Syllabus: SEC 598/MAE 598 Solar Commercialization
Fall 2013

1. Course:
   This solar commercialization course covers the design, manufacture, installation and financing of solar equipment and power plants for residential, commercial and utility applications. Both photovoltaics and concentrating solar thermal power are covered. The course includes lectures, case studies, interactive classroom projects and tours. Grading is based on class participation, homework, quizzes, two exams and a final exam. The course meets for approximately 3 hours per week. Out-of-class work averages about 4 to 6 hours per week.

2. Designation: Elective Course

3. Description: This solar commercialization course covers the design, manufacture, installation and financing of solar equipment and power plants for residential, commercial and utility applications.

4. Prerequisites: None

5. Textbook and Other Materials
   a. Textbook: *Solar Commercialization* by Steven Trimble and Ron Roedel

6. Overall Course Objectives and Course Outcomes
   The overall objective of the course is to introduce students to solar commercialization.

   Specific Course Outcomes include:
   - Students will be able to apply the engineering product development process to the commercialization of solar equipment and power plant systems.
   - Students will be able to optimize and evaluate solar power plants on a cost-of-electricity basis.
   - Students will understand how to characterize the solar market, its methods of finance and applicable regulations.
   - Students will demonstrate their ability to analyze solar commercialization case studies.

7. Instructors:
   a. Steven Trimble, Professor of Practice
      i. Room: ECR 385
      ii. Telephone: 623-229-9070
      iii. Email: steven.trimble@asu.edu

   b. Ron Roedel, Professor Emeritus
      i. Telephone: 480-965-5268
      ii. Email: r.roedel@asu.edu
8. Class Schedule: 75 minutes of lecture/class activity two times a week.

9. Grading Policy:

<table>
<thead>
<tr>
<th>Grade Ranges</th>
<th>Category</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>100% to 98.5%</td>
<td>Homework</td>
<td>300</td>
</tr>
<tr>
<td>98.4% to 91.5%</td>
<td>Quizzes</td>
<td>100</td>
</tr>
<tr>
<td>91.4% to 90.0%</td>
<td>Exam 1</td>
<td>200</td>
</tr>
<tr>
<td>89.9% to 88.5%</td>
<td>Exam 2</td>
<td>200</td>
</tr>
<tr>
<td>88.4% to 81.5%</td>
<td>Final Exam</td>
<td>200</td>
</tr>
<tr>
<td>81.4% to 80.0%</td>
<td>Points</td>
<td>1000</td>
</tr>
<tr>
<td>79.9% to 70.0%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>69.9% to 60.0%</td>
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</table>

All assignments must be submitted at the beginning of the session when due. Exceptions must be approved by one of the instructors.

10. Written Assignments:
All written work will be neat, organized, and easy to read. Homework problems must show all work and the answers must be boxed. (In industry, showing how you arrived at the answer is as important as the answer. There is no answer at the back of the book, so the reviewer must determine if your logic and calculations have yielded the right answer.)

11. Homework:
Homework will be assigned at the end of most sessions. It will be due at the beginning of the next session.

12. Quizzes
Quizzes will be given frequently. The quizzes will be in-class. Students are required to bring their textbook, paper, pencil and calculator to all class sessions. Some or all of the quizzes will be based on prior homework.

13. Exams
There will be two exams and a final exam. Exams may include concept questions in the form of short answer, multiple choice, etc. as well as problems. Students will need a calculator for the exams. For the exams, students may use a summary sheet that is one 81/2” x 11” sheet of paper. Students may use both sides of the sheet.
14. Schedule and Topics

The class schedule is provided below. It is subject to change based on course needs.

1. Course Overview
2. Commercialization Process—Product Development
3. Commercialization Process—Project Development
4. Overview of Technologies—PV (Ron)
5. Overview of Technologies—CSP (Steve)
6. Overview of Technologies—Hybrid (Steve)
7. Cost of Electricity
8. Time Value of Money, IRR, Levelized COE
10. Using Probabilistic Design Techniques to Quantify Risk
11. Reliability, Maintainability and Safety Considerations
13. Regulation and Incentives
14. EXAM 1
15. Case Study 1: Tempe Community Christian Church PV
16. Case Study 1: Tempe Community Christian Church PV
17. Tour of PV system at Tempe Community Christian Church
18. PV including a case study (Ron)
19. PV including a case study (Ron)
20. PV including a case study (Ron)
21. PV including a case study (Ron)
22. PV including a case study (Ron)
23. Case Study Utility CSP Commercialization (Steve)
24. Case Study Utility CSP Commercialization (Steve)
25. Exam 2
26. Finance and Funding (New Economist)
27. Finance and Funding (New Economist)
28. Tour of something to do with solar
29. Course Summary and Discussion of Trends

Final Exam

15. Absence Policy

Instructor’s general policy: Students must contact the instructor for an approved absence. Absences are allowed for illness, major injury, or the following:

1. Excused absences related to religious observances/practices that are in accord with ACD 304–04, “Accommodation for Religious Practices” [given in-part below]

The university community should in all its activities be sensitive to the religious practices of the various religious faiths represented in its student body and employees. Faculty are asked to recognize the obligations of their students who may be participating in the observance of religious holidays. (See the Council of Religious Advisors for more information about various religious
holidays.) Students should notify faculty at the beginning of the semester about the need to be absent from class due to religious observances.

Board of Regents policy prohibits discrimination against any student, employee, or other individual because of such individual’s religious belief or practice, or any absence thereof.

Administrators and faculty members are expected to reasonably accommodate individual religious practices (e.g., by an adjustment to the academic or workplace environment, such as rescheduling, flexibility in scheduling, voluntary substitutions, job reassignments, modification of grooming requirements). A refusal to accommodate is justified only when undue hardship to the university’s legitimate business purposes would result from each available alternative of reasonable accommodation (e.g., requires more than ordinary administrative costs, diminishes the efficiency in other jobs, infringes on other employees’ job rights or benefits, or impairs campus/workplace safety). Contact the Office of the Executive Vice President and Provost or the Office of Equity and Inclusion for assistance in determining undue hardship or reasonable accommodation.

2. Excused absences related to university sanctioned events/activities that are in accord with ACD 304–02, “Missed Classes Due to University-Sanctioned Activities”

Students who participate in university-sanctioned activities that require classes to be missed, should be given opportunities to make up examinations and other graded in-class work. However, absence from class or examinations due to university-sanctioned activities does not relieve students from responsibility for any part of the course work required during the period of the absence.

The executive vice presiden and provost of the university or designee shall determine, for the purposes of this policy, whether a particular event qualifies as a university-sanctioned activity.

In each college, a specific individual (e.g., dean’s designee) should be responsible for facilitating adherence to this policy. In particular, students who participate in university-sanctioned activities should be given the opportunity to make up examinations or other graded in-class work due to classes missed because of that activity, unless it can be shown that such an accommodation would constitute an unreasonable burden on the instructor. Should disagreement arise over what constitutes such a burden, the instructor and the student should initially contact the academic unit chair or the dean’s designee.

The specific activity program coordinator (e.g., assistant athletics director for academic services, director of forensics, director of bands) should, as early as possible, provide the college-designated individual with the class schedule of any student who may be required to miss class because of a university-sanctioned activity.

Students should inform their instructors early in the semester of required class absences. Instructors should attempt to provide opportunities for equivalent work, either before or after the class absence, in accordance with any academic unit or college requirements, which may apply.

Incomplete grades (I) should not be used unless deemed necessary by the respective faculty.

16. Classroom Behavior

Students are expected to conduct themselves as professionals during class. The general use of cell phones and pagers is not allowed. However, if the student is expecting an important message such as from a doctor, then the cell phone or pager may be put on
buzzer to alert the student of the call. If the student needs to respond to the call, then they should take the call outside of the classroom. **Texting is not allowed during class. Students not following the policy may receive a reduction in their grade.**

17. Honor Policy

Ethical conduct is a major part of being an engineering professional. Students will follow the university policies given below. For the purpose of this course, students are encouraged to work with others on the homework problems. For other assignments, the instructor will tell the students whether they must work independently or they can work in groups. Exams and quizzes will be based solely on the work of the individual student—no sharing of information or answers is allowed.

The Student Academic Integrity Policy of Arizona State University requires each student to act with honesty and integrity and to respect the rights of others in carrying out all academic assignments (see: [http://www.asu.edu/studentaffairs/studentlife/judicial/](http://www.asu.edu/studentaffairs/studentlife/judicial/)).

Violations of academic integrity include, but are not limited to, cheating, fabrication, tampering, plagiarism and/or facilitating such activities. A discussion of professional ethics that is especially relevant to FSE students can be found at [http://www.fulton.asu.edu/fulton/departments/acad_affairs/integrity.php](http://www.fulton.asu.edu/fulton/departments/acad_affairs/integrity.php).

For specifics on the ASU policy requiring academic integrity and against plagiarism, see [Student Academic Integrity Policy](http://www.asu.edu/studentaffairs/studentlife/judicial/).

18. Policy against threatening behavior, per the Student Services Manual, SSM 104–02, “Handling Disruptive, Threatening, or Violent Individuals on Campus”

19. It is not anticipated that any course content will be offensive to any student, however, if this is the case, the student should notify the instructor who will take the appropriate action.

20. A reminder to students when requesting accommodation for a disability that they must be registered with the Disability Resource Center (DRC) and submit appropriate documentation from the DRC.

21. The course content, including lectures, is copyrighted material and students may not sell notes taken during the conduct of the course (see ACD 304–06, “Commercial Note Taking Services” for more information).

22. The information in the syllabus, other than grade and absence policies, may be subject to change with reasonable advance notice.