Energy Materials (Fall 2019)
MEEN4480, MEEN 5800

Instructor: Prof. Wonbong Choi
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Date & Time: Tu, Thu (10:00AM – 11:20AM)
Prerequisites: consent of instructor

Course Objectives: The object of the course is to give the students an overview of energy materials which are the basis of modern energy technologies, solar cells and rechargeable batteries.

Course Description: This course will describe how advanced materials make possible efficient energy harvesting (solar cells) and energy storages (batteries, supercapacitors). Also the course introduces some principles for device applications, and advanced materials for future energy technologies.

Reference books:

Grading plan:
1. Midterm: 35%, 1 Final: 45%
2. Quizzes/Homework/Presentation 15%, Attendance 5% of grade
1. Midterm exam will cover Part1. Final exam will be comprehensive.
2. Attendance of the class is required.
3. Unethical conduct on quizzes or exams will automatically lead to failure of the course.
4. A term project will be given, the topic will be discussed during the class

Make-up Policy: Make-up tests will not be allowed for any circumstance.

List of topics to be covered
1. Introduction: Sustainability and energy conversions
2. Basic principle of solar cell
3. Solar cell operational parameters
4. Semiconductor
5. Charge transport in semiconductor
6. Advanced photovoltaic devices
7. The basic of rechargeable batteries
8. Materials in Li-ion batteries
9. Battery Characterizations
10. Advanced rechargeable batteries