First Year Seminar: Classical Mathematics in the Modern Day  
Math FS1300 – Fall 2011

Time: Tuesday, Thursday 2:00 – 3:20 PM  
Instructor: Prof. Barbara Shipman  
Phone: (817) 272-2606  
E-mail: bshipman@uta.edu  
Classroom: Pickard Hall 102  
Office: Pickard Hall 437  
Office Hours: Mon 9—11 AM, Tue 4—5 PM, Wed 1—3 PM.

Website: www.uta.edu/faculty/shipman  
Go to the Student Center, Math FS1300, to view the assignment schedule.

Peer Academic Leader (PAL): Glenroy Boatswain  
E-mail: glenroy.boatswain@mavs.uta.edu  
PAL’s Office: College Hall 301B (formerly called Ransom Hall)  
PAL’s Office Hours: Thursday 11-12

Prerequisite: First-year freshman status

Textbooks (required):  
1. The Heart of Mathematics, 4th ed. by E. Burger and M. Starbird  

Mathematical Content: The seminar will focus on three mathematical topics:  
1. classical theory of knots and Möbius bands and their applications in modern medicine, including research on the structure of DNA topology that has led to new treatments for certain types of cancer,  
2. classical geometry of Golden Rectangles and Fibonacci sequences, and their appearance in patterns of plant formation and other natural phenomena, and  
3. classical theory of modular arithmetic (“clock arithmetic”) and modern applications including its use in bar codes and identification numbers. The seminar will open with mathematical games and logic and conclude with extensions of the ideas studied in the course.

College Success Skills: The course will integrate discussions and practice of good of college transition skills, including time management, productive study habits, healthy living habits, effective communication, teamwork, and involvement within the UT Arlington community. Students will learn about and visit University organizations and services such as the Actuarial Science Club, the Mathematical Association of America, SOAR, and the UT Arlington Math Clinic.

PAL: Mr. Glenroy Boatswain is your Peer Academic Leader (PAL) for this course. He is specially trained and employed by the University to serve as a student mentor to you. Glenroy will help you gain the most from the seminar as well as good momentum toward a successful college career. Your PAL will be available for help and advice during the office hours listed above.
Learning Outcomes: The learning goals of Math FS1300 are

- to demonstrate a robust and practical command of college success skills with momentum to carry them forward into the college career, including strategies for acclimating to a university academic environment, effective academic, financial, and time-management skills, interaction with faculty and student organizations, and critical thinking skills,
- to recognize and appreciate from a mathematically-informed and critical perspective the utility of classical mathematics in modern applications, in the context of the three major topic areas of the course, and
- to construct and deliver well-organized and carefully-explained written and oral presentations of the mathematics and its applications in the topic areas of the course, using creative teamwork and presentation techniques.

Attendance and Participation: At the end of almost every class, you will be given a Class Preparation (CP) to write up neatly and bring to the next class for discussion. These will sometimes be collected and sometimes checked for completion in class. Students will be called on during class to explain their responses to a CP. An attendance/participation score will be taken at each class meeting as follows.

- 2: for attendance with good participation and a well-prepared CP
- 1: for arriving late or leaving at any time during the class, or for being inadequately prepared
- 0: for missing the class

Students are responsible for all announcements made in class.

Team Projects: Three written team projects will be given, involving creative collaboration and some library work, to be completed in teams of three (or four, if needed). You should enjoy these interesting mathematical excursions and do your very best work!

Guidelines for Team Projects:

- Begin working on the project very soon after it is assigned.
- Each team submits one paper, prepared by the team.
- Each team member must work on all parts of the project with the team.
- Each team must work together on the project for at least five hours outside of class.
- Each student will be held accountable for contributing fully to the teamwork.
- The work must be written in complete sentences, using clear and correct English.

Learning Skills Assignments:

Your PAL will assign four interesting learning skills projects for you to complete individually and hand in for a score. Please type your work and enjoy making it creative and interesting for your PAL to read.

Quizzes: Six half-hour quizzes will be given in class on the dates listed below. One lowest quiz score will be dropped.

Final Exam: The Final Exam will consist in a comprehensive portion on the mathematical content taken during class and a take-home portion on the study skills content due at the time of the final exam.
**Grading:** Your work will be graded based on four criteria (the four c’s): clarity, creativity, correctness, and completeness.

<table>
<thead>
<tr>
<th>Category</th>
<th>Weight</th>
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<tbody>
<tr>
<td>Attendance and Class Participation</td>
<td>20%</td>
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<tr>
<td>Three Team Projects</td>
<td>20%</td>
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<tr>
<td>Four Learning Skills Assignments</td>
<td>20%</td>
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<tr>
<td>Five Best Quizzes</td>
<td>20%</td>
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<tr>
<td>Comprehensive Final Exam</td>
<td>20%</td>
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A course average of at least 90% guarantees an A, at least 80% a B, at least 70% a C, and at least 60% a D.

**Policies of the University of Texas at Arlington:**

**Drop Policy:** Students may drop or swap (adding and dropping a class concurrently) classes through self-service in MyMav from the beginning of the registration period through the late registration period. After the late registration period, students must see their academic advisor to drop a class or withdraw. Undeclared students must see an advisor in the University Advising Center. Drops can continue through a point two-thirds of the way through the term or session. It is the student’s responsibility to officially withdraw if they do not plan to attend after registering. **Students will not be automatically dropped for non-attendance.** Repayment of certain types of financial aid administered through the University may be required as the result of dropping classes or withdrawing. Contact the Financial Aid Office for more information.

**Americans with Disabilities Act:** The University of Texas at Arlington is on record as being committed to both the spirit and letter of all federal equal opportunity legislation, including the **Americans with Disabilities Act (ADA).** All instructors at UT Arlington are required by law to provide "reasonable accommodations" to students with disabilities, so as not to discriminate on the basis of that disability. Any student requiring an accommodation for this course must provide the instructor with official documentation in the form of a letter certified by the staff in the Office for Students with Disabilities, University Hall 102. Only those students who have officially documented a need for an accommodation will have their request honored. Information regarding diagnostic criteria and policies for obtaining disability-based academic accommodations can be found at [www.uta.edu/disability](http://www.uta.edu/disability) or by calling the Office for Students with Disabilities at (817) 272-3364.

**Academic Integrity:** It is the philosophy of The University of Texas at Arlington that academic dishonesty is a completely unacceptable mode of conduct and will not be tolerated in any form. All persons involved in academic dishonesty will be disciplined in accordance with University regulations and procedures. Discipline may include suspension or expulsion from the University. According to the UT System Regents' Rule 50101, §2.2, "Scholastic dishonesty includes but is not limited to cheating, plagiarism, collusion, the submission for credit of any work or materials that are attributable in whole or in part to another person, taking an examination for another person, any act designed to give unfair advantage to a student or the attempt to commit such acts."

**Student Support Services Available:** The University of Texas at Arlington provides a variety of resources and programs designed to help students develop academic skills, deal with personal situations, and better understand concepts and information related to their courses. These resources include tutoring, major-based learning centers, developmental education, advising and mentoring, personal counseling, and federally funded programs. For individualized referrals to resources for any reason, students may contact the Maverick Resource Hotline at 817-272-6107 or visit [www.uta.edu/resources](http://www.uta.edu/resources) for more information.
Electronic Communication Policy: The University of Texas at Arlington has adopted the University “MavMail” address as the sole official means of communication with students. MavMail is used to remind students of important deadlines, advertise events and activities, and permit the University to conduct official transactions exclusively by electronic means. For example, important information concerning registration, financial aid, payment of bills, and graduation are now sent to students through the MavMail system. All students are assigned a MavMail account. Students are responsible for checking their MavMail regularly. Information about activating and using MavMail is available at http://www.uta.edu/oit/email/. There is no additional charge to students for using this account, and it remains active even after they graduate from UT Arlington.

To obtain your NetID or for logon assistance, visit https://webapps.uta.edu/oit/selfservice/. If you are unable to resolve your issue from the Self-Service website, contact the Helpdesk at helpdesk@uta.edu.

Weekly Plan:

**Thu Aug 25**  Course Syllabus and Introductions  
Mathematical Dodge Ball

**Tue Aug 30**  Continuation of Dodge Ball and Patterns in Counting  
Discussion on college success skills, led by PAL

**Thu Sep 1**  Student voices on college success skills, led by PAL  
Continuation of Patterns in Counting

**Tue Sep 6**  Using Dodge Ball to prove a major theorem on infinite quantities  
Discussion on college success skills, led by PAL

**Thu Sep 8**  Quiz 1  
Student voices on college success skills, led by PAL  
Class activity on Möbius bands

**Tue Sep 13**  Continuation on Möbius bands  
Discussion on college success skills, led by PAL

**Thu Sep 15**  Time Management assignment due  
Student voices on college success skills, led by PAL  
Möbius bands, knots, links, and applications to biology and medicine

**Tue Sep 20**  Continued work on Möbius bands, knots and links  
Discussion on college success skills, led by PAL

**Thu Sep 22**  Quiz 2  
Student voices on college success skills, led by PAL  
Möbius bands, knots, links, and applications
Tue Sep 27  Möbius bands, knots, links, and applications  
Discussion on college success skills, led by PAL

Thu Sep 29  Meeting with Professor assignment due  
Student voices on college success skills, led by PAL  
Möbius bands, knots, links, and applications

Tue Oct 4  Team Project 1 due  
Student presentations/highlights on Team Project 1  
Fibonacci numbers and the golden ratio  
Meet teams for Team Project 2

Thu Oct 6  Student voices on college success skills, led by PAL  
Fibonacci numbers and the golden ratio in mathematics and in nature  
Hand out Team Project 2

Tue Oct 11  Quiz 3  
Fibonacci numbers and the golden ratio in mathematics and in nature  
Discussion on college success skills, led by PAL

Thu Oct 13  Student voices on college success skills, led by PAL  
Fibonacci numbers and the golden ratio in nature

Tue Oct 18  Class presentations/discussions on Fibonacci numbers in nature  
Discussion on college success skills, led by PAL

Thu Oct 20  Student Organization Visit assignment due  
Student voices on college success skills, led by PAL  
Extensions on Fibonacci numbers and the golden ratio

Tue Oct 25  Extensions on Fibonacci numbers and the golden ratio  
Discussion on college success skills, led by PAL

Thu Oct 27  Team Project 2 due  
Student voices on college success skills, led by PAL  
Class activity on clock arithmetic

Tue Nov 1  Quiz 4  
Clock arithmetic, modular arithmetic, and bar codes  
Discussion on college success skills, led by PAL

Thu Nov 3  Student voices on college success skills, led by PAL  
Modular arithmetic and bar codes and ID numbers

Fri. Nov 4  Last day to drop (automatic W)
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<tr>
<th>Date</th>
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<tr>
<td>Tue Nov 8</td>
<td>Modular arithmetic in bar codes and identification numbers</td>
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<td>Discussion on college success skills, led by PAL</td>
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<td>Thu Nov 10</td>
<td><strong>Reflections on Academic and Career Goals</strong> assignment due</td>
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<td>Student voices on college success skills, led by PAL</td>
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<td></td>
<td>Modular arithmetic in identification numbers</td>
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<td>Tue Nov 15</td>
<td><strong>Quiz 5</strong></td>
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<td>More activities on modular arithmetic</td>
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<td>Discussion on college success skills, led by PAL</td>
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<td>Thu Nov 17</td>
<td>Student voices on college success skills, led by PAL</td>
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<td>Extensions on modular arithmetic and its applications</td>
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<tr>
<td>Tue Nov 22</td>
<td><strong>Team Project 3</strong> due</td>
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<td>Thu Nov 24</td>
<td><strong>Happy Thanksgiving (no class)</strong></td>
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<td>Tue Nov 29</td>
<td>Extensions on selected mathematical topics and applications</td>
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<td>Discussion on college success skills, led by PAL</td>
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<td>Thu Dec 1</td>
<td><strong>Quiz 6</strong></td>
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<td>Student voices on college success skills, led by PAL</td>
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<td></td>
<td>Extensions on selected mathematical topics and applications</td>
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<tr>
<td>Tue Dec 6</td>
<td>Extensions on selected mathematical topics and applications</td>
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<td>Discussion on college success skills, led by PAL</td>
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<td>Thu Dec 8</td>
<td>Class reflections on the semester at UT Arlington, led by the PAL</td>
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<td><strong>Review</strong> for Final Exam</td>
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<td>Tue Dec 13</td>
<td><strong>Final Exam 2--4:30 PM</strong></td>
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<td>Take-home portion of Final Exam due at the beginning of the hour</td>
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<td>Take in-class portion of Final Exam</td>
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