**ENEG/MECH3110 Materials for Energy Technologies (MET)**


**Instructor:**
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**Lecture times:**
Wednesday 15:00 – 16:20 Venue: 4579
Friday 15:00 – 16:20 Venue: 4579

**Tutorial times:**
Friday 12:00 – 12:50 Venue: 1409
* TA will coordinate the tutorials based on the students' needs.

**Course Introduction:**

This course elaborates on the materials science and engineering of different energy technologies, including fuel, wind, nuclear, hydrogen, solar cells, batteries, and supercapacitors. The knowledge imparted from this course will be key to the future of chemical/materials engineers in the energy industry.

**Course Intended Learning Outcomes (CILOs):**

| No. | Upon successful completion of this course, students should be able to: |
|---|---|
| 1 | Gain the background knowledge on the local and global energy issues. |
| 2 | Understand the fundamental principle of major energy technologies. |
| 3 | Understand the structure-property-performance relationship in energy materials. |
| 4 | Learn how to select and incorporate the materials for energy systems. |

**Assessment Methods:**
Homework: 20% (3 assignments)
In-class quiz: 20%
Individual Project: 30% (15% presentation + 15% report)
Final Examination: 30% (Open class notes)

* The times for homework and quiz will be announced during the course progress.
* Presentation will be in the final teaching week. The project details are at the end of this syllabus.

**Course Materials:**
PPT materials will be uploaded before the lectures.

**Tentative Lecture Content:**

| Date | **Topic** |
|---|---|
| 4/9/2024 | Syllabus |
| 6/9/2024 | Materials basics |
| 11/9/2024 | Materials basics |
| 13/9/2024 | Fuel |
| 18/9/2024 | NO class (public holiday) |
| 20/9/2024 | Wind |
| 25/9/2024 | Wind |
| 27/9/2024 | Nuclear |
| 2/10/2024 | Nuclear |
| 4/10/2024 | Hydrogen |
| 9/10/2024 | Hydrogen |
| 11/10/2024 | NO class (public holiday) |
| 16/10/2024 | In-class quiz |
| 18/10/2024 | PV |
| 23/10/2024 | PV |
| 25/10/2024 | PV |
| 30/10/2024 | Guest Lecture:<br>Chiral Energy Materials (Dr. Tianwei Duan) |
| 1/11/2024 | In-laboratory teaching on PV |
| 6/11/2024 | Battery |
| 8/11/2024 | Battery |
| 13/11/2024 | Battery |
| 15/11/2024 | Supercapacitor |
| 20/11/2024 | Supercapacitor |
| 22/11/2024 | Recycling |
| 27/11/2024 | Project presentation |
| 29/11/2024 | Project presentation |

**Project Task:**

The students must choose one of the following areas and 'synthesize' knowledge from various resources.

- Science problems on the energy materials structure, synthesis, and processing
- Engineering problems on a specific type of energy technology
- Issues in the technology deployment and the mitigation pathways

Each individual project's deliverables include an oral presentation and a report (the presentation file with scripts accurately and comprehensively explaining each slide).