# AAA616: Program Analysis

## Hakjoo Oh

## Fall, 2019

| Time | 9:00AM–11:30AM, Mondays |
|---|---|
| Classroom | 206 (Woojung) |

**Basic Information**

- Instructor: Hakjoo Oh

  - **Position:** Associate professor in Computer Science and Engineering, Korea University
  - **Expertise:** Programming Languages
  - **Office:** 616c, Science Library
  - **Email:** hakjoo_oh@korea.ac.kr
  - **Office Hours:** 1:00pm–3:00pm Mondays (by appointment)

**Objectives**  Program analysis aims to reason about dynamic semantics of computer programs statically and automatically. Applications inlucde program verification, bug-finding, software security, program optimization, etc. The goal of this course is to deliver principles of program analysis. After taking this course, students are able to

- understand the theory and practice of program analysis techniques, and

- design and implement program analyzers.

**Prerequisites**

- Undergraduate-level courses on programming language theory, compilers, discrete math, and automata

**Textbook:**

- Xavier Rival and Kwangkeun Yi. Introduction to Static Analysis: An Abstract Interpretation Perspective. MIT Press

**Grading:**

- Quiz –50%

  - Every class will begin with a short quiz (closed book)

- Final exam – 30%

- Paper reading – 20%

  - 3–5 papers will be given as reading assignments

**Schedule (tentative):**

| Weeks | Topics |
| --- | --- |
| Week 1 | Introduction |
| Week 2 | Preliminaries: Operational Semantics |
| Week 3 | Preliminaries: Denotational Semantics |
| Week 4 | Abstract Interpretation |
| Week 5 | Abstract Interpretation |
| Week 6 | Abstract Interpretation |
| Week 7 | Advanced Static Analysis Techniques |
| Week 8 | Advanced Static Analysis Techniques |
| Week 9 | Mid-term exam |
| Week 10 | Static Analysis Tool Implementation |
| Week 11 | Static Analysis Tool Implementation |
| Week 12 | Static Analysis for Advanced Programming Features |
| Week 13 | Static Analysis for Advanced Programming Features |
| Week 14 | Classes of Semantic Properties and Verification by Static Analysis |
| Week 15 | Type and effect system |
| Week 16 | Specialized Static Analysis Frameworks |