

2019 Fall- Syllabus

Thermodynamics II

Youngsuk Nam

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Multiscale Energy Laboratory

Instructor

- Youngsuk Nam (남영석)
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공학관 502 호 (x3652)
- Research group: MEL - Multiscale Energy Laboratory
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- Office hour: To be determined
- Research interest
Deliver innovative energy and environmental solutions by combining novel surfaces & materials, fundamental understanding in multiscale transport phenomena and state of-the-art model & experimental techniques.



Class Overview

- Material: Thermodynamics by Cengel & Boles (8th or latest edition)
- Chapters: Review of Thermodynamics I
Ch. 8~12, part of Ch.13~16
- Overall objectives
We will apply our basic understandings on the first/second law of thermodynamics to various engineering problems including power cycles, refrigerators, heat pumps, and mixing/reacting/energy conversion systems.
- Class Evaluation:
Midterm (35%), Final (45%), Others: /quiz/participation (10%), Attendance (10%)
 - *2 lateness = 1 absence*
 - *Lateness check: after ~10 min from the attendance check*



Class Overview

- Material: Thermodynamics by Cengel & Boles 9th edition
- Chapters: 1, 2, 3, 4, 5, 6, 7, (8), (12) -to be adjusted-
- Overall objectives
 - Understanding the basic principles of thermodynamics
 - Applying the concepts to real-world engineering examples
 - Developing an intuitive understanding of thermodynamics
- Midterm 1 (30%), Final (40%), Attendance (10%), ETC (10%)
 - 2 lateness = 1 absence
 - Lateness check: after ~10 min from the attendance check



Class Material

- Will be posted on Multiscale Energy research Lab (MEL) website mel.khu.ac.kr

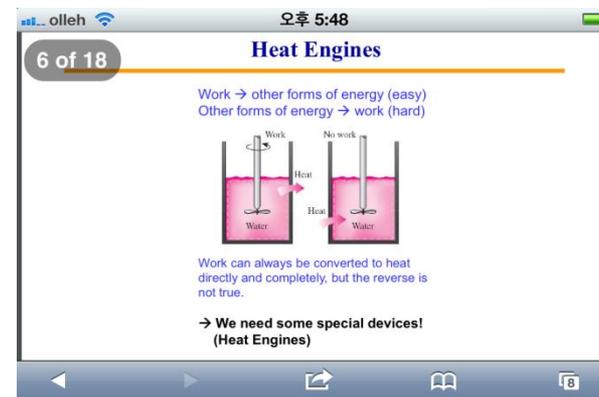
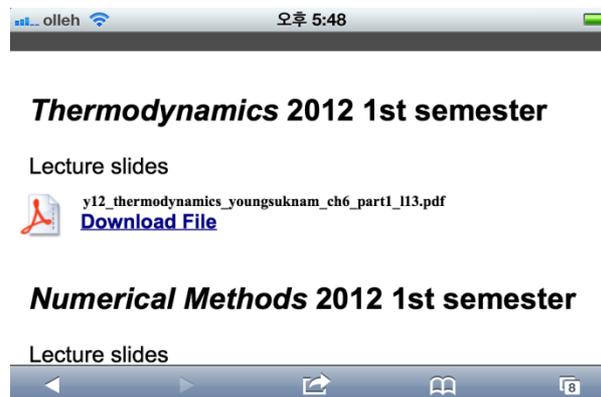
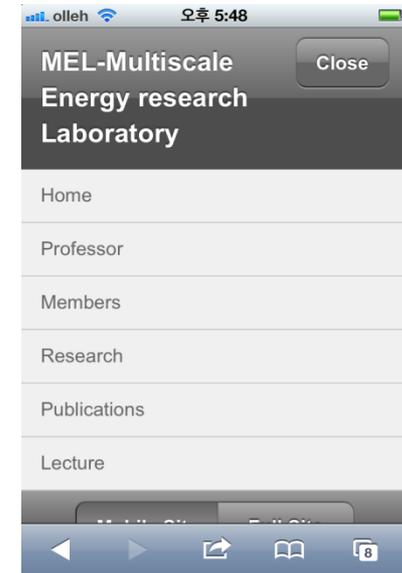


We aim to deliver innovative energy and environmental solutions by combining novel surfaces & materials, fundamental understanding in multiscale transport phenomena and state-of-the-art model & experimental techniques. Please explore our website, check our recent [news](#), [research](#), [publications](#) and [gallery](#) and feel free to contact Prof. Nam via ysnam1@khu.ac.kr if you have any questions.



Class Material

- Mobile version: mel.khu.ac.kr



Class Topics

Thermodynamics I review

Energy vs Power, 1st and 2nd Thermodynamics laws, Enthalpy, Entropy, Irreversibility, Carnot cycle

Core topics

- Exergy analysis
- Gas power cycles
- Vapor and combined power cycles
- Refrigeration cycles
- Thermodynamic property relations
- Gas mixtures
- Air-conditioning

Optional topics

- Other thermodynamic processes
(chemical reaction, solar energy conversion, etc.)



Class Weekly Schedules

1. Class overview, Thermodynamics I review (part I)
2. Thermodynamics I review (part II), Exergy
3. Thermodynamic property relations
4. Analysis of closed and open gas power cycle
5. Analysis of closed and open gas power cycle
6. Analysis of closed and open gas power cycle
7. Vapor and combined power cycles
8. 1st summary, Midterm Exam.
9. Vapor and combined power cycles
10. Vapor and combined power cycles
11. Vapor compression refrigeration cycles & heat pumps
12. Vapor compression refrigeration cycles & heat pumps
13. Gas-Vapor mixtures and air conditioning
14. Air conditioning / chemical reactions
15. Chemical reactions/others
16. 2nd summary, Final Exam



** can be modified during the semester*