

Introduction to Logic

IF2121 Computational Logic 2023/2024

Informatics Engineering Study Program
School of Electrical Engineering and Informatics ITB

Contents

- Course Organization
- Introduction to Logics
 - Formal Logic
 - Computational Logic

Lecturers

Lecturers:

- Fariska Zakhralativa Ruskanda (K1)
 - fariska@informatika.org
- Nur Ulfa Maulidevi (K2)
 - ulfa@informatika.org
- Rila Mandala (K3)
 - rila@informatika.org



Vision and Mission STEI ITB

Visi:

Menjadi Institusi pendidikan tinggi, pengembang ilmu pengetahuan Teknik Elektro dan Informatika yang unggul dan terkemuka di Indonesia dan diakui di dunia serta berperan aktif dalam usaha memajukan dan mensejahterakan bangsa.

Misi:

1. Menyelenggarakan pendidikan tinggi dan pendidikan berkelanjutan di bidang teknik Elektro dan Informatika dengan memanfaatkan teknologi komunikasi dan informasi
2. Mengikuti (memelihara) keterkinian (state of the art) serta mengembangkan ilmu pengetahuan Teknik Elektro dan Informatika melalui kegiatan penelitian yang inovatif.
3. Mendiseminasikan ilmu pengetahuan, teknologi dan pandangan/wawasan Teknik Elektro dan Informatika yang dimiliki kepada masyarakat baik melalui lulusannya, kemitraan dengan industri atau lembaga lainnya maupun melalui kegiatan pengabdian pada masyarakat dalam rangka membentuk masyarakat berkearifan teknologi.

Program Educational Objective

- Setiap lulusan IF ITB diharapkan (dalam 3-5 tahun setelah lulus):
 - Lulusan akan memiliki karir yang sukses dan menjadi seorang professional yang produktif di bidangnya
 - Lulusan dapat melanjutkan dan menyelesaikan pendidikan lanjutannya
 - Lulusan dapat berkembang secara professional melalui pembelajaran mandiri dan memiliki peran aktif dan **kepemimpinan** dalam pengembangan alat, teknologi dan metodologi baru.

Student Outcome

Graduates of the program will have an ability to:

1. Analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions.
2. Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline.
3. Communicate effectively in a variety of professional contexts.
4. Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles.
5. Function effectively as a member or leader of a team engaged in activities appropriate to the program's discipline.
6. Apply computer science theory and software development fundamentals to produce computing-based solutions.



Learning Outcomes for IF2121

1. Students are able to translate a natural language problem into propositional logic representation.
 2. Students are able to translate a natural language problem into relational logic representation.
 3. Students are able to prove or draw a conclusion from existing facts/ premises using propositional/ relational proof.
 4. Students are able to prove or draw a conclusion from existing facts/ premises using propositional/ relational resolution.
 5. Students are able to design and implement a simple program in Prolog to solve simple problem, based on automatic theorem proving.
 6. Students are able to evaluate an existing Prolog program,
-
- ▶ 7 based on the problem to be solved.

Courses

- Credits: 2 credit points
- Courses:
 - Attending classes 2 hours/week (14 weeks):
 - Wednesday (15.00 – 16.40)
 - attendance is obligatory (15 minutes late)
 - Assignments
 - Homework and quiz (individually)
 - Midterm Exam (week 8); Final Exam (week 16)
- No additional exam/ quiz

Courses contents

1. Introduction
2. Concept of logics
3. Propositional Logics (syntax, semantic, proofing)
4. First Order Predicate Logics (syntax, semantic, proofing)
5. Introduction to Proofing Theory
6. Declarative Programming → Prolog
7. Simple Application using Prolog

Grading

- Homework
- Assignments/ Laboratory Work
- Quiz
- Midterm Exam
- Final Exam
- Dishonesty → E

References

- Lecture Notes in Stanford University: Introduction to Logic, can be accessed at <http://intrologic.stanford.edu/homepage/materials.html> (Pustaka utama)
- Mathias Schilling, Introduction to Logic Programming with Prolog, 2017, can be accessed at <https://www.mathchilling.com/introduction-to-logic-programming-with-prolog/>
- Stuart J Russell & Peter Norvig, Resources of topics in Artificial Intelligence: A Modern Approach, 4th Edition, Global Edition Paperback, Pearson, 2021, <http://aima.cs.berkeley.edu/>
- Aaron Krauss, Declarative Programming with Prolog, 2018, can be accessed at <https://thecodeboss.dev/2018/06/declarative-programming-with-prolog-part-1-getting-started/>
- Patrick Blackburn, Johan Bos, and Kristina Striegnitz, [Learn Prolog Now!](#), last accessed November 2019, can be accessed at <http://www.learnprolognow.org/lpnpag.php?pageid=online>



Class Media

- Course website: <https://edunex.itb.ac.id/courses>
Discussion for each class: IF2121-0x (x is the class number)
- Kehadiran di SI-X
- Mailing-list: if2121@students.if.itb.ac.id (optional)
- Class channel