16:335:502: Integrated Energy Challenges & Opportunities (II):

Syllabus:

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Course Number: 16:335:502(01), index # 54892
Cross-listed with 34:970:672 (01), index#58174

Course Title: Integrated Energy Challenges & Opportunities (II):
Course Subtitle: Issues in Renewable and Sustainable Biofuels/Bioenergy

Credits: 2
Format: Lecture/Seminar
Schedule: Tuesdays, 9:00 – 11:30 am
Location: Room 168, Civic Square (CSB, downtown New Brunswick)

Lead Instructor/ Organizer: Dr. Frank Felder, Director, Center for Energy, Economic and Environmental Policy, Edward J. Bloustein School of Planning and Public Policy.
Telephone: 732 932 5680 x 670
Email: ffelder@rci.rutgers.edu
Office hours are 1 hour prior to and after class and by appointment (CSB 249)

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Synopsis:
A cross-disciplinary seminar course that investigates scientific, technological, economic, and public policy issues associated with biofuels/bioenergy. Lectures by faculty/guest experts and student-led discussions and presentations, individually and in teams. Prerequisites: Permission of the instructor(s)*.

Comments:
Required of Fellows in the Sustainable Fuels IGERT project.
Open to other interested graduate students, particularly if pursuing fuels/energy related research, very broadly defined (including but not limited to: i) biomass feedstock development and optimization; ii) innovations in biomass processing; catalysis, conversion technologies; iii) sustainability and ecological impacts; iv) economics, deployment logistics, and policy issues).
Space permitting, also open to advanced undergraduates in relevant fields.

Prerequisites:
None formally, however interest/background in fuels-energy related research is assumed.
Note: 16:335:501 is NOT a formal prerequisite.

Special Permission Number Required to Register:
For information and to request a special permission number, contact Linda Anthony, lanthony@rci.rutgers.edu

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Course Structure:

- Organized topically around 4 key aspects of biofuels/bioenergy:
  - (i) feedstock development and optimization;
  - (ii) processing and energy conversion;
  - (iii) land use, environmental impact, and sustainability;
  - (iv) economics, logistics, and policy.
- Meets once weekly, officially for 2.5 hours, but formal part will often end early to provide in-class or comp time for students to work on group based assignments, etc.
- Interactive seminar/tutorial/roundtable format for most class sessions (see “Class Structure”, below); some field trips and/or presentations by faculty/guest lecturers.

Class Structure: (for seminar-format classes)

- Class begins with one or more students (and/or faculty/guests) giving short (~20 min?) ~presentation(s) on his/her home research group’s biofuels/bioenergy related research.
- Two short presentations (~10 min?) will follow by one or more other assigned student(s) and/or invited faculty/guest responder(s).
  - The first will discuss the research in relation to other work within the same discipline.
  - The second will address the significance and implications beyond discipline.
- Q&A/discussion period by all will close each session. It will include questions and recommendations to each presenter about (i) the research and its role in the biofuels/bioenergy context and (ii) presentation skills.

Assignments:

- During the semester, each student will fulfill 3 roles: main presenter, in-discipline responder, and out of discipline responder. In each role, student and will prepare a talk and an accompanying slide (powerpoint) deck.
- Two-weeks prior to being main presenter, student will provide an annotated bibliography of approx. 5 readings/resources, to help foster effective class participation and learning.
- Before preparing bibliography, presenter also needs to selected and meet with 2 faculty members – at least one of which is beyond main discipline – to discuss research and potentially get recommendations for the bibliography.
- One week ahead of each class, the students not assigned as main presenter or responder will be required to submit 2 written questions/comments, based on something in the pre-assigned annotated bibliography. These are intended to help the presenters and discussants as they finalize their presentations.

Grading:

Main (research) presentation (20%); In discipline and beyond discipline responses, (10% each); annotated bibliography (10%); In-class discussions (25%); Written responses (25%).
**Class schedule:**

This schedule is **illustrative – VERY tentative.**

Subject to change after Jan 18 organizational meeting (as student research areas are more fully understood and as adjustments made for student and faculty availability)

<table>
<thead>
<tr>
<th>Week/date</th>
<th>Type</th>
<th>Topics</th>
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<tbody>
<tr>
<td>1. Jan 18</td>
<td>Class, Introduction, Overview, Organization</td>
<td>Includes Lam on Duckweed as example of in-discipline and broader issues</td>
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<tr>
<td>2. Jan 25</td>
<td>Class, Guest Presentation</td>
<td>Critical review of life cycle analyses of algal biofuels (Also serves as example of presentation-and-response format)</td>
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<td>3. Feb 01</td>
<td>Field Trip &amp; release time for assignments</td>
<td>RU Co-Gen Plant and Solar Farm (and/or someone’s lab?)</td>
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<td>4. Feb 08</td>
<td>Class</td>
<td>Feedstock Development 1 (‘Focus on “grassohol”, non-food crops)</td>
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<td>5. Feb 15</td>
<td>Class</td>
<td>Feedstock Development 2 (Focus on algal sources)</td>
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<td>6. Feb 22</td>
<td>Class</td>
<td>Feedstocks to Fuels/Energy 1: (Focus on Chem/F-T, and thermal?)</td>
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<tr>
<td>7. Mar 01</td>
<td>Class</td>
<td>Feedstocks to Fuels/Energy 2: (Focus on biochem: ferment/anaerobic, etc)</td>
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<td>8. Mar 08</td>
<td>Field Trip and/or Guest Presentation</td>
<td>Salem Nuclear Plant (tentative)</td>
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<tr>
<td>9. Mar 22</td>
<td>Class</td>
<td>Environment &amp; Sustainability 1 (Focus on land use, ecology)</td>
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<td>10. Mar 29</td>
<td>Class</td>
<td>Environment &amp; Sustainability 2 (Focus on environmental issues)</td>
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<td>11. Apr 05</td>
<td>Class</td>
<td>Economics, Policy, Logistics 1 (Focus on economics, int’l markets, etc)</td>
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<td>12. Apr 12</td>
<td>Class</td>
<td>Economics, Policy, Logistics 2 (Focus on infrastructures, capacity?)</td>
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<td>13. Apr 19</td>
<td>Field Trip and/or Guest and/or Special Activity</td>
<td>TBD, with class input earlier in the term</td>
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<td>14. Apr 26</td>
<td>Class/Special Activity</td>
<td>Final integrative wrap up – planned by the class – town meeting or other special format?</td>
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