"Freshmen Seminar: New materials to open the future"

Spring 2016 (053.001-015)

Professor Eun Soo Park

Syllabus

Location: **33-228**
Meeting time: **Monday 16:00-18:00**
Class web page: http://etl.snu.ac.kr/

Teaching staff

Instructor: **Eun Soo Park**
Office: **33-313**
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Office hours: **by appointment**

***Text*:** "**Made to Measure: New Materials for the 21st Century**",
Philp ball, Princeton University Press, 1997 &

"Transmaterial_next: A Catalog of Materials that Redefine Our Future",
Blaine Brownell, Princeton Architectural Press, 2016
Additional reading materials will be provided.

***Course Description*:**

Toward the end of the 20th century, technology expert Tom Forester predicted that three mega-technolgies would come to dominate global industrial activity: biotechnology, information technology, and new materials. Today an international material revolution is underway, motivated by heightened material research investigations, in addition to an intense sociocultural focus on the expressive possibilities of material application. This course will cover the rapidly evolving field of advanced materials, with a particular emphasis on the cutting-edge systems that are currently in use, or future systems that appear to have the promise for future applications. This course intends to takes a cross-sectional look across a variety of industries in an effort to identify the most important material opportunities for architecture and design as well as their most significant implications for the future of society. Resource trends, environmental goals, scientific achievement, and design applicability are all relevant to questions about tomorrow's physical environment, and this course focuses on next-generation materials because of the huge changes they are anticipated to bring. I hope that the rich array of interesting topics will provide students with useful insights into the next revolutionary materials.

Schedule

week 1 *Introduction to Advanced Materials*
week 2 *Coventional Alloys vs Quasicrystals*
week 3 *Coventional Alloys vs Quasicrystals*
week 4 *Bulk Metallic Glasses vs High Entropy Alloys*
week 5 *Bulk Metallic Glasses vs High Entropy Alloys*
week 6 *Shape Memory Alloys and Superelastic Alloys*
week 7 *Shape Memory Alloys and Superelastic Alloys*
week 8 *Graphene vs Carbon Nanotube*
week 9 *Graphene vs Carbon Nanotube*
week 10 *Aerogel vs Metal Foam*
week 11 *Aerogel vs Metal Foam*
week 12 *Self-healing polymer vs Self-healing Metal*
week 13 *Self-healing polymer vs Self-healing Metal*
week 14 *Group discussion for next revolutionary materials*
week 15 *Group presentation for next revolutionary materials*

***Components of Your Grade*:**

1) **Presentation of Student Research (30%)**

There will be one presentation for student research in the first part of the course, which takes place in class for 1 hour. The presentation will include mainly students' own research topics.

2) **Group Report and Presentation for Cutting Edge Material (60%)**

There will be one group study to propose cutting edge systems of structural materials in the second part of the course. Students form a small group to propose a cutting edge system of structural materials by combining group members' research fields. If they can display novel fusion works and research results at the end of semester, they will receive high scores.

3) **Attendance (10%)**

Please don't be late to class.

Remarks: The grade components might change up to 10% depending on the student's achievement.

Course Policies, Questions and Answers

Q: Is it possible to adjust class time?

A: None is planned, but if you really want one, speak up. We can negotiate.

Q: What is the course style?

A: Most classes will proceed in a discussion format with student presentations, so please do ask questions.

Q: What is the policy for attendance?

A: Please be on time. Being late disrupts the instructor and other students. If you cannot attend a class, please let me know in advance by email.

Prof. Eun Soo Park
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