Discrete Mathematics

The objectives of Discrete Mathematics (IDISM2) are: The introduction of the mathematics needed for analysis, design and verification of discrete systems, including the application within programming languages for computer systems.

Having passed the IDISM2 course, the student will be able to accomplish the following:
- Understand and apply formal representations in discrete mathematics.
- Understand and apply formal representations in problems within discrete mathematics.
- Understand methods for solving problems in discrete mathematics.
- Apply methods for solving problems in discrete mathematics.

Having completed this the student is able to carry out the following:

Expressions and sets:
Define a set; define a logic expression; negate a logic expression; combine logic expressions; construct a truth table for a logic expression; apply reduction rules for logic expressions. Apply these concepts to new problems.

Relations and functions:
Define a product set; define and apply equivalence relations; construct and apply functions. Apply these concepts to new problems.

Natural numbers and induction:
Define the natural numbers; apply the principle of induction to verify a selection of properties of natural numbers. Apply these concepts to new problems.

Division and factoring:
Define a prime number and apply Euclid’s algorithm for factoring an integer.

Regular languages:
Define a language from the elements of a set; define a regular language; form strings from a regular language; construct examples on regular languages. Apply these concepts to new problems.

Finite state machines:
Define a finite state machine as a 6-tuple; describe simple finite state machines by tables and graphs; pattern recognition by finite state machines; minimizing the number of states in a finite state machine; construct a finite state machine for a given application. Apply these concepts to new problems.

The teaching in Discrete Mathematics is a combination of sessions with lectures and students solving problems, either manually or by using Matlab.
Furthermore a selection of projects must be solved and handed in during the course.

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