

**Fall Semester 2016**  
**MATH 3003W: Transition to Advanced Mathematics**

**Instructor:** Dr. Vu Kim Tuan

**Time & Location:** MW, 2:00 PM - 3:15 PM, Boyd 307

**Office:** Boyd 325

**Office Hours:** MW, 1:30 PM-2:00 PM, 3:15 PM-4:00 PM, or by appointment. Please contact me only through campus MyUWG e-mail or in person.

**Phone:** 678-839-4135

**E-mail:** [vu@westga.edu](mailto:vu@westga.edu)

**Hours Credit:** 3 hours

**Textbook:** Douglas Smith, Maurice Eggen, and Richard St. Andre, *A Transition to Advanced Mathematics*, 8<sup>th</sup> Edition, Cengage Learning, Boston, 2014.

Additional Resources: Gary Chartrand, Albert D. Polimeni, and Ping Zhang, *Mathematical Proofs: A Transition to Advanced Mathematics*, 3<sup>rd</sup> Edition, Pearson, 2013.

**Course Description:** This course introduces elements of mathematical proof, focusing on three main themes: the meaning of mathematical statements, the roles of examples in determining the validity of mathematical statements, and the various forms and methods of mathematical proofs, including direct proof, proof by exhaustion, indirect proof (by contradiction, or by contrapositive), mathematical induction, disproof by counterexample.

**Topics:**

- 1- Set Theory
- 2- Logic
- 3- Direct Proof and Proof by Contrapositive
- 4- Proof by Contradiction and Existence
- 5- Mathematical Induction
- 6- Equivalence Relation
- 7- Functions
- 8- Cardinality

**Learning Outcomes:** It is expected that the student who completes this course will:

- 1- have an understanding of symbolic logic and quantifiers, and be able to translate sentences from English statements into logical expressions and back.
- 2- be familiar with methods of proofs, including direct proof, proof by induction, contradiction, and contrapositive.
- 3- know the basic concepts of naive set theory.
- 4- know the basic properties of functions and relations, including surjectivity, injectivity, bijectivity.
- 5- know the definition of cardinality, and be able to determine if a set is finite, countably infinite, or uncountably infinite.
- 6- be able to effectively communicate written mathematics.

**Tests and Final Exam:** There will be two tests worth 15% each. The final exam is comprehensive and counts 30% . Make-up for missing tests will only be granted in case of verifiable illness or the most extreme circumstances (at my discretion). Even in legitimate cases, the make-up test will be harder than the original test.

**Important Dates:** 9/14 : Test 1  
10/26 : Test 2  
12/5 : Final, 2:00 – 4:00 PM

**Homework:** This is an important part of the course. Homework assignments will be given approximately once per week, and should be submitted to me on the next lecture day, at the beginning of the class for grading. Homework assignments count for 40%.

**Grading:** The grading of assignments and exams will be based on mathematical correctness and coherence of the presentations. The final letter grade will be determined by the following scale:

A = 90%, B = 80%, C = 70%, D = 60% , F = below 60%

**DSW:** Since this is a DSW (Discipline Specific Writing) course, the assignments will include a considerable amount of writing. The student should present proofs in an accurate and coherent way.

**Disabilities:** Students with documented disabilities (through West Georgia's Disability Services) will be given all reasonable accommodations. Students must take the responsibility to make their disability known and request academic adjustments or auxiliary aids. Adjustments needed in relation to test-taking must be brought to the instructor's attention well in advance of the test (at least one week prior).

**Attendance Policy:** You are expected to attend every class. Although absences are not penalized, if a class is missed, you are responsible for all material and assignments.

**Academic Honesty:** You are expected to achieve and maintain the highest standards of academic honesty and excellence. In short, be responsible and do your own work.