Instructor: Dr. Russell Reid  
Office: NTDP F102L  
Phone: (940) 369-8944  
Email: russell.reid@unt.edu  
Lecture Time: Tue, Thurs 5:00-6:20 pm, room NTDP F175  
Instructor Office Hours: Tue, Thurs 4:00-5:00 pm or anytime my door’s open

TA: TBD, office: D206A  
TA Office Hours: TBD & by appointment

Required Textbook:

Course Descriptions:
Introduction to the physics, systems and methods of energy conversion from non-conventional energy sources, such as solar, wind, biomass, and energy storage devices. Advantages and disadvantages of alternative energy sources and engineering challenges for the harnessing of such forms of energy.

Prerequisites:
MEEN 3110 Thermodynamics II, MEEN 3210 Heat Transfer.

Course Learning Outcomes (CLO):
Upon successful completion of this course, students will able to:
1. Understand the definition, scope and limitations of alternative energy forms
2. Conduct fundamental engineering analysis for wind energy
3. Perform basic analysis of solar energy applications: solar radiation, photovoltaics, solar heating and cooling, solar process heat
4. Understand the advantages and disadvantages of biomass energy systems
5. Understand fundamentals of energy storage technologies
6. Be knowledgeable about transportation energy issues
7. Orally present their thoughts on current renewable energy research
8. Conduct a project-level technical analysis on a selected energy concept

ABET Student Learning Outcomes (SO)

a Ability to apply mathematics, science and engineering principles.  
b Ability to design and conduct experiments, analyze and interpret data.  
c Ability to design a system, component, or process to meet desired needs.  
d Ability to function on multidisciplinary teams.  
e Ability to identify, formulate and solve engineering problems.  
f Understanding of professional and ethical responsibility.  
g Ability to communicate effectively.  
h The broad education necessary to understand the impact of engineering solutions in a global and societal context.  
i Recognition of the need for and an ability to engage in life-long learning.  
j Knowledge of contemporary issues.  
k Ability to use the techniques, skills and modern engineering tools necessary for engineering practice.
<table>
<thead>
<tr>
<th>CLO</th>
<th>ABET Student Outcomes (SO)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>a</td>
</tr>
<tr>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>X</td>
</tr>
<tr>
<td>3</td>
<td>X</td>
</tr>
<tr>
<td>4</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>X</td>
</tr>
<tr>
<td>6</td>
<td>X</td>
</tr>
<tr>
<td>7</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>X</td>
</tr>
</tbody>
</table>

**Grades:**

- **Homework:** 20% 
  - ≥ 90% A
- **Quizzes:** 10%  
  - 80-89.9% B
- **Midterm:** 15%  
  - 70-79.9% C
- **Presentation:** 10%  
  - 60-69.9% D
- **Project:** 25%  
  - < 60% F
- **Final Exam:** 20%  
  - Total 100%

**Homework:**

1. Homework is due at the start of class one week after it has been assigned. Homework turned in after class is considered late.
2. A 20% per day deduction will be applied to late homework. Exceptions to this rule include: medical emergencies (student and important ones), transportation/traffic emergency, religious holidays/duty, jury duty and military duty. Evidence must be submitted.
3. Having no textbook is not a valid excuse for not doing your homework. It is the student’s responsibility to acquire textbook for his/her study.
4. Homework may be submitted in electric format (not preferred). In this case send the scanned copy directly to the instructor or TA.

**Quizzes and Exams:**

1. Short pre-lecture Blackboard and/or iClicker quizzes will be given to motivate students to complete assigned readings in preparation for classroom lectures.
2. Other quizzes and exams will be held in class, during class time.
3. Textbooks and notes will be permitted for quizzes and tests but no electronic resources will be permitted.
4. The final exam will be comprehensive.
5. **There will be NO make-up quizzes or exams.** Exceptions: medical emergency (student and important ones), transportation/traffic emergency; religious holidays/duty, jury duty and military duty. Evidences must be submitted.

**Presentation:**

1. Each individual student is required to give a 10-minute presentation reviewing a peer-reviewed scientific journal article published within the last 5 years.
2. Presentations will begin the third week of class and run throughout the rest of the semester.
3. Presentations should cover the important aspects of the article including: the introduction and purpose of the paper, the author’s materials and/or methods, and the important results and conclusions. Students should mention why they chose the article.
Approximately 5 minutes will be allotted at the end of the presentation for the class and instructor to ask questions.

Time limits may be enforced so that all students can have the opportunity to present.

Students will fill out and turn in a rubric to help grade presentation(s) given in class that day.

Project:

This is an open-ended activity whose purpose is to engage students in an alternative energy aspect that interests them.

Projects may be done individually or in groups of no more than 3 people.

The project must be an applied or technical analysis of an aspect of alternative or sustainable energy. The project is not an essay.

Students must submit a project abstract by the due date. The abstract should describe the motivation for the project (why is it important/useful?), the methods and resources that will be used, and the expected outcome.

Students must submit a revised abstract after receiving feedback on their original submission.

A project report must be submitted by the due date. The report will summarize the project’s purpose, scope, methods, results, and conclusions.

Extra credit will be given for creating a 5-10 minute online video that summarizes the key points of the project.

Disability Accommodations:
If you need academic accommodations for disability you must have document which verifies the disability and makes you eligible for accommodations, then you can schedule an appointment with the instructor to make appropriate arrangements.

Academic Dishonesty:
There is a zero tolerance policy for academic dishonesty. Any cheating whatsoever will result in an automatic ‘F’ in this course and the matter will be turned over to the appropriate student disciplinary committee.
# MEEN 4110 / 5110 Schedule Overview (Subject to Change)

<table>
<thead>
<tr>
<th>Week #</th>
<th>Dates</th>
<th>Topics</th>
<th>Reading Assignment</th>
<th>Assignments / Tests</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Jan. 14-20</td>
<td>Introduction to alternative energy</td>
<td>Kreith Ch. 1: 1.1, 1.3, 1.6, 1.8, 1.10</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Jan. 21-27</td>
<td>Wind energy</td>
<td>Krieth, Ch. 3</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Jan. 28-Feb. 3</td>
<td>Wind energy (continued)</td>
<td></td>
<td>HW #1 due</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Presentations begin</td>
</tr>
<tr>
<td>4</td>
<td>Feb. 4-10</td>
<td>Fundamentals of solar radiation</td>
<td>Krieth, Ch. 5</td>
<td>Quiz #1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Project proposals due</td>
</tr>
<tr>
<td>5</td>
<td>Feb. 11-17</td>
<td>Solar energy fundamentals (continued)</td>
<td></td>
<td>Revised project proposals due</td>
</tr>
<tr>
<td>6</td>
<td>Feb. 18-24</td>
<td>Photovoltaics</td>
<td>Krieth, Ch. 6</td>
<td>HW #2 due</td>
</tr>
<tr>
<td>7</td>
<td>Feb. 25-Mar. 3</td>
<td>Photovoltaics (continued)</td>
<td></td>
<td>Quiz #2</td>
</tr>
<tr>
<td>8</td>
<td>Mar. 4-10</td>
<td>Solar heating and cooling of buildings</td>
<td>Krieth, Ch. 7: 7.1-7.4, 7.6-7.7</td>
<td>Midterm exam</td>
</tr>
<tr>
<td>9</td>
<td>Mar. 11-17</td>
<td>No class – Spring Break</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Mar. 18-24</td>
<td>Solar heating and cooling of buildings (continued)</td>
<td></td>
<td>HW #3 due</td>
</tr>
<tr>
<td>11</td>
<td>Mar. 25-31</td>
<td>Solar energy through biomass</td>
<td>Krieth, Ch. 4</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Apr. 1-7</td>
<td>Solar energy through biomass (continued)</td>
<td></td>
<td>HW #4 due</td>
</tr>
<tr>
<td>13</td>
<td>Apr. 8-14</td>
<td>Energy storage</td>
<td>Krieth, Ch. 10</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Apr. 15-21</td>
<td>Energy storage (continued)</td>
<td></td>
<td>Quiz #3</td>
</tr>
<tr>
<td>15</td>
<td>Apr. 22-28</td>
<td>Transportation and hybrid electric vehicles</td>
<td>Krieth, Ch. 12</td>
<td>HW #5 due</td>
</tr>
<tr>
<td>16</td>
<td>Apr. 29-May 5</td>
<td>Finish presentations; Review</td>
<td></td>
<td>Semester projects due</td>
</tr>
<tr>
<td>17</td>
<td>May 6-12</td>
<td>Finals</td>
<td></td>
<td>May 8: Final Exam, 5-7 pm</td>
</tr>
</tbody>
</table>