Course Description

URL: http://math.fau.edu/ford/syllabi/S15/MAC4937/

Instructor: Dr. Timothy Ford, Professor
Office: SE 216
Phone: 561-297-3348
Office hours: 10:00 – 11:00 MWF and other times by appointment.
Email: ford@fau.edu

Prerequisite: Discrete Mathematics, MAD 2104, with a grade of C or higher. This includes an introduction to sets, proofs, elementary logic, mathematical induction, functions and relations. This should be considered a minimal prerequisite. Most students would benefit by waiting to take MAT 4937 after first finishing the lower division requirements for a Mathematics Major: Calculus I (MAC 2311), Calculus II, (MAC 2312), Calculus III (MAC 2313), and Introduction to Computational Math (MAD 2502). Mathematics Majors should visit the URL: http://math.fau.edu/ford/mathmajors/.


Course content, objectives, and learning outcome goals: This course will concentrate on understanding, exploring, and solving, or attempting to solve, problems in various contexts and of various complexity. Heuristics, strategies, and methods of problem solving are discussed and practiced extensively in class and in student assignments. Communicating mathematics, reasoning and connections between topics in mathematics are emphasized.

The student will be able to:
(1) Recognize and understand precisely stated problems.
(2) Explore various parts of a problem.
(3) Introduce variables.
(4) Draw pictures and look for related problems.
(5) Learn a variety of problem solving techniques.
(6) Apply logical reasoning and mathematical methods towards solving problems.
(7) Practice efficient communication about problems and solutions, both orally and in writing.

Attendance and classroom etiquette: Regular attendance at the lectures is expected. It is the student’s responsibility to know what is going on in class. To minimize disruption to the learning environment, you are requested to arrive on time and not leave until the end of class. It is the student’s responsibility to notify the instructor prior to any anticipated
absence, and within a reasonable amount of time after an unanticipated absence. Also, you are requested to refrain from looking at cellphones and computers during lecture.

**Topics.** Generally, we will follow this outline.

1. Strategies for Investigating Problems (Chapter 2) A good math problem, one that is interesting and worth solving, will not solve itself. You must expend effort to discover the combination of the right mathematical tactics with the proper strategies. Strategy is often non-mathematical. Some problem solving strategies will work on many kinds of problems, not just mathematical ones.

2. Fundamental Tactics for Solving Problems (Chapter 3) Many fundamental problem-solving tactics involve the search for order. Often problems are hard because they seem chaotic or disorderly; there appear to be missing parts (facts, variables, patterns) or the parts do not seem to be connected. Finding and using order can quickly simplify such problems. Consequently we will begin by studying problem-solving tactics that help us find or impose order where there seemingly is none. The most dramatic form of order is symmetry.

3. Three Important Crossover Tactics (Chapter 4). A crossover is an idea that connects two or more different branches of math, usually in a surprising way. In this chapter we will introduce perhaps the three most productive crossover topics: Graph Theory, Complex Numbers, and Generating Functions.

4. Special Topics chosen from Chapters 5 – 9.

**Homework:** Homework will be assigned and collected. The homework exercises will be posted at the class URL which appears at the top of page one. Preferably, homework should be hand-written on letter size paper. Homework that has been printed on paper and typeset using \LaTeX\ is also acceptable. Homework that has been faxed, or otherwise scanned is unacceptable. Homework assignments that involve computer programming can be done using Python or C. If you prefer to use another programming language, that is allowed, but please verify this with me in advance. In this case, the program source code as well as a written report should be submitted. Homework assignments are due at the start of class, 9:30, on the assigned day. Late homework papers will be assessed a penalty. You are expected to do your own homework. Submitting solutions that have been copied from someone else, or from the various sources available on the internet is considered academic dishonesty.

**Presentations.** Each student will prepare and present two problems in class. The problem can be either one from our textbook, or another source. The presentation should be prepared, scheduled in advance, and should be at most 15 minutes.

**Exams:** There will be one midterm exam and a final exam. The tentative date for the midterm exam is Oct. 8. A comprehensive final examination will be given during the final exam week. The time of this exam is set by the university and is Thursday, December 3, 2015, 7:45 – 10:15. Exams are taken in our usual classroom.

**Makeup Exams:** Makeup exams will be given only under circumstances which coincide with university policy (http://www.fau.edu/academic/registrar/catalog/academics.php?topics=all). It is the student’s responsibility to establish with documentation that the exam was missed for a solid reason. The student cannot make up a missed midterm or final exam without such documentation. If you miss an exam, you must provide a written, verifiable excuse, if possible in advance of the scheduled exam. Approval for a makeup exam must be obtained from your instructor.
Grades: The grade for the course will be determined by the following scheme:
- homework: 45%
- presentations: 10%
- midterm exam grade: 15%
- final exam: 30%

Plus or minus grades are not assigned. The grading scale is based on the number of points accumulated.

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<tr>
<th>points</th>
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<td>at least 90%</td>
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<td>at least 80% but less than 90%</td>
<td>B</td>
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<td>at least 70% but less than 80%</td>
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<td>at least 60% but less than 70%</td>
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<td>less than 60%</td>
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Academic Honesty: Students at Florida Atlantic University are expected to maintain the highest ethical standards. Academic dishonesty is considered a serious breach of these ethical standards, because it interferes with the university mission to provide a high quality education in which no student enjoys an unfair advantage over any other. Academic dishonesty is also destructive of the university community, which is grounded in a system of mutual trust and places high value on personal integrity and individual responsibility. Harsh penalties are associated with academic dishonesty. For more information, see University Regulation 4.001.

Students With Disabilities: In compliance with the Americans with Disabilities Act, students who require special accommodation due to a disability to properly execute coursework must register with the Office for Students with Disabilities (OSD) – in Boca Raton, SU 133 (561-297-3880) and follow all OSD procedures.

Disclaimer: This syllabus is subject to reasonable changes at the discretion of the instructor.

ACADEMIC CALENDAR

Calendar: The following table contains some important dates.

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<tbody>
<tr>
<td>August</td>
<td>18</td>
<td>First day of class</td>
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<td></td>
<td>21</td>
<td>last day to drop or add</td>
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<td>29</td>
<td>last day to drop without W</td>
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<tr>
<td>October</td>
<td>8</td>
<td>Midterm exam</td>
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<td>November</td>
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<td>24</td>
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<td></td>
<td>26 – 29</td>
<td>Thanksgiving break, no classes</td>
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<tr>
<td>December</td>
<td>3</td>
<td>Final exam, 7:45 – 10:15</td>
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