Syllabus for Maths 305: Foundations of Mathematics, Spring 2014

Instructor: Dr. Martial Longla
Office: Hume Hall 308
Office hours: Monday, Wednesday 11:20 - 12:35, or by appointment
Email: mlongla@olemiss.edu
Telephone: (662) 915-7436

Course Information

Textbook: A Transition to Advanced Mathematics by D. Smith, M. Eggen and R. St. Andre.
Time/Place: Monday, Wednesday: 10:00 AM - 11:15 AM / S Res college 113

Course Description

This course is intended to equip students who are interested in studying mathematics with the nuts and bolts of the subject. In particular, we will discuss logic, sets, relations, and functions, with a particular emphasis on proofs. After having finished this course, students are expected know all of the definitions introduced, and to be able to carry out mathematical proofs. We will essentially cover the material from chapters 1 through 5 of the book.

Topics

The course includes, but is not limited to the following:

- Logic and proof writing

  1. Proof by contradiction and by contraposition
  2. Proof by induction and the well-ordering principle

- Sets

  1. Operations on sets and the associated laws
  2. The power set Cardinality

- Relations

  1. Equivalence relations
  2. Congruences
  3. Orderings

- Functions

  1. Examples and properties
  2. Injections, surjections and bijections

Homework and Quizzes

A homework assignments will be given after every class. There will be a 10-minutes quiz in class every **Monday** consisting of two of the previously assigned homework exercises.

Mid-terms and Final Exam

Three in-class mid-term exams will be given, on the following days: **February 26th**, **March 26th**, and **April 26th**. The final exam will be given on **Wednesday May 7th**. The final exam will be comprehensive. Students must show all work for each exam question in order to **get** full credit. The lowest score of the three mid-term grades will be replaced by the final exam percentage (provided the final exam percentage is higher).

Grade letters and scores

Grading The course grade will be calculated out of a total of 600 points, with each mid-term being worth 100 points, the final exam worth 200 points, and the homework/quizzes worth 100 points.

The grading scale is: A: 540-600, B: 480-539, C: 420-479, D: 360-419, F: 000-359. I reserve the right to make the grading scale easier.

Calculator Policy

An inexpensive scientific calculator is sufficient in Math 305 but is not necessary. Calculators will NOT be allowed during exams or quizzes. While I cannot stop you from using a calculator at home, I encourage you to do the homework without a calculator. **Calculators, cell phones, ipods, and other electronic equipment are prohibited during exams.**

Additional Policies

1. Any person who must miss a scheduled mid-term exam or quiz because of an official university function must reschedule with the instructor to take the test at a time before the test is scheduled to be given. No other rescheduling will be allowed. If asked for by the instructor, official documentation must be provided.

2. A student who wishes to discuss the grading policy and/or testing policy, or wishes to have a conversation regarding the instructor of the course should make an appointment with the course supervisor in the Department of Mathematics.

3. An "I" grade will not be given without the permission of the Department of Mathematics.

4. Any student having three or more final exams scheduled for the same day may arrange with the instructor to take the exam at another time. This is the only reason that a final exam may be rescheduled.

5. Every student must take each exam at the time scheduled. The only exceptions are those students affected by (1) or (4) above.

Important Dates

March 10th - March 14th: Spring break
March 4th: Last day to drop
May 5th - 9th: Final exam week

Course Withdrawal

The withdrawal deadline is **March 4th 2014**. After the Course Withdrawal Deadline, courses dropped will be recorded on University records and the W grade will be recorded if the student is not failing the course at the time of withdrawal; otherwise the grade recorded will be F. After the course with-drawal deadline, a student may drop a course only in cases of extreme and unavoidable emergency as determined by the academic dean; dropping a course after the deadline will not be permitted because of dissatisfaction over an expected grade or because the student is changing his/her major.

Academic Needs

It is the responsibility of any student with a disability who requests a reasonable accommodation to contact the Office of Student Disability Services (915-7128). Contact will then be made by that office through the student to the instructor of this class. The instructor will then work with the student so that a reasonable accommodation of any disability can be made.

Academic Honesty

Cheating: The following statement is the policy of the Department of Mathematics regarding cheating:
Offenses: Cheating on any exam or quiz, theft or attempted theft of exam questions, possession of exam questions prior to the time for examination, or the use of an illegal calculator on tests or quizzes shall all be offenses subject to appropriate penalties.
Penalties: The penalty for commission of any offense set out above is failure in the course and, subject to the approval of the Chancellor, dismissal or suspension from the University

<div align="center">Daily Schedule</div>

January 22nd January 27th	Syllabus + Introduction to logic and Terminology Statements and Truth tables
January 29th: February 3rd:	Logical equivalence and logical deductions The Contrapositive, Negation and Converse of an Implication
February 5th : February 10th:	Quantifiers Proof writing: Terminology and Goals
February 12th : February 17th:	Existence Proofs and Counterexamples/Direct Proofs Using Cases in Proofs (Review problems due on the 19th.)
February 19th : February 24th:	Review for Exam 1 Exam 1
February 26th: March 3rd :	Proofs by Contrpositive Proofs by Contradiction
March 5th : March 17th:	Mathematical induction Uniqueness Proofs, WOP and PCI (Proof of the division algorithm)
March 19 th: March 24th :	Sets and Set operations Indexed families of sets/ Cartesian products
March 26 th : March 31 st :	Relations Relations (Review Problems due on the 2 nd)
April 2 nd: April 7th :	Review for Exam 2 Exam 2
April 9 th: April 14 th	Functions Functions
April 16 th : April 21 st :	Functions Cardinality: Equivalent sets (Review problems due on the 23rd)
April 23 rd ; April 28th:	Review for Exam 3 Exam 3
April 30 th :	Countable sets/The Ordering of Cardinal numbers (Axiom of choice and final Exam review if time permits.)