

**MAT 302-001**  
**Spring 2009**  
**Introduction to Higher Mathematics (3 credits)**

INSTRUCTOR: Chris Christensen  
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OFFICE HOURS: MWF 1:30 – 2:30, TR 9:00 – 10:00, by appointment, and by capture.

CLASS TIME: MWF 8:00 – 8:50. ST 255.

PREREQUISITE: C or better in MAT 228 or MAT 229.

TEXT: *Foundations of Higher Mathematics, Third Edition* by Fletcher and Patty.

TOPICS: We will cover most of the material in chapters 1, 2, 3, 4, and 5.

GRADING:

Three tests worth 100 points each	300
F, 20 February	
F, 27 March	
W, 22 April	
Homework	75
Presentations in class	75
Comprehensive final exam	<u>150</u>
	600

Work missed during excused absences may be made up without penalty.

Test grading scales will be announced when tests are returned.

ATTENDANCE: You are responsible for all material assigned or covered in class. Attendance will not be taken.

WITHDRAWAL: The deadline for withdrawing from this course with a grade of W is Monday, March 30. Withdrawal after that date is not likely to be permitted.

Mid-Term grades for freshmen will be entered March 2 – March 26.

The instructor reserves the right to alter the syllabus if circumstances dictate.

The work you will do in this course is subject to the Student Honor Code. The Honor Code is a commitment to the highest degree of ethical integrity in academic conduct, a commitment that, individually and collectively, the students of Northern Kentucky University will not lie, cheat, or plagiarize to gain an academic advantage over fellow students or avoid academic requirements.

**Communication: Students will be able to convey their mathematical knowledge both orally and in writing.**

1. Students will be able to write clear, well-explained proofs.
2. Students will be able to explain their mathematical results clearly to their peers.

**Connections: Students will be able to demonstrate a mastery of the connections between distinct mathematical topics and the connection of mathematics to other disciplines.**

Students will be able to prove results from various areas of mathematics such as algebra, calculus, number theory, statistics, geometry, combinatorics, and probability.

**Mathematical Thinking: Students will be able to reason mathematically, analyze and synthesize, and problem solve.**

1. Students will be able to assess a proof for its logical correctness.
2.
  - a. Students will be able to use principles of induction to prove mathematical results.
  - b. Students will be able to use contradiction to prove mathematical results.
  - b. Students will be able to use contrapositive to prove mathematical results.
  - c. Students will be able to use direct proof to prove mathematical results.
  - d. Students will be able to write proofs involving conjunctions.
  - e. Students will be able to write proofs involving conditionals and biconditionals.
  - f. Students will be able to write proofs involving quantifiers.
3. Students will be able to select an appropriate method of proof to use in the given situation and implement the method correctly.
4. Students will be able to use mathematical definitions for creating examples and forming proofs. This may include the following definitions: converse, contrapositive, negation, relation, function, equivalence relation, symmetric, transitive, reflexive, equivalence class, congruence class mod  $n$ , Cartesian products.

Attainment of course learning objectives will be measured by three tests, a comprehensive final exam, and homework.