COURSE SCHEDULE

Exams will be announced two weeks in advance.

The course objectives are to understand and use the following sections:

1. **Symbolic logic (Propositional calculus)** **Weeks 1 and 2**
   Logical connectives and truth tables
   Quantifiers
   Tautologies
   Relation to mathematical statements and proof

2. **Foundations of mathematics** **Weeks 3 and 4**
   Set theory: union, intersection
   Cartesian products, relations, partitions
   Function: composition, injection, surjection, bijection, inverse
   Binary operations
   Graphs: translations, reflections
   Numbers: natural, integers, Real, Complex

3. **Practicing proofs** **Weeks 5, 6 and 7**
   Direct proof
   Proof by Induction
   Proof by Contradiction
   Counterexample

4. **Calculus I Proofs** **Weeks 9, 10 and 11**
   Mean Value Theorem
   Fundamental Theorem of Calculus.
   ε-δ proofs (limit theorems, etc.)

5. **More topics** **Weeks 12, 13 and 14**

Complex numbers
Binomial theorem
Elementary probability

6. **Modern Algebra** **Week 15**

Definitions of and simple examples of groups, rings, fields.

If time permits additional topics may be taken from one or more of the following disciplines: number theory, dynamics, probability, graph theory, or modeling. These topics chosen are at the discretion of the instructor. Hence a detailed list of topics will be provided by the instructor.

In this course, there will be many examples treated in class and the student should learn and remember

(1) The definitions
(2) The techniques used:
(a) how a problem is solved and (b) how to write the solution
(3) The feeling of confidence that her/his solution is correct