CSIE 5111: Introduction to Mathematical Logic

(Semester 2, 2017/18)

Website

`https://www.csie.ntu.edu.tw/~tonytan/teaching/2017b-logic/2017b-logic.html`

Instructor

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Venue and time

Thursday, 10:30–13:00, room 546.

Prerequisite

Discrete mathematics and mathematical maturity. Familiarity with theory of computation will be helpful toward the end.

Syllabus (tentative)

1. Propositional calculus.
2. Proof system in propositional calculus and its completeness.
3. First-order logic (FO): Syntax and semantics.
4. Logical consequences and theories.
5. Proof system in FO and Gödel's completeness theorem.
6. Löwenheim-Skolem theorem and categorical sets.
7. Gödel's incompleteness theorem.
8. Decision problems for FO.

Textbook

We will not follow one particular textbook. All the materials that we will cover can be found in the following textbooks:

- *A Mathematical Introduction to Logic* by H. Enderton.
- *A Concise Introduction to Mathematical Logic* by W. Rautenberg.
- *Mathematical logic* by H.-D. Ebbinghaus, J. Flum and W. Thomas.

You can find informal treatment of logic in the following books:

- *Gödel's Theorem: An Incomplete Guide to its Use and Abuse* by T. Franzén.
- *A Tour through Mathematical Logic* by W. Rautenberg.

Grading

- Five assignments weigh 20% each.