MGF1107 Spring 2020

Course Summary

MGF 1107, Mathematics for Liberal Arts 2 is a general education/math course which is not intended to prepare you for Precalculus or Calculus. Instead, this course emphasizes mathematical reasoning and the connections between mathematics and the liberal arts. This course qualifies for both GenEd and Gordon Rule credits.

Instructors

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The above is the instructor of record for this course. Email is the preferred method of communication followed by Canvas messages.

Name: Jason Johnson
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The above is the TA for this course, but he functions as a co-instructor. He will update his contact information once his course schedule is fixed. It is best to contact Dr. Ptacek first for administrative questions, but feel free to message whoever you want for course content issues.

Prerequisites: None (No, not even MGF1106. The courses are independent.)

Credits: 3

Textbook: There is no textbook from this class. All of the essential information will be provided in-class through notes. In addition, there is a minor research component to the course where students will be encouraged to go beyond the basics presented in the notes using freely available resources.

Goformative: Goformative (www.goformative.com) is a free service which we will use for both homework assignments and in-class groupwork. Every student will make an account on the first day of class.

Course Content: This course will revolve around three major questions

1. **What is math?** There is a great difference between what is done in high school and lower division undergraduate math courses and what is done by professional mathematicians. In this class, we will try as much as possible to function like mathematicians.
2. **How are things true in math?** Every discipline has different standards for establishing truth. Mathematical truth is is established through rigorous logical arguments called proofs. We will devote some time to writing informal proofs with every topic covered.
3. **How can mathematical truth be applied outside of math?** If mathematical truth is so different, how can it possibly be applicable to other fields? We will model problems from other disciplines with mathematics and understand the limitations of our models.

These questions are the thrust of the course, and covering particular material is of secondary importance. That said, we will cover topics from game theory, graph theory, counting principles, probability and statistics, topology and elementary number theory. Course material is flexible and will be guided to some extend by student interest.

Course Format

There will be very little traditional lecture in this course. Most classes will have the class form small groups to work on challenging problems. Following some initial time to work on the problem, groups will present their (partial) solutions to the class. Followup activities will be given for homework and weekly quizzes will be given to reinforce the topics from the group activities. Finally, there will be a major project at the end of the term.

All course communication will be through Canvas or your ufl email. Course announcements will be posted on Canvas, so it is highly recommended to have notifications from canvas sent to your email (Click on "Account" in the side bar of Canvas, then go to "Notifications" and set announcements to email). This should be the default setting.

Assignments

Assignments are graded either based on mastery or numerically. In short, mastery grades will either give all points or none but have a chance for resubmission while numerical grades are graded once for points. Details can be found below in the "Grading Procedures" section.

In-Class Groupwork: Most days will begin by dividing into groups of 3-5 and working on a problem or a continuation of a previous day's problem. Group work will be assessed as a participation grade, but the material covered in groupwork will feature prominently on homework so it will need to be completed accurately. There may be a bellringer given as an attendance check prior to the group work. In this case, the day's grade will be split 50-50 between the bellringer and the group participation. Three days can be missed without penalty.

Homework: Homework assignments build on the material in the classwork and come in three levels based on difficulty. The levels must be completed in order. Level 1 and level 2 assignments are graded numerically while the level 3 assignment is graded for mastery. If a submission does not meet a certain threshold, **zero points will be given**. This threshold is up to the instructor's discretion. Typically, homework assignments are individual, but there may be some exceptions, especially on level 1 assignments.

Quizzes: We will have a quiz every week which will be graded numerically. These are open notes (that you personally have taken). Quizzes are individual assignments which cover topics from that week's group work.

Documentaries: Throughout the semester you will be provided with documentaries that deal with the history and application of mathematics. Questions about the documentaries will appear on the quizzes.

Final Project: There will a final project due on the last day of class. In short, the project is to write a short paper about a famous result from mathematics and to provide an appropriate graphical aid. Full specifications can be found on Canvas. Projects will be given a numerical grade rather than a mastery grade. With few exceptions, these will have the same conditions as homework. All final work must be original work. The bibliography must include at least one non-encyclopedia source. Plagiarism gets an immediate zero for the assignment.

The course is divided into three units (see tentative schedule at the bottom). Each unit will have 3 homework assignments each with three levels.

Grading Procedures

Every assignment in this course is either given a numerical grade or a mastery-based grade. Numerical grades are the kind of grades you are familiar with. An assignment that is graded based on mastery will either be awarded 0 points or full points. However, assignments given a mastery grade may be resubmitted up until the final deadline. The mastery assignments should be treated as a conversation

where we go back and forth with the material until it is clear that the material has been mastered.

Some assignments are group assignments, but all submitted answers should be individual work. Any answer copying or plagiarism will result in an immediate zero for that assignment. Your final papers will be tested for plagiarism.

Attendance/Groupwork	110 points
Quizzes	100 points (10 x 10 points, 12 total w/ 2 dropped)
Level 1 HW	80 points (8 x 10 points, 9 total w/ 1 dropped)
Level 2 HW	160 points (8 x 20 points, 9 total w/ 1 dropped)
Level 3 HW (mastery)	150 points (5 x 30 points, 9 total w/ 4 dropped)
Final Project	200 points
Total	**800 points**

Final grades are assigned on a 100 point scale

700 to 800 points gives an A

600 to 699 points gives a B

500 to 599 points gives a C

400 to 499 points gives a D

Plus and minus grades are given at the instructor's discretion, typically on the strength of the final project and incomplete level 3 homework assignments. Otherwise, this grading scale will be strictly adhered to. The University's grade point policy can be found here: https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx.

Grade Disputes

Students are strongly encouraged to ask questions about potential mistakes in graded assignments. However, they are encouraged to do so as assignments are graded, not at the end of the term. End of term point scrounging will be penalized with a minus grade. For example a student with 699 points (in the B range) who asks for grade leniency at the end of the term will receive a B- instead of what would certainly have been a B+. If you think an assignment has a mistake in it, bring it to my attention. If you think your answer should have been accepted, bring it to my attention, but please do not haggle for every individual point and, moreover, don't do it on the last day of the semester.

Makeup Policy

Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies that can be found at: https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx.

Any makeup request **must be made prior to the deadline of the assignment** unless an emergency prevents communication. Makeups are only approved in the case of official UF business, religious observances, or personal emergency. Makeups may be denied if the reason for absence was known about well before it being communicated.

Special Accommodations

Students with disabilities requesting accommodations on homework, quizzes, and exams must first register with the Dean of Students Office (352-392-8565, http://www.dso.ufl.edu/drc/). The Dean will provide the student with documentation, which must be turned in as soon as possible.

Academic Honesty

The University of Florida expects students to be honest in all of their university class work. Please remember to commit yourself to academic honesty with the pledge:

"*We, the members of the University of Florida Community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity.*"

The Math Department expects you to follow the academic honesty guidelines. Matters of violations of academic honesty are adjudicated by the Student Honor Code.

In this course, it is especially important that students do their own work. Since the bulk of the class is about mathematical reasoning, the use of a tutor is **strongly discouraged**. In general, if a student cannot adequately explain their reasoning to the point that the instructor does not believe that it is the student's work, it will be treated as though the student copied the answers.

Evaluations

Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at https://gatorevals.aa.ufl.edu/students/. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via https://ufl.bluera.com/ufl/. Summaries of course evaluation results are available to students at https://gatorevals.aa.ufl.edu/public-results/.

Tentative Weekly Schedule

Unit 1: Graphs and Games (proof, graph theory, symmetry, counting principles)

Week 1: Graph Theory (graphs and trees)

Week 2: Game Trees (solving games, N and P positions)

Week 3: More Solving Games (Chomp, Nim)

Week 4: Strategic Games and Nash Equilibrium

Week 5: Mixed Strategies and End Activity (Overfishing)

Unit 2: Randomness (Game Theory, Probability, Statistics)

Week 6: Randomness, sample space, events

Week 7: Distributions and probability

Week 8: Counting methods and expected value

Week 9: Conditional probability, Statistics

Week 10: Statistics

Unit 3: Geometry, Topology, and Miscellanea

Week 11: Mobius strip dissection and nonorientability

Week 12: Planarity, Genus, Euler Characteristic

Week 13: The fold and cut problem

Week 14: Cartography, stereographic projection, cylindrical projection

Week 15: Finish up projects!

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