ECEN 4005/5005 • Organic Electronics
Spring 2019

Lecture: MWF 10:00 – 10:50 am, ECCR 139

Instructor: Sean Shaheen
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Office hours: Th, 4:00 - 5:00 pm, ECEE 1B45 (OCS Conference Room)
T, 6:30 - 7:30 pm, ECEE 265

Textbook: None.

Readings: As assigned.

Course Description
Surveys the science and technology of organic electronic devices, including organic light emitting diodes (OLED's), field effect transistors (OFET's), photovoltaics (OPV's and hybrid perovskites), electrochemical transistors (OECT's), and neuromorphic devices. The essentials of materials chemistry, electronic structure, design, operation, and numerical simulation of the devices will be covered.

Course Learning Goals
• Gain familiarity with structures and concepts of organic semiconductors
• Learn principles of molecular photophysics and charge transport
• Understand and model the physics of device operation
• Design new device architectures and organic electronic circuitry
• Learn about issues in materials processing and device fabrication for commercial organic electronic technologies

Key Topics
• Essential molecular orbital theory and molecular structure concepts
• Basic photophysics and spectroscopy of pi-conjugated materials
• Charge transport in disordered, molecular materials
• Device physics simulations
• Organic electronic circuit design and performance
• Understanding pathways to higher performance/efficiency for OE devices

Grading
Grading will be broken down into the following contributions:
Homeworks and in-class problems……………….40%
Mid-term project (Week of March 4)……………..30%
Final project (Week of April 29)………..………..30%

Grading for individual problems will be based on the following criteria:
   100% – Answer is fully correct and was arrived at through sound reasoning.
   90% – Answer is wrong due to a minor math or algebraic error; reasoning was sound.
   75% – Substantial effort was put into the problem, but a conceptual error was made near
         the end of the solution.
   50% – Substantial effort was put into the problem, but a fundamental conceptual error
         was made near the beginning of the problem.
   25% – Only a cursory attempt was made at the problem.
   0% – No attempt made.

The final grading scale for the class will be determined by the instructor according to the
following rationale:
   A – Mastery or near mastery of course material, concepts, and problems.
   B – Demonstrated understanding of most of the concepts covered in the course;
   good proficiency at problem solving.
   C – Reasonable effort was put into the class, but substantial gaps in conceptual understanding and
   low performance on problem solving tasks were demonstrated.
   D – Little effort was put into the class, and little was learned.
   F – No attendance or attempt at material.

ABET Learning Outcomes
This course strives to provide the student with a variety of specific learning outcomes. These
include the student outcomes identified by ABET, and adhered to by the ECEE department,
related to the skills, knowledge, and behaviors that students acquire as they progress through the
program. The specific Student Outcomes can be found
here: http://ecee.colorado.edu/academics/courses/criterion3.html.

Missed Assignment Policy
Late problem sets or assignments or missed examinations cannot be accepted without an
approved reason. Make-up assignments, quizzes or projects can be given for documented
reasons of *medical issues, a critical family matter, a religious observance, or attendance at a
conference or other approved university or academic obligation*. Please contact the instructor
before the due date of the assignment to make other arrangements.

Accommodation for Disabilities
If you qualify for accommodations because of a disability, please submit your accommodation
letter from Disability Services to your faculty member in a timely manner so that your needs can
be addressed. Disability Services determines accommodations based on documented disabilities
in the academic environment. Information on requesting accommodations is located on the
Disability Services website. Contact Disability Services at 303-492-8671 or
dsinfo@colorado.edu for further assistance. If you have a temporary medical condition or
injury, see Temporary Medical Conditions under the Students tab on the Disability Services
website.

Classroom Behavior
Students and faculty each have responsibility for maintaining an appropriate learning
environment. Those who fail to adhere to such behavioral standards may be subject to discipline.
Professional courtesy and sensitivity are especially important with respect to individuals and
topics dealing with race, color, national origin, sex, pregnancy, age, disability, creed, religion,
sexual orientation, gender identity, gender expression, veteran status, political affiliation or

political philosophy. Class rosters are provided to the instructor with the student's legal name. I will gladly honor your request to address you by an alternate name or gender pronoun. Please advise me of this preference early in the semester so that I may make appropriate changes to my records. For more information, see the policies on classroom behavior and the Student Code of Conduct.

Honor code
All students enrolled in a University of Colorado Boulder course are responsible for knowing and adhering to the Honor Code. Violations of the policy may include: plagiarism, cheating, fabrication, lying, bribery, threat, unauthorized access to academic materials, clicker fraud, submitting the same or similar work in more than one course without permission from all course instructors involved, and aiding academic dishonesty. All incidents of academic misconduct will be reported to the Honor Code (honor@colorado.edu; 303-492-5550). Students who are found responsible for violating the academic integrity policy will be subject to nonacademic sanctions from the Honor Code as well as academic sanctions from the faculty member. Additional information regarding the Honor Code academic integrity policy can be found at the Honor Code Office website.

Course Ethics
Discussion and group brainstorming about concepts and homework problems in the course is strongly encouraged. However, copying of homework, cheating on exams, or any other form of academic dishonesty is strictly forbidden. In case of doubt on a particular issue, please consult the instructor.

Sexual Misconduct, Discrimination, Harassment and/or Related Retaliation
The University of Colorado Boulder (CU Boulder) is committed to fostering a positive and welcoming learning, working, and living environment. CU Boulder will not tolerate acts of sexual misconduct (including sexual assault, exploitation, harassment, dating or domestic violence, and stalking), discrimination, and harassment by members of our community. Individuals who believe they have been subject to misconduct or retaliatory actions for reporting a concern should contact the Office of Institutional Equity and Compliance (OIEC) at 303-492-2127 or cureport@colorado.edu. Information about the OIEC, university policies, anonymous reporting, and the campus resources can be found on the OIEC website. Please know that faculty and instructors have a responsibility to inform OIEC when made aware of incidents of sexual misconduct, discrimination, harassment and/or related retaliation, to ensure that individuals impacted receive information about options for reporting and support resources.

Religious Holidays
Campus policy regarding religious observances requires that faculty make every effort to deal reasonably and fairly with all students who, because of religious obligations, have conflicts with scheduled exams, assignments or required attendance. Please notify me of any observances that may impact your academic duties in this class. See the campus policy regarding religious observances for full details.

FERPA
The privacy of student's education records are protected by regulations set by the Family Educational Rights & Privacy Act (FERPA). Details can be found at http://www.colorado.edu/registrar/annual-ferpa-notification.