Instructor Contact Information
Professor Emma Rasiel
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Office hours: TBD.

Course Objectives
This course exposes students to key topics in energy finance including: discount rates and discounted cash flows, valuation approaches, project finance, option pricing, real options, and energy derivatives. The goal of the course is to increase your understanding of financing, investment, and hedging decisions as they relate to energy companies and energy-related projects.

Organizational Matters
The Sakai site contains links to all of the course materials. There is no formal text book for the course.

Class Meetings and Attendance:
I will provide a short break roughly half way through each class (the exact time of the break will be determined based on what seems to be the best stopping point). I expect you to attend all classes regularly and on time, having prepared beforehand all assignments and readings. On time means that you are in a seat and prepared to begin class at the start of the scheduled class time. If you are unable to attend class on a given day (and this should not be a regular occurrence), you will not be permitted to make-up that participation in some other way. During class, all electronic communications devices should be turned off.

Assignments and grading:
Your course grade will be based on a final exam, team assignments, and class participation. The following weights will be used in calculating your final grade:

<table>
<thead>
<tr>
<th>Assignment</th>
<th>Weight</th>
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<tbody>
<tr>
<td>Final Exam</td>
<td>40%</td>
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<tr>
<td>Individual Assignments</td>
<td>25%</td>
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<tr>
<td>Team Assignment (teams of 2 or 3, self chosen)</td>
<td>20%</td>
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<tr>
<td>Class Participation (including pop quizzes)</td>
<td>15%</td>
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The final exam reflects your individual effort, is cumulative and is open-book, open-notes.

Class participation is an individual effort. It is critical that you attend class and come prepared to participate actively in the discussion. The questions provided for cases and readings will help you prepare for class. Learning for everyone in this class is enhanced through debate, different perspectives, and new insights. Keep in mind that your goal should be to contribute high quality comments, not high quantity.

There will be a number of individual and group assignments over the course of the semester. Students should form their own teams for each group project (you may remain with the same group throughout the semester, or switch groups as you wish). Any student having difficulty finding a group will be invited to contact me and I will assist.

Most individual assignments will be due within a week of the start of the assignment (i.e., due at the beginning of the subsequent class). Most team assignments will be due after two weeks. Our progression through the semester will determine the timing of the assignments, but you should assume (1) that you will be working on either a group assignment or an individual assignment in any given week, and (2) that while you are working on a group assignment (over two weeks), there will not be an individual assignment due at any time during the same two week period.

**Duke University Honor Code:**

The Duke University Honor Code applies to all aspects of this course. I will not tolerate any infraction of the Honor Code. The nature of each assignment indicates the type of communication and consultation that is permitted. Work that is described as an individual effort is to be your work alone, without consultation or assistance from any other person. Work that is described as a team effort is to be your team’s effort alone, again without consultation or assistance from anyone else. If you are uncertain about the nature of collaboration for any assignment, please ask me.
Course Schedule

Section 1: Review of Net Present Value as a tool to evaluate projects


In class: Renewable Power project valuation

Assignments:
- DCF Problem Set (individual)
- Impala case study (group)

Visiting Talk: Feb 5, CCI

Section 2. Project Finance


In class: Borrowing capacity and coverage ratio examples

Assignments:
- Read: Project Finance Primer (on Sakai)
- Saito Solar Case Study (group)
- Cogeneration project (individual)

Visiting Talk: Mar 5, Chris Abbate & colleagues, Riverstone Credit.

Section 3: Introduction to Real Options

Topics: From NPV to option-adjusted PV; expansion, timing and learning options; case study for electricity generator project; delay and abandon options.

Assignments:
- Options problem set 1 (individual)
- Options problem set 2 – Rigby Oil (group)
Section 4: Futures

Topics: Forwards and futures; spot vs futures markets; hedging vs speculation; futures pricing using no-arbitrage; exceptions in the commodities futures markets; contango and backwardation

Assignments:
- Amaranth case study (group)
- Jetfuel hedging assignment (individual)

Section 5: Financial Options and Real Options redux

Topics: Financial Options. Option pricing: Binomial model; relationship between options and futures; options for hedging and speculation. The “greeks” and risk analysis.

More on real options; extracting the value of the real option through dynamic hedging

Assignments:
- Options problem set (individual)
- Real Options Valuation of Oil Field Concession in the North Sea (Emma Rasiel, 2002) (group)

Final Exam (in class, Tuesday April 16)