

“Advanced Research of Structural Materials”

Spring 2020 (445.707_001)

Professor Eun Soo Park

Syllabus

Location: **33-226**

Meeting time: **M & W 18:30-19:45**

Class web page: <http://etl.snu.ac.kr/>

Teaching staff

Instructor: **Eun Soo Park**

Office: **33-313**

Telephone: **02-880-7221**

Email: espark@snu.ac.kr

Office hours: **by appointment**

Text: “**Advanced Structural Materials:** properties, design optimization and application”,

Winson O. Soboyejo, CRC Press, 2006 &

“**Physical Metallurgy and Advanced Materials**”, (7th edition)

R.E. Smallman, A.H.W. Ngan, Elsevier Ltd., 2007

Additional reading materials will be provided.

Course Description:

In recent years, the concept of advanced structural materials has changed from advanced composites and intermetallics to micro-electromechanical systems, cellular materials, biomaterials, shape memory alloys, amorphous alloys, and nanostructured materials. Many of the intermetallic and composite systems that appeared promising just a decade ago are no longer considered by many to be serious candidates for near-term applications in the next decade. This course will cover the rapidly evolving field of advanced structural materials, with a particular emphasis on the cutting-edge systems that are currently in structural use, or future systems that appear to have the promise for near-term structural applications. This course intends to illustrate the major materials issues for advanced structural materials by presenting students’ own research topics with deep understanding from processing to properties and from the fundamental science to viable industrial applications. I hope that the rich array of interesting topics will provide students with useful insights into the structure, properties, and applications of some of the systems that are currently considered advanced structural materials.

Prof. Eun Soo Park

Department of Materials Science and Engineering/Seoul National University

Schedule

- week 1** *Introduction to Advanced Materials*
- week 2** *Brief Introduction of Students' Research*
- week 3** *Classification of Presentation Topics*
- week 4** *Advance of Structural Materials I*
- week 5** *Advance of Structural Materials II*
- week 6** *Advance of Structural Materials III*
- week 7** *Novel Structural Materials I*
- week 8** *Novel Structural Materials II*
- week 9** *Novel Structural Materials III*
- week 10** *High Tech Property Analysis I*
- week 11** *High Tech Property Analysis II*
- week 12** *High Tech Property Analysis III*
- week 13** *Design of Fusion Research*
- week 14** *Cutting Edge System of Structural Materials I*
- week 15** *Cutting Edge System of Structural Materials II*
- week 16** *Cutting Edge System of Structural Materials III*

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 Reports and Presentation of Cutting Edge System (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.