

CS 540300 Advanced Programming Languages

一、課程說明(Course Description)

This course will introduce advanced programming language concepts (especially with languages for GPUs) and compiler optimizations. This course will be covering more seminar style classes with more research discussions and include presentations and reports for students to realize advanced programming languages technologies. This course is not a basic course in the graduate school. For the basic graduate compiler course, one can find “Advanced Compiler” course. The main topics for this class include

1. Advanced Java
2. OpenCL and OpenCL 3.0
3. SPIR-V
4. CLDNN
5. Sparse Compiler Optimizations
6. Compiler with Memory Locality Issues (Old HPF examples)
7. NNEF
8. C++11, C++14, C++17, C++20
9. MISRA C++
10. Compilers for RISC-V with P and V extension.
11. Low-Power Numeric such as Fixed-Point, Bfloat16, and int4
12. Relay IR
13. Compiler optimization issues with Halide
14. Select topics from Encyclopedia of Parallel Computing, Padua, David (Ed.)
15. Simulator study such as Gem5, Qemu, and Spike.
16. NNAPI

二、指定用書(Text Books)

Lecture Notes by the instructor

三、參考書籍(References)

1. Encyclopedia of Parallel Computing, Padua, David (Ed.)

四、成績考核(Evaluation)

Present, Report, and Class Participations 30%

Software Courses 30%

Final Exams 40%