

## Contemporary Mathematics: MATH 1018 - 40994

# 1 Contact Information

**Professor:** Dr. Blake Farman  
**Phone Number:** (318) 342 - 1851  
**Email Address:** farman@ulm.edu  
**Website:** <https://ulm.edu/~farman>  
**Office:** Walker 3-34  
**Office Hours:** Monday/Wednesday: 9:00 AM - 12:00 PM  
Tuesday/Thursday: 2:00 PM - 4:00 PM

## 1.1 Preferred Method of Communication

The best way to communicate with me during the semester is through email. I monitor my email Monday - Friday from 9:00 AM until 5:00 PM. I normally try to respond within one business day.

### 1.1.1 Official University Email Addresses

The University provides each student with an email address, username@warhawks.ulm.edu, and all official course correspondence will **only** be conducted using official university email addresses.

### 1.1.2 Email Etiquette

When you send an email, your message should contain the following information

- Subject:** A few words that describe the content of your email along with the course identifier (MATH 1018-40994).
- Salutation:** A professional greeting such as “Dear” or “Hello” followed by the appropriate honorific and the recipient’s last name.
- Body:** A concise message that clearly expresses the purpose of your email.
- Signature:** A simple closing (e.g. “Sincerely,” “Thank you,” “Best regards,” etc.) followed by your first and last name.

For your convenience, included below is an example email.

Subject: Meeting - Math 1018 - 40994

Dear Professor Farman,

I am having trouble with this week’s homework. I have tried working through the examples in the text, but I am struggling to understand the concepts involved. Could we schedule a time to meet before the next class to discuss some of the concepts in more detail?

Thank you,

Jane Doe

For more details, you can read this Medium post about [How to Email Your Professor](#).

# 2 Course Description

Selected topics from contemporary mathematics including logic, graph theory, set theory, number theory, probability, statistics, voting theory, and consumer mathematics.

### 3 Course Prerequisites

You must satisfy **one** of the following prerequisites to be eligible to be enrolled in Math 1018:

- Grade of C or better in Math 1009 (or equivalent),
- Grade of C or better in Math 1011 (or equivalent),
- Grade of C or better in Math 1013 (or equivalent), or
- Grade of C or better in Math 1014 (or equivalent),

### 4 Course Objectives

The goal of this course is to develop both critical thinking and problem-solving skills needed to solve and interpret problems in areas of discrete mathematics. The course will help the student appreciate some of the recent advances in mathematics and their impact on many areas of life. Course topics include graph theory, logic, set theory, voting theory, apportionment, and number theory.

#### 4.1 Set Theory

The student will organize and visually represent a collection of objects whose contents can be clearly defined.

- a. Use three methods to represent sets and use appropriate symbols to compare sets or their elements.
- b. Define and recognize the empty set, the universal set, and the cardinality of a set.
- c. Identify sets as equal, equivalent, or neither, and as finite or infinite.
- d. Calculate the number of subsets and proper subsets for any set.
- e. Use Venn diagrams to visualize relationships and perform operations between two sets or three sets.
- f. Find the complement, difference, intersection, or union of two or three sets.
- g. Distinguish between the logical meaning of the words ‘or’ and ‘and.’
- h. Use Venn diagrams to visualize and interpret a survey’s results.

#### 4.2 Logic

The student will apply logic in order to communicate effectively, make more convincing arguments, and develop patterns of reasoning for decision making.

- a. Identify quantifiers and negate statements with quantifiers.
- b. Use symbols to identify compound statements with connectives.
- c. Construct truth tables for compound statements involving connectives.
- d. Categorize statements as self-contradictions, implications, tautologies, inverses, contrapositives, or converses.
- e. Classify statements as equivalent or not equivalent using truth tables or DeMorgan’s Laws.
- f. Write variations of equivalent statements.
- g. Determine the validity of a symbolic argument using truth tables or standard arguments.
- h. Provide a logical conclusion from a given set of premises.
- i. Utilize Euler diagrams to determine the validity of a syllogistic argument.

### 4.3 Graph Theory

The student will use graph theory principles to construct models and solve applications involving the maximization or minimization of resources.

- a. Describe basic graph terminology and identify a graph's components.
- b. Use Euler's theorems to determine if a graph has Euler paths or Euler circuits and demonstrate them if possible.
- c. Draw a graph to model "real-life" applications and apply Euler's theorems when necessary to such applications.
- d. Find Hamilton paths and circuits on a graph.
- e. Compute the number of edges, the number of vertices, and the number of Hamilton circuits for a complete graph using formulas developed.
- f. Solve "Traveling Salesman Problems" using the Brute-Force and Nearest Neighbor algorithms.
- g. Describe basic terminology associated with trees and identify which graphs are trees using key properties.
- h. Count spanning trees for a given graph.
- i. Use Kruskal's algorithm to find minimum-cost spanning trees for given graphs.

### 4.4 Voting & Apportionment Theories

The student will analyze a variety of techniques in a social science setting including voting theory and apportionment problems.

- a. Organize and examine data in preference schedules.
- b. Determine the winner of an election using the following methods: plurality, Borda count, plurality with elimination, and pairwise comparisons.
- c. Recognize the majority, head-to-head, monotonicity, and irrelevant alternatives criteria and demonstrate when these criteria have been violated in an election.
- d. Identify the states, seats, and populations for apportionment problems.
- e. Calculate the standard divisor and the standard, lower, and upper quotas for each state.
- f. Apportion seats of a legislature using Hamilton's and Webster's methods of apportionment.
- g. Recall the quota rules, Alabama paradox, population paradox, and new states paradox and demonstrate when these have occurred in an apportionment problem.

### 4.5 Number Theory

The student will apply principles of number theory to solve applications involving number sense.

- a. Apply divisibility rules.
- b. Identify numbers as prime or composite.
- c. Write a composite number as a unique product of prime numbers.
- d. Calculate the least common multiple and greatest common divisor.
- e. Identify Fibonacci-type sequences.
- f. Determine congruence in a modulo  $m$  system.

- g. Perform operations in a modulo  $m$  system.
- h. Verify and calculate the check digit for various identification numbers.
- i. Use modular arithmetic to understand clock systems including hours, days, and months.

## 5 Instructional Methods

This course is offered as a face-to-face course.

- Learning will be facilitated through face-to-face lectures and the textbook.
- Homework assignments and Exams will be completed using MyMathLab.
- ULM offers one-on-one tutoring in the MATH Center, and Math 1011 has a supplemental instructor who offers additional study sessions outside of class.
- It is the student's responsibility to learn how to use MyMathLab. To register for MyMathLab, follow the instructions posted in Moodle. For technical questions concerning MyMathLab, go to

<https://support.pearson.com/getsupport>

and click Support or call 1-844-292-7015.

### 5.1 Temporary Remote Instruction (TRI)

During the semester, class and/or campus operations might be disrupted by an occurrence such as a tornado, fire, or illness outbreak that temporarily prevents in-person instruction. Until in-person instruction is possible, the class will enter a phase of temporary remote instruction (TRI). During this phase, instruction will take place via virtual means, either synchronously or asynchronously. Your instructor will alert you when this happens via e-mail and will include a description of how the course will proceed.

### 5.2 Technical Requirements During TRI

During a period of temporary remote instruction, the need for the course to continue in a virtual manner means that you will be required to have appropriate equipment, software, and telecommunication access to allow you to participate. This course will require that you have the following, should we have to go into TRI:

- A stable internet connection that is capable of joining Zoom meetings and taking assessments.
- A web camera (internal or external) and a microphone that can be used for Zoom meetings.
- A device such as a scanner or a smartphone equipped with a scanning app such as Adobe Scan to upload assessments on Moodle.

## 6 Evaluation

### 6.1 Grade Assignment

#### 6.1.1 Scale

For the course total, the final grade will be determined as follows:

- A: At least 90%
- B: At least 80% and less than 90%
- C: At least 70% and less than 80%
- D: At least 60% and less than 70%
- F: Less than 60%

### 6.1.2 Weights

Grades will be calculated with the following weights:

Tests:	40%
Homework:	30%
Review Quizzes:	30%

## 6.2 Tests

- There will be five 100-point 55-minute tests administered through MyMathLab. Tests will be taken during class time in the MRC as shown on the course schedule found at the end of this document. Tests will be computer graded and results will be displayed to the student immediately after test submission. Failure to take a test during class time may result in a grade of zero (0%) for that test. If a test is missed due to an excused absence, follow the procedure outlined below in the Make-up Policy section of the syllabus (section VIII.C).
- Required materials for testing include: a calculator, pencils, and a ULM or valid picture ID to show the instructor. Students who fail to bring a picture ID on the day of a test will not be allowed to take the test.
- Cell phones and other electronic devices must be OFF and out of sight during tests.
- Students in need of additional testing adjustments must contact the Counseling Center (<http://www.ulm.edu/counselingcenter/>).
- Tentative test dates are: August 30, September 22, October 13, November 8, and December 2.

## 6.3 Homework

- Completing the assigned homework is absolutely essential in order for students to complete the course successfully and to keep students current with the material and its applications. Homework will be administered online through MyMathLab and can be completed anywhere with an internet connection.
- Homework assignments will be available at the beginning of each testing unit. **All homework must be completed by 12:00 PM on the day of the unit test**; however, it is strongly recommended that students complete the homework by the due date shown in MyMathLab. Technology issues arise but will not be accommodated.
- Homework assignments can be attempted an infinite number of times prior to the due date. Feel free to use the “Help Me Solve This”, “Textbook Pages”, “Videos”, and “View an Example” features in MyMathLab while doing homework, but continue to rework a similar exercise until you can do the exercise without any assistance. Only then will you be ready to take a test on that material.
- **Homework CANNOT be submitted after the unit test or made up.**

## 6.4 Review Quizzes

- Review quizzes will be administered online through MyMathLab and can be completed anywhere with an internet connection. **Working the assigned review quizzes repeatedly without the use of notes is one of the best ways to prepare for tests.**
- There will be two review quizzes for each test that will be available at the beginning of each testing unit. There is no limit to the number of attempts at the review quizzes prior to the deadline.
- The review quizzes are timed and must be completed by the due date shown MyMathLab; however, it is strongly recommended that students begin working the quizzes as soon as possible.
- **Review quizzes CANNOT be completed after the deadline or made up. Technology issues arise but will not be accommodated.**

## 7 Class Policies and Procedures

At a minimum, all policies stated in the current ULM student policy manual & organizational handbook should be followed (see <http://www.ulm.edu/studentpolicy/>). Additional class policies include:

### 7.1 Textbook

The required text for this course is

*A Survey of Mathematics with Applications*, 10<sup>th</sup> Edition, ISBN: 9780134112107.

You may purchase the MyMathLab Access Kit, which provides an access code, from the ULM Bookstore.

**You must register for a MyMathLab account by the beginning of the second week of classes.** Students who are waiting for financial aid may gain temporary access to MyMathLab for 14 days. Failure to register for MyMathLab will result in a grade of F for the course.

### 7.2 Calculator

A scientific calculator is required, preferably one with a two-line display such as TI-30X IIS or TI-30X IIB. A cell phone cannot be used as a calculator.

### 7.3 Other Materials Needed

ULM student ID, paper, writing utensils, PowerPoint/lecture notes, MyMathLab user name and password.

### 7.4 Health and Safety Requirements

In order to safeguard the health and safety of students, faculty, and staff during the COVID-19 pandemic, the University has instituted a variety of different protocols in response to State of Louisiana and University of Louisiana System mandates during the different phases of reopening. All students are expected to be in compliance with these required policies and procedures. This means that students will need to wear face masks, practice social distancing, and follow other requirements inside all campus buildings and while attending classes until such time as State and University authorities no longer mandate them. Students who fail to follow these guidelines could be subject to the Classroom Behavior Policy which can be found in the Student Handbook. As we continue to pursue learning during this unprecedented health crisis, please remember that you are being required to do these things to protect others and to show concern for their welfare; you should expect the same consideration in return.

Face masks have been shown to greatly reduce the risk of the transmission of the virus when they are appropriately constructed and worn. All face coverings, whether disposable or reusable, must

- be made with at least two layers of breathable material;
- fully cover the nose and mouth and secure under the chin;
- fit snugly but comfortably against the side of the face; and
- be secured on the face, allowing one to remain hands-free.

For more information about University policies and procedures regarding the COVID-19 pandemic, please visit <https://www.ulm.edu/coronavirus/>.

## 7.5 Attendance Policy

Students are expected to adhere to the Class Attendance Policy outlined in the ULM Student Policy Manual.

- Class attendance is regarded as an obligation and a privilege, and all students are expected to attend all required classes in which they are enrolled regularly and punctually. Failure to do so may jeopardize a student's scholastic standing and may lead to suspension from the University. **Students are responsible for the effect absences have on all forms of evaluating course performance.**
- In accordance with University policy, the instructor will take roll regularly. It is the student's responsibility to ensure that his/her attendance is recorded. To be marked present for a given class period, students must stay until the class is completed.
- Each student is responsible for all class material and assignments whether or not the student is present. If a student misses class, then he/she is expected to check Moodle and ULM email for announcements and work on the assignments listed in MyMathLab.
- A student accumulating absences of 25% of the class meetings regardless of the reasons (excused or unexcused) will be reported to the Dean of Arts, Education, & Sciences which could result in academic withdrawal from the course or a course grade of F. This may be avoided if the course is dropped; however, it is the responsibility of the student to drop the course. Class removal carries with it the penalties of being assigned a grade of W or F, whichever is appropriate, and no credit for the course. Academic withdrawal may negatively impact a student's full-time status.
- If a student comes to class late, it is his/her responsibility to let the instructor know after class to be counted present and to receive the appropriate attendance credit.
- University Excuses: Any University-related activity requiring an absence from class will count as an absence when determining if a student has met the minimum attendance requirement.
- Only students registered in MATH 1018 may attend the lectures.
- Only students registered in mathematics courses may enter the Math Resource Center (MRC).

## 7.6 Make-up Policy

- As per the student and faculty handbook, any tests missed due to: University-excused absence, accident, serious illness, or death of an immediate family member may be rescheduled if the student provides appropriate documentation to his/her instructor. It is the student's responsibility to contact the instructor via email within one business day of returning to campus explaining the absence and to provide documentation prior to rescheduling a missed test. A missed test due to an undocumented or unexcused absence may not be rescheduled, and the student will receive a zero (0%) on the test. Tests should be rescheduled immediately.
- If a university event causes the student to miss a test, the student should take the make-up test before the scheduled test. In such cases, the student must make arrangements with his/her instructor at least one week before the scheduled test.
- Failure to take a scheduled make-up test will result in a zero (0%) for that test.
- Since homework assignments are available well before deadlines, students CANNOT make-up missed homework assignments.
- Students CANNOT make-up review quizzes, which are available online well in advance of the due date.

## 7.7 Academic Integrity

Faculty and students must observe the ULM published policy on Academic Dishonesty (see the ULM Student Policy Manual – <http://www.ulm.edu/studentpolicy/>).

Any student caught turning in work that is not his/her own will be reported to the School of Sciences. If the student is found to be responsible for such a violation, then a formal report will be made to the Office of Student Services and the student will receive **a grade of F for the course**.

## 7.8 Course Evaluation Policy

At a minimum, students are expected to complete the online course evaluation.

# 8 Academic Services

## 8.1 MATH Center

The MATH Center is a mathematics only tutoring facility located in Walker Hall Room 3-46. MATH Center tutors are available during the hours listed below for in-person or online tutoring.

- Monday - Thursday 1:00 PM - 6:00 PM
- Friday 10:00 AM - 1:00 PM

### 8.1.1 MATH Center Procedures:

- You must scan in and out of the MATH Center using a ULM student ID or valid photo ID.
- You should bring all materials to the MATH Center: notebook, calculator, writing utensils, etc. No materials will be provided for students in the MATH Center.
- Cell phone usage is not allowed in the MATH Center. Cell phones must be turned off and stored out of sight. Any visibility or use of a cell phone by a student within the MATH Center is grounds for immediate removal from the MATH Center.

## 8.2 Mathematics Resource Center (MRC)

The Mathematics Resource Center (MRC), operated by the ULM mathematics faculty, is located on the third floor of Walker Hall. The MRC is a mathematics learning center used for hands-on classroom experience and testing. The MRC is available for use by ULM faculty/students any time classes are in session. Testing is available only by appointment or faculty assignment.

## 8.3 Supplemental Instruction

From the ULM Supplemental Instruction website

(<https://www.ulm.edu/studentssuccess/supplementalinstruction.html>)

Supplemental Instruction (SI) sessions are weekly review sessions for students enrolled in historically difficult courses. SI targets tough courses!

SI provides a chance to get together with people in your class to compare notes, to discuss important concepts, to develop strategies for studying the subject, and to test yourselves before your professor does, so that when he/she does, you'll be ready.

SI is provided for all students who want to improve their understanding of course material and improve their grades. These sessions are facilitated by a trained SI leader.



## 9 Student Services

You can find information about the following available ULM student services at the websites listed below.

- Student Success Center (<http://www.ulm.edu/cass/>).
- Counseling Center (<http://www.ulm.edu/counselingcenter/>).
- Special Needs (<http://www.ulm.edu/counselingcenter/special.htm>).
- Library (<http://www.ulm.edu/library/referencedesk.html>)
- Computing Center Help Desk (<http://www.ulm.edu/computingcenter/helpdesk>)

Additional information can be found on The Student Services web site (<http://www.ulm.edu/studentaffairs/>).

### 9.1 Disability Accommodations

The University of Louisiana at Monroe strives to serve students with special needs through compliance with Sections 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act. These laws mandate that postsecondary institutions provide equal access to programs and services for students with disabilities without creating changes to the essential elements of the curriculum. While students with special needs are expected to meet our institution's academic standards, they are given the opportunity to fulfill learner outcomes in alternative ways. Examples of accommodations may include, but are not limited to, testing accommodations (oral testing, extended time for exams), interpreters, relocation of inaccessible classrooms, permission to audiotape lectures, note-taking assistance, and course substitutions.

Current policies on serving students with disabilities can be obtained from the ULM website: <http://ulm.edu/counselingcenter/>. If you need accommodation because of a known or suspected disability, you should contact the director for disabled student services at:

- Voice phone: (318) 342 - 5220
- Fax: (318) 342 - 5228
- Walk In: ULM Counseling Center, 1140 University Avenue (this building and room are handicapped accessible).

If you have special needs of which I need to be made aware, you should contact me within the first two days of class.

### 9.2 Mental Wellness

If you are having any emotional, behavioral, or social problems, and would like to talk with a caring, concerned professional please call one of the following numbers:

- The ULM Counseling Center (318) 342 - 5220
- The Marriage and Family Therapy Clinic (318) 342 - 9797
- The Community Counseling Center (318) 342 - 1263.

### 9.3 Title IX

*Title IX of the Education Amendments of 1972 prohibits sex discrimination against any participant in an educational program or activity that receives federal funds, including federal loans and grants. Furthermore, Title IX prohibits sex discrimination to include sexual misconduct, sexual violence, sexual harassment and retaliation. If you encounter unlawful sexual harassment or gender-based discrimination, please contact Student Services at (318) 342 - 5230 or to file a complaint, visit [www.ulm.edu/titleix](http://www.ulm.edu/titleix).*

Remember that all services are offered free to students, and all are strictly confidential.

## 9.4 Emergency Procedures

The emergency number for the ULM Police Department is (318) 342 - 5350 and should be used for emergency calls. If the campus police are contacted about an emergency for a student, they will go to the student's class to inform the student.

## 9.5 Discipline / Course Specific Policies

Any policies given here may be altered by the professor if deemed necessary. If this occurs, ample notice will be given.

## 9.6 FERPA

Do not email or call your professor regarding your course grades. The Family Education Rights and Privacy Act (FERPA) prohibits your professor from discussing your grade in any manner except in person. Please do not have family members, friends, or anyone else contact your professor about your grade as FERPA prohibits your professor from sharing that information with them.

# 10 Tentative Course Schedule

## 10.1 Contact Information

**Professor:** Dr. Blake Farman  
**Phone Number:** (318) 342 - 1851  
**Email Address:** farman@ulm.edu  
**Website:** <https://ulm.edu/~farman>  
**Office:** Walker 3-34  
**Office Hours:** Monday/Wednesday: 9:00 am - 12:00 PM  
 Tuesday/Thursday: 2:00 PM - 4:00 PM

### Week 1

Day	Date	Assignment Due (MyMathLab)
Mon	8/16	Set Concepts
Wed	8/18	Subsets

### Week 2

Day	Date	Lesson Due (MyMathLab)
Mon	8/23	Venn Diagrams & Set Operations
Wed	8/25	Venn Diagrams with 3 Sets

### Week 3

Day	Date	Lesson Due (MyMathLab)
Mon	8/30	Test 1: Set Theory Review Quizzes Due by 12:00 PM
Wed	9/1	Statements & Connectives

### Week 4

Day	Date	Lesson Due (MyMathLab)
Mon	9/6	<i>Labor Day</i>
Wed	9/8	Truth Tables

**Week 5**

Day	Date	Lesson Due (MyMathLab)
Mon	9/13	Equivalent Statements
Wed	9/15	Symbolic Arguments

**Week 6**

Day	Date	Lesson Due (MyMathLab)
Mon	9/20	Euler Diagrams
Wed	9/22	Test 2: Logic Review Quizzes Due by 12:00 PM

**Week 7**

Day	Date	Lesson Due (MyMathLab)
Mon	9/27	Graph Theory Definitions
Wed	9/29	Euler Circuits and Paths

**Week 8**

Day	Date	Lesson Due (MyMathLab)
Mon	10/4	Hamilton Circuits and Paths
Wed	10/6	Brute Force and Nearest Neighbor

**Week 9**

Day	Date	Lesson Due (MyMathLab)
Mon	10/11	Trees
Wed	10/13	Test 3: Graph Theory Review Quizzes Due by 12:00 PM

**Week 10**

Day	Date	Lesson Due (MyMathLab)
Mon	10/18	Plurality and Borda Count
Wed	10/20	Elimination and Pairwise Comparisons

**Week 11**

Day	Date	Lesson Due (MyMathLab)
Mon	10/25	Voting Flaws
Wed	10/27	Apportionment Methods

**Week 12**

Day	Date	Lesson Due (MyMathLab)
Mon	11/1	<i>Fall Break</i>
Wed	11/3	Apportionment Flaws

**Week 13**

Day	Date	Lesson Due (MyMathLab)
Mon	11/8	Test 4: Voting Theory Review Quizzes Due by 12:00 PM
Wed	11/10	Divisibility

**Week 14**

Day	Date	Lesson Due (MyMathLab)
Mon	11/15	Primes, Composites, & Factors
Wed	11/17	CD and LCM

**Week 15**

Day	Date	Lesson Due (MyMathLab)
Mon	11/22	Fibonacci Numbers
Wed	11/24	<i>Thanksgiving Break</i>

**Final Week**

Day	Date	Lesson Due (MyMathLab)
Mon	11/29	Modular Arithmetic
Wed	12/1	Student Study Day
Fri	12/3	Test 5: Number Theory 3:00 PM - 4:50 PM Review Quizzes Due by 9:00 AM