MATH 3190 CT2	Introduction to Proof	Spring 2015
2:30-3:20 MWF	Course Syllabus	Martin M 203

Course Basics:

Meetings: 2:30pm-3:20pm on Mondays, Wednesdays, and Fridays in Martin M 203.

Textbook: *Mathematics: A Discrete Introduction* (Second edition) by Edward Scheinerman.

Description: A course which introduces mathematical proofs with topics including proof techniques, elementary logic, induction, sets, functions, and relations.

CT2: This course is a CT^2 seminar in which you will not only study the course material but also develop your critical thinking skills.

Analysis Success Program: This class is participating in the Analysis Success Program. This program is designed to support students in analysis classes. We will have a weekly recitation through this program.

Calculator: You may occasionally want to use a calculator for homework. Calculators are not allowed on quizzes or exams.

Prerequisites: MthS 1080: Calculus of One Variable II or MthS 1110: Calculus II for Biologists.

Prerequisite For: MthS 4110: Introduction to Combinatorics, MthS 4550: Topics in Geometry, MthS 4560: Topology. This course is required for the math major or the education major with a mathematics speciality. The department has planned for MthS 3190 to be a prerequisite for more 4000-level courses in the near future.

Attendance: Attendance at every class is expected. If you have an unavoidable conflict with an exam or other in-class assessment, please contact me *before* the class. In the case of a sudden emergency or illness, contact me as soon as possible.

Texting: Texting is not appropriate during class. If I catch you texting during class, I will try to embarrass you.

Online Information: I will communicate with you via email and Blackboard for this class.

Lateness: Class is cancelled if the instructor is more than 15 minutes late.

Cancellations: If class is cancelled due to inclement weather or an unexpected event, homework will be due the following class. Exams will be rescheduled.

Instructor Information:

Instructor: Dr. Michael Burr

Email: burr2@clemson.edu (This is the best way to contact me.)

Office: Martin Hall, O-19.

Office Hours:

- Tuesdays: 10:00 am – 12:00 pm
- Wednesdays: 12:00 pm – 2:00 pm
- Thursdays: 10:00 am – 12:00 pm
- and by appointment. Please email me to set up an appointment outside of normal office hours.

Recitation: Tuesdays: 5:00 pm – 6:00 pm in Martin O 10 (Exterior doors lock around 4:30).
Office Phone: (864)-656-5220

Homework, Quizzes, and Exams:

Grading: Your final grade will be computed using the following formula:
- 5% Participation and Reactions
- 10% Homework
- 15% Quizzes
- 40% Exams (2 Exams, 20% each)
- 30% Final

Final Grades: Final letter grades (after rounding) use the standard scale:
- A: ≥ 90
- B: $80 - 89$
- C: $70 - 79$
- D: $60 - 69$
- F: ≤ 59

Recitation Office Hours: On one day a week, I will hold a "recitation office hour" through the analysis success program where attendees will practice the course material in small groups. You might work on practice problems or consider a given proof in more depth. Recitation office hours are not mandatory, but are suggested.

Participation and Reactions: You will have short daily assignments before and after some lectures. In these assignments, you will prepare for lecture or react to the proofs presented in class. The reactions will be completed online.

Homework: You will have several written homework assignments per week. Expect to work on each week's homework for several hours. Each homework problem must be well-organized and thoroughly explained in words for full credit. Note that a thorough explanation is *necessary* for you to receive full credit for your work. Homeworks turned in one class late will receive 50% credit and will not be accepted beyond that.

Quizzes: There will be weekly short quizzes (5-10 minutes) at the beginning of class on Fridays. The quiz questions will be short answer questions which test your recall of the basic course material. Questions on these quizzes may be drawn from any of the class material, not necessarily just the most recent material.

Exams: There will be two in-class exams in this course. The in-class exams will be held on Friday, February 13th and Friday, March 27th. These dates are subject to change after the first few classes.

Final Exam: According to the final exam schedule, the final will be held on Thursday, April 30th 3:00pm - 5:30pm. There will be no exemptions from the final.

Group Work: Group work is encouraged on the homework, but you must write up your solutions separately. This means that the techniques and approaches that you use may be the same, but the text or explanation of the solution should be written up *in your own words*. Identical or very similar homeworks *may not be graded*. If you work on the homework together or receive a hint from someone

else, you *must write the names of the people with whom you worked at the top of your submission.* By writing the names of the people with whom you worked, you are giving them credit for their contributions, just as you would expect credit for helping someone else.

Topics:

Proof Techniques: The main skill that is developed in MthS 3190 is the ability to write mathematical proofs. The mathematical proof techniques in this course include the following techniques: direct proof, proof by contrapositive, proof by contradiction, quantifier proof, epsilon-delta proof, and proof by induction.

Mathematical Objects: This class will also introduce you to the language of mathematics and basic definitions that are used in most 4000-level courses. In particular, the basic mathematical objects discussed in this class include quantifiers, sets, functions, relations, and equivalence relations.

Critical Thinking: Since this course is a CT^2 seminar, we will also explicitly discuss the role of critical thinking in mathematics. In particular, we will not only discuss the role of critical thinking in the development of proofs, but we will also discuss why mathematics is done in the way it is, what makes good mathematics, and why mathematicians have chosen a particular language for mathematics.

Selected Topics: If there is time at the end of the semester, we will cover selected topics from combinatorics, elementary number theory, and graph theory.

Learning Objectives:

Upon successful completion of this course, students will be able to

- Define basic mathematical objects.
- Describe the standard mathematical proof techniques.
- Identify the key steps of a given proof.
- Summarize and analyze the key steps of a given proof.
- Apply basic proof techniques to prove a variety of theorems.
- Compute the basic data of mathematical objects using their properties.
- Give examples and counterexamples for mathematical statements
- Classify proofs by technique and identify similarities and differences between them.
- Inspect and characterize the data and questions in a statement.
- Assemble basic proof techniques into a coherent multi-step plan to prove complex statements.
- Assess the applicability of various proof techniques for a given problem.
- Produce written mathematical proofs that express complex and technical arguments clearly.
- Critique given proofs for correctness and completeness.
- Discuss the differences between computations, algorithms, and proofs.
- Monitor and assess one's own thoughts and arguments for clarity, precision, correctness, and logicalness.
- Evaluate several proofs of the same statement for their clarity and mathematical style.

Academic Integrity:

Class Policy: Your are expected to follow the university's policy on academic integrity:

"As members of the Clemson University community, we have inherited Thomas Green Clemson's vision of this institution as a "high seminary of learning." Fundamental to this vision is a mutual commitment to truthfullness, honor, and responsibility, without which we cannot earn the trust and respect of others. Furthermore, we recognize that academic dishonesty detracts from the value of a Clemson degree. Therefore, we shall not tolerate lying, cheating, or stealing in any form."

In particular, in this course, if you use references outside of the course materials, e.g., the internet, a different book, or discuss the problems with anyone, you are expected to provide a short citation. On homeworks, you are also required to write the names of the people with whom you worked at the top of your submission.

Disability Services:

Class Policy: It is University policy to provide, on a flexible and individualized basis, reasonable accommodations to students who have disabilities. Students are encouraged to contact Student Disability Services to discuss their individual needs for accommodation. The Student Disability Services department is located in the Academic Success Center Building.

In addition, students with disabilities who need accommodations should make an appointment with me to discuss specific needs within the first month of classes (I must receive the letter at least one week before an exam in order to provide accommodations). Students should present a Faculty Accommodation Letter from Student Disability Services when we meet.

Title IX Policy:

Class Policy: Clemson University is committed to a policy of equal opportunity for all persons and does not discriminate on the basis of race, color, religion, sex, sexual orientation, gender, pregnancy, national origin, age, disability, veterans status, genetic information or protected activity (e.g., opposition to prohibited discrimination or participation in any complaint process, etc.) in employment, educational programs and activities, admissions and financial aid. This includes a prohibition against sexual harassment and sexual violence as mandated by Title IX of the Education Amendments of 1972. This policy is located at `http://www.clemson.edu/campus-life/campus-services/access/title-ix/`. Mr. Jerry Knighton is the Clemson University Title IX Coordinator.

Disclaimer:

Syllabus Changes: This syllabus is subject to change, if necessary, for reasons including those related to unforeseen conflicts, cancellations, course needs, or educational needs. I will contact you whenever a change must be made, and an up-to-date version of the syllabus will always appear on the course website.