Carthage Mathematics Department
Course Summary for Math 1240 Discrete Structures

1. Credits: 4 cr.
2. Semesters Offered: J-term, Spring
3. Text(s): *Notebook for Discrete Structures* by Snavely, or *Book of Proof* by Hammack
4. Topics Covered:
    a. Symbolic Logic and Truth Tables
    b. Quantified statements and quantifiers
    c. Mathematical Proofs
        i. Direct
        ii. Indirect
        iii. Induction
    d. Set Theory
    e. Basic Combinatorics
    f. Graph Theory
    g. Number Theory
    h. Functions
5. Skills Enhanced:
    a. Mathematical Investigation, insight into mathematics research
    b. Logical thinking and argumentation
    c. Proof writing
6. Sample Syllabus: (Book of Proof)
    a. Chapters 1-10, 12
    b. Additional handout on number theory if necessary
7. Miscellanea
    a. Many other topics are often covered, including proofs in symbolic logic, voting theory, apportionment, discrete dynamical systems, polyominoes and tiling, board games.
    b. A mini research project is sometimes included as part of this course.
8. Course Goals: By the end of the course, students should be able to do the following.
    a. Demonstrate proficiency with logical structures, including logical operators and quantifiers.
        i. Assessment: The final exam will include at least one problem requiring facility with logical structures.
    b. Write a mathematical proof using the methods of direct and indirect proof
        i. Assessment: The final exam will include problems wherein the student must demonstrate proficiency in writing mathematical proofs.
        ii. Assessment: The final exam will include a problem requiring an indirect proof.
    c. Write a proof using mathematical induction.
        i. Assessment: The final exam will include a problem requiring mathematical induction
    d. Demonstrate sufficient knowledge of the course content.
        i. Assessment: Exams, quizzes and homework. Sufficient knowledge is required to obtain a passing grade. The knowledge must be demonstrated on homework and exams.