
From the 1st through the 12th class day, an undergraduate student can drop a course via the web and receive a refund, if eligible. From the 13th class day through the university’s academic drop deadline, a student may Q drop a course with approval from the Dean, and departmental advisor.

Course/Instructor Evaluation:
An evaluation of the course and instructor will be conducted at the end of the semester using the approved UT Course/Instructor evaluation forms.
## TENTATIVE COURSE SCHEDULE
### ARE 346N - dates in bold are quiz days

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<th>Date</th>
<th>Topics</th>
<th>Assigned Reading</th>
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<tbody>
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<td>01/21</td>
<td>Introduction to the course</td>
<td>Tao Ch.1</td>
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<td>01/23</td>
<td>Thermal Comfort and Psychrometry</td>
<td>Tao Ch.2</td>
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<td>01/28</td>
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<td>01/30</td>
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<td>02/04</td>
<td>No class (make up will be the field trip)</td>
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<td>02/06</td>
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<td>02/18</td>
<td>Heat/Cooling Load</td>
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<td>02/20</td>
<td>Heating/Cooling Equipment and Systems</td>
<td>Tao Ch.4, 5</td>
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<td>02/25</td>
<td>Heating/Cooling Equipment and Systems</td>
<td>Tao Ch.4, 5</td>
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<td>02/27</td>
<td>HVAC Delivery Systems</td>
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<td>03/03</td>
<td>Air Handling Units and Distribution Systems</td>
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<td>03/05</td>
<td>Air Handling Units and Distribution Systems</td>
<td>Tao Ch.6</td>
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<td>03/10</td>
<td>Electricity Theory</td>
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<td>03/12</td>
<td><strong>Exam I</strong></td>
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<td>03/24</td>
<td>Electricity Circuit</td>
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<td>03/26</td>
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<td>04/07</td>
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<td>04/16</td>
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<td>04/21</td>
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<td>04/23</td>
<td>Lighting Fundamentals</td>
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<td>04/28</td>
<td><strong>Exam II</strong></td>
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<td>04/30</td>
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**Important Dates:**
- Midterm 1: March 12
- Midterm 2: April 28
- **Final Exam:** Wednesday, May 13, 2:00 pm-5:00 pm

Field trips will be scheduled in early March