

Static Program Analysis

Class codes:

- **DCC831** - Graduate program in computer science
- **DCC030** - Undergraduate program in computer science
- **DCC049** - Undergraduate program in information systems

Class name: Static Program Analysis - (**Curso dado em inglês**)**Date/Time:** Mon/Wed, 2:55 pm - 4:35 pm, **Room:** ICEX 2015**Professor:** Fernando Magno Quintão Pereira**Audience:** grad/undergrad students**Syllabus:** Program representations; Code optimizations; The data-flow monotone framework; constraint-based analyses; Alias and points-to analysis; Lattice theory; Abstract interpretation; Register allocation algorithms; Static single assignment form; Sparse data-flow analyses; Static analyses for GPUs; Dynamic analysis in JIT compilers; Automatic theorem verification; Type systems and type inference; The LLVM compilation infrastructure.

Class	Date	Subject	Format
1	Mar 12	Introduction	Classroom
2	Mar 17	Control flow graphs	Classroom
3	Mar 19	Dataflow analyses	Classroom
4	Mar 24	Algorithms to solve dataflow analyses	Classroom
5	Mar 26	Lattice theory	Classroom
6	Mar 31	Partial redundancy elimination	Classroom
7	Apr 02	Constraint based analysis	Classroom
8	Apr 07	Pointer analysis	Classroom
9	Apr 09	Loop optimizations	Classroom
10	Apr 14	Static single assignment form	Classroom
11	Apr 16	Sparse abstract interpretation	Classroom
12	Apr 21	Tainted flow analysis	Classroom
13	Apr 23	Paper discussion	Classroom
14	Apr 28	Review class	Classroom
15	Apr 30	Midterm exam	Remote

Class	Date	Subject	Format
13	May 05	Range analysis	Classroom
17	May 07	Program slicing	Classroom
18	May 12	Predictive Compilation	Classroom
19	May 14	Operational semantics	Classroom
20	May 19	Type systems	Classroom
21	May 21	Mechanical validation of theorems with Twelf	Classroom
22	May 26	Type inference	Classroom
23	May 28	Just-in-time compilers	Classroom
24	Jun 02	Register allocation	Classroom
25	Jun 04	SSA-based register allocation	Classroom
26	Jun 09	Correctness	Classroom
27	Jun 11	Divergence analysis	Classroom
28	Jun 16	Paper discussion	Classroom
29	Jun 18	Review class	Classroom
30	Jun 23	Final exam	Remote

Supporting material: <https://homepages.dcc.ufmg.br/~fernando/classes/dcc888>

Evaluation: Two classroom exams worth 20 points each. For examples, see:

<https://homepages.dcc.ufmg.br/~fernando/classes/dcc888/grading.html>.

Project assignment:

VPL	Deadline	VPL	Deadline	VPL	Deadline
1	Apr 20	4	May 11	7	Jun 8
2	Apr 27	5	May 25	8	Jun 15
3	May 4	6	Jun 1	9	Jun 22

Online classes: videos on YouTube, with links available at:

<https://homepages.dcc.ufmg.br/~fernando/classes/dcc888/ementa/>.

Paper discussion: two sessions of paper discussion. For more info, see:

<https://homepages.dcc.ufmg.br/~fernando/classes/dcc888/discussion.html>.