

Mathematics for Modern Technology Syllabus

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1 Basic Information

Course: Mathematics for Modern Technology, 2030:161–104 74197

Course Type: Web-based (31%–99% online)

Course Web Site: <http://srandby.org/2018-2/161-104/home.html>

Class Location: Polsky 486

Time and Dates: 4:15–5:05 pm, Mo, 8/27/2018–12/3/2018

Instructor: Dr. Scott Randby

Department: Applied General and Technical Studies

Phone: 330–972–6094

Email: srandby@uakron.edu

Office: Polsky 131F

Office Hours

Tuesday: 12:00–2:00 pm

Thursday: 12:00–2:00 pm

or by appointment

Online Office Hours

Tuesday: 12:00–2:00 pm

Thursday: 12:00–2:00 pm

or by appointment

Optional Text: *Finite Mathematics: For the Managerial, Life, and Social Sciences*. Soo T. Tan. Cengage Learning, Eleventh Edition, 2012.

2 Overview

1. The class will meet once per week on campus. Each class meeting will be 50 minutes in length. A 50-minute quiz will be given during weeks 3–15. An online quiz will be given during week 2.
2. New lessons will be posted in the *Current Lessons* section of the *Lessons* page of the course website during week 1 and after each quiz.
3. The lessons should be done in the order they appear in the *Current Lessons* section of the *Lessons* page.
4. Lessons should be completed by the evening of the day before the quiz.
5. Follow the instructions for each lesson. Plan to spend at least 200 minutes each week working through lessons and at least 400 minutes each week working on homework problems.

6. Each quiz will be worth 50 points and will cover the lessons posted in the *Current Lessons* section of the *Lessons* page.

The relationship between the instructor and a student will be a professor-student relationship. This type of relationship is not employer-employee, commander-subordinate, parent-child, or friend-friend. The role of the professor in this class is to guide students through the course and help students learn the course material. The role of the student is to learn the course material and demonstrate that learning on quizzes.

3 Syllabus Policy

Students are required to download the syllabus from the homepage of the course website. The syllabus file is a PDF file which should be opened using a PDF reader.

It is the responsibility of every student to read and understand the syllabus.

4 Email Policy

All students are required to check their `zips.uakron.edu` email account at least once a day.

Email is not sent out every day, but students are required to check their `zips.uakron.edu` account anyway.

Students are required to use their `zips.uakron.edu` email account when they send email to the instructor.

Email from the instructor to a student is sent only to the student's `zips.uakron.edu` account.

5 Textbook

No textbook is used in this class. All course materials (lessons, homework assignments, etc.) are posted on the course website.

6 Computer and Internet Access Policy

All students are required to have continuous access for the entire duration of the course to the Internet using a fully functional computer that works properly.

7 Calculator Requirement

All students are **required** to have a **Texas Instruments TI-30X IIS** calculator.

Every student is **required** to have possession of their calculator by the end of the first week of classes.

Students are **required** to bring the required calculator to each class.

8 Course Components

All lessons and other course materials are posted online at the following website.

Homepage: <http://srandby.org/2018-2/161-104/home.html>

Course materials may also be accessed via the learning management system operated by the university.

The course website contains lessons, notes and audio from non-quiz class meetings, instructions for obtaining help, and other information about the course.

8.1 Lessons

Links to the lessons are given on the Lessons web page available at the following address.

Lessons page: <http://srandby.org/2018-2/161-104/lessons.html>

New lessons will be posted in the *Current Lessons* section of the *Lessons* page during week 1 after the quizzes on weeks 2–14. Lessons studied in previous weeks will appear in the *Old Lessons* section of the *Lessons* page.

The lessons should be done in the order they appear in the *Current Lessons* section of the *Lessons* page.

Lessons should be completed by the evening of the day before the quiz.

Make sure to follow the lesson instructions. Plan to spend at least 200 minutes each week studying lessons and at least 400 minutes each week working on homework problems.

It takes time for the human brain to absorb and comprehend mathematics, and setting aside that time is crucial for success in this course. You should begin studying the lessons posted in the *Current Lessons* section of the *Lessons* page soon after they are posted. Set aside ample time each day to work on the current lessons. By the day before the quiz, you should have worked through each lesson, completed all of the homework problems, thoroughly understood the material covered in the lessons, and reworked the homework problems several times. If you work in this manner, then you will have ample time to ask the instructor questions and understand the course material well enough to earn a good grade on the quiz.

Students are required to complete all homework assignments.

It is the responsibility of the student to seek help in a timely manner if it is needed on a homework assignment.

8.1.1 Lesson Instructions

In order to learn the material covered in this course, students need to have good learning practices while working on a lesson. Scientific research into learning has shown that students who use certain “good” practices are more successful than students who don’t use those practices. The following instructions are meant to encourage students to use good learning practices while working on a lesson.

1. You may study the lessons online, or you can download them for offline use.
 - A lesson’s PDF files may be viewed using any PDF reader.
2. Read the text of the lesson carefully in a place without distractions.
 - Take thorough, complete, and good notes as you study the lesson.
 - Taking notes is an effective memory-retention technique that improves learning.
 - Make note of items you do not understand and go back over those items until you understand them. Ask for help on any items you are unable to understand yourself.
 - Do not use other electronic devices (except for a calculator) or visit other web sites when you are studying the lesson unless their use is required in the lesson.
3. Work through the homework problems referring to your notes and the lesson when necessary. Use the homework problem solutions only when you get completely stuck.
4. Do not consider the lesson to be completed until you thoroughly understand it. If there is something about a lesson you do not understand, then obtain help by either visiting Dr. Randby in his office during his office hours, making an appointment to meet with him in his office and meeting with him during the appointment’s time, visiting the online help room during the Dr. Randby’s online office hours, making an appointment to meet with the Dr. Randby in the online help room and meeting with him in the help room during the appointment’s time, or sending an email message to srandby@uakron.edu asking for help.
5. Redo the homework problems before a quiz without referring to any other materials. It is best to do this more than once.

8.2 Quizzes

A 50 point quiz will be given in class during weeks 3–15. An online quiz will be given during week 2.

Each quiz will be over the material covered in the lessons that were posted after the weekly class meeting preceding the quiz.

Students will have 50 minutes to complete each in-class quiz.

Online quizzes will be available on Brightspace. Enter the Brightspace site of the course and click on the Quizzes button in the navigation bar to access an online quiz. Students will have 60 minutes to complete an online quiz.

The instructor will grade the quizzes and post the grades on Brightspace.

8.2.1 Quiz Schedule

1. **Topics:** Sets, inclusion-exclusion principle
Date: 9/3 (online)
2. **Topics:** Multiplication principle, permutations
Date: 9/10
3. **Topics:** Combinations
Date: 9/17
4. **Topics:** Probability, computing probabilities
Date: 9/24
5. **Topics:** Random variables, expected value
Date: 10/1
6. **Topics:** Standard deviation
Date: 10/8
7. **Topics:** Normal distribution, binomial distribution
Date: 10/15
8. **Topics:** Statements, truth tables
Date: 10/22
9. **Topics:** Implications
Date: 10/29
10. **Topics:** Logical equivalence
Date: 11/5
11. **Topics:** Quantifiers
Date: 11/12
12. **Topics:** Compound interest
Date: 11/19
13. **Topics:** Annuities
Date: 11/26
14. **Topics:** Amortization
Date: 12/3

The quiz schedule may be altered by Dr. Randby if necessary.

8.2.2 Quiz Policies

Students are required to arrange their schedules so that they arrive to all quizzes on time. Students who are late to a quiz may not disturb other students in any way, and they will be given the quiz only after all other students are settled.

Early quizzes will not be given for any reason.

Students are not permitted to use scrap paper, red pens, or red pencils during a quiz.

Except for approved calculators, students are not permitted to use electronic devices (smart-phones, cell phones, headphones, earbuds, etc.) during a quiz unless the use of such devices meets an accommodation requirement or their use has been approved by the instructor prior

to the quiz. These devices are not permitted to be visible and they may not make any sounds during a quiz (unless their use is permitted of course). Students may not leave the class during a quiz to use an electronic device for any reason.

Students are required to turn in all materials they have received from the instructor after completing a quiz.

Students are required to finish their quizzes by the end of the class period. Students who arrive late to a quiz will not be given a time extension.

8.2.3 Make-Up Quizzes

Students are required to take every quiz during its scheduled date and time unless Dr. Randby agrees to schedule a make-up quiz.

It is the responsibility of a student to request a make-up quiz. Dr. Randby reserves the right to require a student to provide additional information or documentation whenever a student requests a make-up quiz.

Make-up quizzes are given at the discretion of Dr. Randby. Requesting a make-up quiz does not guarantee that a make-up quiz will be granted. Some of the factors that are taken into account when determining whether or not to grant a make-up quiz request are (1) the reason for the request, (2) the length of time between the quiz and the submission of the request, (3) attendance, (4) homework completion, and (5) the number of previous make-ups. A make-up quiz will not be granted if the reason for the request is either not exceptional or not beyond the control of the student or both.

Make-up quiz requests for participation in a university-sponsored event, jury duty, or military service require documentation. Students are required to supply Dr. Randby with documentation in PDF form.

A make-up quiz will only be given on campus in the presence of Dr. Randby.

8.2.4 Quiz Grading

Each problem or part of a problem on a quiz is graded on a 0–1 point scale in increments of 1/10th of a point. The points are totaled, the point total is divided by the maximum possible point total, the result of the division is multiplied by 50, and the result of the multiplication is rounded to the nearest 1/10th. The rounded number is the grade on the quiz.

The following questions are considered when a quiz problem is graded.

1. Does the solution demonstrate an understanding of the concepts and methods covered in class that are relevant to the problem?
2. Does the solution use the required and proper techniques and methods?
3. Is the solution presented in a logical and coherent manner?
4. Does the solution use notation properly and correctly?
5. Are the theoretical and numerical computations that appear in the solution correct?
6. Are the numerical values that appear in the solution correct?

7. Is the solution succinct and to-the-point?
8. Is the solution clear and unambiguous?

Problem Grading

- 0: Perfect work
- 0.1: A work with minor errors
- 0.2: B work
- 0.3: C work
- 0.4: D work
- 0.5: F work
- 1.0: No work or required work missing

8.2.5 Understanding Quiz Results

When graded quizzes are returned to a student, only the student's graded work is returned. The sheet containing the quiz problems is not returned. The reason for this practice is that quizzes are not learning tools, they are where students demonstrate learning. If there appears to be a grading error on a quiz or if the grading is not understood, then a student should meet with Dr. Randby to discuss the grading.

9 Getting Help

Instructions for getting help are given on the *Help* web page available at the following address:

Help page: <http://srandby.org/2018-2/161-104/help.html>

The following information is given on the *Help* page.

9.1 Office Hours

Dr. Randby will be available in Polsky 131F during the following days and times:

Tuesday: 12:00–2:00 pm

Thursday: 12:00–2:00 pm

If Dr. Randby is not in his office during one of the above times and he has not previously announced that he will not be there, then students should assume there is a legitimate reason for his absence. Students may either wait to see if Dr. Randby returns to his office before the end of the help period, obtain help during the next scheduled help period, or send an email to srandby@uakron.edu asking for help in Dr. Randby's office at a different time.

If a student wishes to meet with the Dr. Randby at a time not listed above, then that student should see him in person to arrange a meeting or send an email requesting a meeting to srandby@uakron.edu.

Students may come to Polsky 131F anytime, not just during office hours. If Dr. Randby is in the office when a student arrives and he is not working on something urgent, then he will be happy to help the student.

Please note that office hours are for discussing homework problems, clarifying concepts discussed in class, and discussing general mathematical issues.

Whenever a student goes to Dr. Randby's office for help, the student should bring relevant class notes, a copy of any relevant homework assignments, any work the student has done, a calculator, a writing instrument, and paper.

9.2 Online Help

Students may communicate in real time (audio, video, chat, screen sharing) with Dr. Randby in a Jitsi Meet room. You may access the room by clicking on the following link:

Online help room: <https://meet.jit.si/DrRandbyOnlineOffice>

Dr. Randby will be available in the online help room during the following days and times:

Tuesday: 12:00–2:00 pm

Thursday: 12:00–2:00 pm

If Dr. Randby is not in the online help room during one of the above times and he has not previously announced that he will not be there, then students should assume there is a legitimate reason for his absence. Students may either wait to see if Dr. Randby enters the online help room before the end of the help period, obtain help during the next scheduled help period, or send an email to srandby@uakron.edu asking for help in the online help room at a different time.

If a student wishes to meet with Dr. Randby in the online help room at a time not listed above, then that student should send an email requesting an online meeting to srandby@uakron.edu.

9.3 Email Help

Students may send questions about the course lessons and homework assignments to Dr. Randby via email. Questions should be sent to srandby@uakron.edu from a `zips.uakron.edu` account. Questions sent from accounts other than `zips.uakron.edu` accounts will not receive a response.

Questions sent via email will receive a response within 24 hours after they are sent unless special circumstances prevent Dr. Randby from replying during that time period.

9.4 University Tutoring

Information about tutoring services is available at the following link:

UA Tutoring Sevices

<https://www.uakron.edu/tutoring/>

Online tutoring services are available at the following link:

Online Tutoring Sevices

<https://www.etutoring.org/login.cfm?institutionid=263>

Please note that Dr. Randby does not vouch for the quality, knowledge, or ability of any tutor on or off the campus.

10 Course Grade

All quiz grades will be posted on the learning management system operated by the university.

Use the following to determine your *numerical course grade* G .

$qnum$ = the number of quizzes given

$qmax$ = the maximum possible points on a quiz

$qsum$ = the sum of the scores earned on the quizzes

$$G = \frac{100 \cdot qsum}{qnum \cdot qmax}$$

Use the numerical course grade and the following list to determine your course letter grade.

A	if	$91 \leq G \leq 100$	C	if	$71 \leq G < 77$
A-	if	$90 \leq G < 91$	C-	if	$70 \leq G < 71$
B+	if	$87 \leq G < 90$	D+	if	$67 \leq G < 70$
B	if	$81 \leq G < 87$	D	if	$63 \leq G < 67$
B-	if	$80 \leq G < 81$	D-	if	$60 \leq G < 63$
C+	if	$77 \leq G < 80$	F	if	$G < 60$

11 Course Content and Objectives

11.1 Bulletin Description

Prerequisite: Placement test or completion of 2010:052, 054, 057, or 084 with a grade of C or better. Lines, linear regression, sets, counting, basic probability, basic statistics, binomial and normal distributions, mathematics of finance, symbolic logic, arguments, logic circuits.

11.2 Course Objectives

After completing this course the student should have the following competencies:

1. the ability to graph lines, find equations of lines, and use linear regression lines in applications;
2. an understanding of the mathematics of finance including simple interest, compound interest, annuities, present value, future value, the APR, and consumer loans;
3. an understanding of sets and basic counting techniques and their uses;
4. the ability to compute simple probabilities and odds;

5. the ability to compute and apply modes, medians, means, expected values and standard deviations;
6. an understanding of the binomial and normal distributions and their applications;
7. an understanding of basic symbolic logic, arguments, and logic circuits.

11.3 General Education Learning Outcomes

Students will demonstrate foundational competency in creating and evaluating reasoned arguments and employing quantitative, qualitative, and normative information in such arguments. In particular, students employ the appropriate analysis and application of quantitative information, such that they:

1. Identify the value and limitations of magnitude (i.e., how large) and multitude (i.e., how many) measures;
2. Manipulate and express such measures with arithmetic, algebraic, geometric, and statistical methods;
3. Manipulate and express such measures with graphs, charts, and tables;
4. Manipulate and express such measures to solve practical and multistage problems.

In the course outline given below, a bold number indicates that the associated topic addresses the general education learning outcome with that number.

11.4 Course Outline

1. Lines
 - (a) The concept of slope **1**
 - (b) Graphing a line using its slope **1, 3**
 - (c) The point-slope, slope-intercept and general forms of a line
 - (d) Mathematical modeling using linear functions **1, 3, 4**
 - (e) Systems of linear equations and their applications
 - (f) Linear regression and its applications **3, 4**
2. Mathematics of Finance
 - (a) Simple and compound interest: compound amount, present value, effective rate **1, 2**
 - (b) Ordinary annuities: present value, future value **1, 2**
 - (c) Amortization of loans **2, 3, 4**
 - (d) Sinking funds **2**
 - (e) IRAs, discount points, variable-rate mortgages, interest-only mortgages, the add-on method (all optional)
 - (f) Difference equations (optional)
 - (g) Financial mathematics using difference equations (optional)
3. Sets and Counting **1**
 - (a) Basic set theory
 - (b) The inclusion-exclusion principle
 - (c) The multiplication principle
 - (d) Permutations
 - (e) Combinations
4. Probability

- (a) Experiments, outcomes, sample spaces, events **1**
- (b) The definition of probability **1, 3**
- (c) Basic probability rules
- (d) Computing probabilities **1, 2**
- 5. Statistics
 - (a) Random variables, probability distributions, histograms **3**
 - (b) The mean, expected value, and odds **1, 2, 4**
 - (c) The median and mode **1, 2**
 - (d) Variance and standard deviation **1, 2, 4**
 - (e) The binomial distribution **1, 2**
 - (f) The normal distribution and applications **1, 2, 4**
- 6. Logic
 - (a) Symbolic logic: statements, and, or, not, implication
 - (b) Truth tables
 - (c) Logical equivalence
 - (d) Arguments, rules of inference
 - (e) Logic circuits

12 University Policies

12.1 Undergraduate Bulletin

The university policies that affect students are contained in the *Undergraduate Bulletin*. To view the *Undergraduate Bulletin*, go to the following address:

Undergraduate Bulletin

https://www.uakron.edu/academics_majors/ub/

12.2 Attendance Policy

The official attendance policy of the university is presented on the *Important Policies* page of the *Undergraduate Bulletin*.

Important Policies

https://www.uakron.edu/academics_majors/ub/important-policies/

A student is expected to attend all class meetings for which the student is registered. A student may be dropped from a course in the current term by the dean if absence is repeated and the instructor recommends this action; a student can gain re-admission only with permission of both the instructor and the dean. A student dropped from a course receives an “F” which counts as work attempted whenever grade-point ratio calculations are made.

12.3 Incomplete Policy

The official incomplete policy of the university is presented on the *Grade Policy and Credit* page of the *Undergraduate Bulletin*.

Grade Policy and Credit

https://www.uakron.edu/academics_majors/ub/important-policies/grade-policy-and-credit.dot

Students are expected to read and understand the official incomplete policy.

12.4 Withdrawal Policy

The official withdrawal policy of the university is presented on the *Important Policies* page of the *Undergraduate Bulletin*.

Important Policies

https://www.uakron.edu/academics_majors/ub/important-policies/

Students are expected to read and understand the official withdrawal policy.

The withdrawal deadline for this course is **Sunday, October 14**.

13 Academic Honesty and Student Conduct

Students are required to maintain the highest level of academic honesty in this course. The university's academic honesty expectations are contained in the *Grade Policies and Credit* page of the *Undergraduate Bulletin* and in section 3359-41-01 of the *University Rules* (see <https://www.uakron.edu/ogc/UniversityRules/pdf/41-01.pdf>).

Students are required to follow The University of Akron's *Code of Student Conduct*. The *Code of Student Conduct* is available on the website of the *Student Conduct and Community Standards* office. See the following links for more information:

Student Conduct and Community Standards

<https://www.uakron.edu/studentconduct/>

Code of Student Conduct

<https://www.uakron.edu/ogc/UniversityRules/pdf/41-01.pdf>

14 Accessibility, Counseling, and Health Services

Students who require special services and/or accommodations in the course should submit a request to the *Office of Accessibility* (OA) in a timely manner. The OA is located in Simmons Hall Room 105, and it may be contacted at 330-972-7928 (v), 330-972-5764 (tdd), or access@uakron.edu. See the following link for more information.

Office of Accessibility

<https://www.uakron.edu/access/>

Currently enrolled students may obtain free psychological services at the *Counseling & Testing Center*. See the following link for more information.

Counseling & Testing Center

<https://www.uakron.edu/counseling/>

Currently enrolled students may obtain free or low cost health services at *Student Health Services*. See the following link for more information.

Student Health Services

<https://www.uakron.edu/healthservices/>

15 Title IX at UA

The University of Akron is committed to providing an environment free of all forms of discrimination, including sexual violence and sexual harassment. This includes instances of attempted and/or completed sexual assault, domestic and dating violence, gender-based stalking, and sexual harassment. If you (or someone you know) has experienced or experiences sexual violence or sexual harassment, know that you are not alone. Help is available, regardless of when the violence or harassment occurred, and even if the person who did this is not a student, faculty or staff member.

Confidential help is available. If you wish to speak to a professional, in confidence, please contact:

University Counseling and Testing Center

Website: <https://uakron.edu/counseling/>

Phone: 330-972-7082

University Health Services

Website: <https://uakron.edu/healthservices/>

Phone: 330-972-7808

Please know the majority of other University of Akron employees, including faculty members, are considered to be “responsible employees” under the law and are required to report sexual harassment and sexual violence. If you tell me about a situation, I will be required to report it to the Title IX Coordinator and possibly the police. You will still have options about how your case will be handled, including whether or not you wish to pursue a law enforcement or complaint process. You have a range of options available and we want to ensure you have access to the resources you need.

Additional information, resources, support and the University of Akron protocols for responding to sexual violence are available at <https://uakron.edu/Title-IX/>.