Program of Studies:	**Master Program Bioinformatics**
Name of the module:	**Introduction to Computational Logic**
Abbreviation:	**I-M-8**
Subtitle:	Core Lecture
Modules:	Lecture: 4 h (weekly) Tutorial: 2 h (weekly)
Semester:	1st -3rd semester/at least every two years
Responsible lecturer:	Prof. Dr. Gert Smolka
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Language:	English
Level of the unit/ Mandatory or not:	Graduate course / mandatory elective
Total workload:	270 h = 90 h of classes and 180 h private study;
Credits:	9
Entrance requirements:	none
Aims/Competences to be developed:	- structure of logic languages based on type theory - distinction notation / syntax / semantics - structure and formal representation of mathematical statements - structure and formal representation of proofs (equational and natural deduction) - solving Boolean equations - proving formulas with quantifiers - implementing syntax and deduction
Content:	Type Theory: - functional representation of mathematical statements - simply typed lambda calculus, De Bruijn representation and substitution, normalization, elimination of lambdas - Interpretations and semantic consequence - Equational deduction, soundness and completeness - Propositional Logic - Boolean Axioms, completeness for 2-valued interpretation - resolution of Boolean equations, canonical forms based on decision trees and resolution Predicate Logic (higher-order): - quantifier axioms - natural deduction - prenex and Skolem forms

Assessment/Exams:	- Regular attendance of classes and tutorials. - Passing the midterm and the final exam.
Grade:	Will be determined from performance in exams, exercises and practical tasks. The exact modalities will be announced at the beginning of the module.
Literature:	Will be announced before the start of the course on the course page on the Internet.