Making Additive Manufacturing: Materials, Light, Law, and Design across Borders

(15 Hours · One-Week Intensive)

Course Overview

This one-week intensive course examines additive manufacturing as a cross-disciplinary platform connecting materials, light-based processes, intellectual property, and computational design. The course is delivered by instructors from different technical and professional backgrounds, highlighting how ideas move across disciplines and national boundaries.

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1. Materials & Light in Additive Manufacturing

Instructor: Sang-Hoon Nam

- How materials interact with light in additive manufacturing processes (1hour)
- Process–structure–property relationships in printed systems (1hour)
- Functional microlattices via additive manufacturing (Part 1): architecture and mechanics (1hour)
- Functional microlattices via additive manufacturing (Part 2): performance and applications (1hour)
- Case studies from advanced additive manufacturing research environments (2hour)

2. Ultrafast Light as a Manufacturing & Sensing Tool

Instructor: Kyung-Han Hong

- Ultrafast laser material processing and EUV generation (1hour)
- Optical sensing using ultrafast nonlinear optics and spectroscopy (2hour)
- Optical frequency combs and laser metrology (1hour)
- Precision limits and scalability of light-based technologies (1hour)

3. Intellectual Property Frameworks for Additive Manufacturing

Instructor: Jhongwoo Peck

- Intellectual property fundamentals for additive manufacturing (1hour)
- Patents, freedom-to-operate, and design protection (0.5hour)
- Translating research outcomes into protected technologies (0.5hour)

4. Computational Design & the Built Environment

Instructor: Wonyeob Seok

- Computational design workflows in architecture (1hour)
- Bridging digital models, physical prototypes, and constructed systems (0.5hour)

- Cross-scale design thinking: geometry, fabrication, and performance (0.5hour)

Learning Outcomes

By the end of the course, students will be able to:

- Understand how materials and light govern additive manufacturing processes
- Evaluate additive manufacturing technologies from technical, legal, and design perspectives
- Connect research concepts to manufacturable and deployable systems

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Schedule (2026.01.26 ~ 30, 09:00 – 12:00 AM, Zoom live online lectures)

26th January (D604)

Lecture1: How materials interact with light in additive manufacturing processes (Instructor: Sang-Hoon Nam, 1hour)

Lecture2: Process–structure–property relationships in printed systems (Instructor: Sang-Hoon Nam, 1hour)

Lecture3: Ultrafast laser material processing and EUV generation (Instructor: Kyung-Han Hong)

27th January (D603)

Lecture1: Optical sensing using ultrafast nonlinear optics and spectroscopy (Instructor: Kyung-Han Hong)

Lecture2: Optical sensing using ultrafast nonlinear optics and spectroscopy (Instructor: Kyung-Han Hong)

Lecture3: Functional microlattices via additive manufacturing (Part 1): architecture and mechanics (Instructor: Sang-Hoon Nam, 1hour)

28th January (D604)

Lecture1: Functional microlattices via additive manufacturing (Part 2): performance and applications (Instructor: Sang-Hoon Nam, 1hour)

Lecture2: Intellectual property fundamentals for additive manufacturing (Instructor: Jhongwoo Peck, 1hour)

Lecture3: Patents, freedom-to-operate, and design protection / Translating research outcomes into protected technologies (Instructor: Jhongwoo Peck, 1hour)

29th January (D603)

Lecture1: Case studies from advanced additive manufacturing research environments (Instructor: Sang-Hoon Nam, 1hour)
Lecture2: Computational design workflows in architecture (Instructor: Wonyeob Seok, 1hour)
Lecture3: Bridging digital models, physical prototypes, and constructed systems / Cross-scale design thinking: geometry, fabrication, and performance (Instructor: Wonyeob Seok, 1hour)

30th January (D604)

Lecture1: Optical frequency combs and laser metrology (Instructor: Kyung-Han Hong, 1hour)
Lecture2: Precision limits and scalability of light-based technologies (Instructor: Kyung-Han Hong, 1hour)
Lecture3: Case studies from advanced additive manufacturing research environments (Instructor: Sang-Hoon Nam, 1hour)

Required Technical Resources

There are no prerequisites for this course.

Instructor Information

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