Courses in English

Course Description

Department: 07 Computer Science and Mathematics

Course title: Logic and Proof

Hours per week (SWS): 4

Number of ECTS credits: 5

Course objective: The objective of this course is to master the fundamentals of mathematical logic and methods of proof. That is, after the course students should be able to construct and write mathematical proofs and be able to apply them in every day life, when they speak and write.

Prerequisites: This course is designed for second year Mathematics students or Computer Science students that wish to learn about fundamental logic methods used for proofs.


Teaching methods: Interactive Lecture and Problem Sessions

Assessment methods: Written Exam

Language of instruction: English

Name of lecturer: Prof. Stefan Mancas

Email: mancass@erau.edu

Link: http://pages.erau.edu/~mancass/

Course content: This course is designed as a 2 part course, each of which will take about 7 weeks. A third part, focusing on a mathematical discipline e.g. "Proofs in Analytical Geometry" is optional.

Part One: Language of Logic, Demonstrations and Quantified Statements (7 weeks)
- Statements, Open Statements, Compound Statements, Truth Tables, Tautologies (2 weeks),
- Valid Arguments, Establish Validity with Demonstration, Equivalence, Conditional Demonstrations, Indirect Proofs, Negations (3 weeks) Quantified Statements,
- Universal and Existential Quantifier, Translating Quantified Statements, Restricted Quantifier, Rules of Logic for Quantified Statements (3 weeks)

Part Two: Algebra of Sets, Functions, and Induction (7 weeks)
- Equality, Relations among Sets, New Sets from Old, Definitions and Axioms, Theorems, Set Inclusion (2 weeks)
- Ordered Pairs, Relations, Functional Notation, Into, Onto, One-to- one, Inverse, Compositions (3 weeks)
- Principle of Mathematical Induction, Modified Principle of Mathematical Induction, Second of Mathematical Induction (3 weeks)

Optional Part Three: E.g. "Proofs in Analytical Geometry"

Remarks