

Technical Mathematics II

Spring 2010

Basic Information

Course	Technical Mathematics II 2030:152-007 10150
Time	9:55-10:45 am, MTuWF 1/11/2010-3/5/2010
Location	Polsky 455
Text	<i>Technical Mathematics, Second Edition</i> Dale Ewen, Joan Gary, James Trefzger ISBN 0-13-048810-0
Instructor	Dr. Scott Randby
Office	Polsky 133D (POL 133D) Associate Studies Department
Office hours	12-2:30 pm, MW and by appointment
Phone	(330)-972-6094
E-mail	srandby@uakron.edu
Web Page	srandby.org

Course Prerequisites

This course has a prerequisite: Technical Mathematics I (2030:151) with a grade of C- or better or placement test. It is assumed that students in this course have an adequate understanding of the material covered in Technical Mathematics I.

Course Objectives

After completing this course the student should have the following competencies: **(1)** the ability to solve problems using ratios, proportions, and variation; **(2)** an understanding of basic right-triangle trigonometry and trigonometric functions; **(3)** the ability to apply right-triangle trigonometry to real-world situations; **(4)** the ability to use the laws of sines and cosines properly; **(5)** a complete understanding of the properties and equations of lines; **(6)** the ability to use determinants and Cramer's rule to solve systems of linear equations; and **(7)** the ability to perform basic arithmetical operations using complex numbers.

Course Content	
Chapter	Sections
4	4.3, 4.4, 4.5
3	3.1, 3.2, 3.3, 3.4
10	10.1, 10.2
11	11.1, 11.2, 11.3
1	1.14, 1.15
6	6.4, 6.5, 6.6
14	14.1

Grading

Course Components	
Attendance	0.15 bonus points/class day
Homework	10 points/assignment
Exams	100 points/exam

Attendance

Attendance will be taken at the beginning of each class. You will be rewarded with 0.15 bonus points for each class day that you attend class **and** sign the attendance sheet. Good attendance will raise your final grade by as much as 4%.

Homework

There will be a graded homework assignment, worth ten points, for each section covered in class. Homework counts towards 25% of your final grade. The due date for each graded assignment will be announced in class.

The homework assignments for this course are contained in a PDF file which is posted on the course website. All students must download this file. It may either be viewed on a computer screen or printed out.

Unless an acceptable excuse is provided or the instructor agrees to give an extension, points will be deducted from late homework using the following scale. Note that the number of points deducted from late homework increases exponentially with the number of class days an assignment is late. Also, homework is late if it is not turned in before or during the class in which it is due.

x = the number of class meetings an assignment is late

x	Points Deducted
$0 < x \leq 1$	2
$1 < x \leq 2$	4
$2 < x \leq 3$	8
$x > 3$	10

The beginning of each class will be devoted to a discussion of homework problems. Remember, success in a mathematics course requires individual effort outside of the classroom, the standard recommendation being two hours of study for each hour of class.

Exams

Each exam is worth 100 points and will be based on the material previously covered in class. Exams count towards 75% of your final grade.

Exam Schedule	
1/27	Exam 1
2/17	Exam 2
3/5	Final

Final Grades

To determine your grade percentage use the following formula.

h = the number of homework assignments

e = the number of exams

hw = the total number of homework points earned

ex = the total number of exam points earned

c = the total number of classes attended

p = the grade percentage

$$p = hw \left[\frac{25e + 2.5h}{10eh + h^2} \right] + ex \left[\frac{7.5e + 0.75h}{10e^2 + eh} \right] + 0.15c$$

To determine your course grade use the course grading scale given below.

Minimum Percentage	Grade
91	A
90	A-
87	B+
81	B
80	B-
77	C+
71	C
70	C-
67	D+
63	D
60	D-
0	F

Incompletes

A grade of **incomplete (I)** will be granted only in special circumstances. To receive an **I** a student must have **(1)** the agreement of the instructor, **(2)** successfully completed a substantial portion (generally 4/5) of the required coursework, **(3)** have a good and acceptable reason for not completing any remaining coursework, and **(4)** maintained a grade of C or better on the coursework that has been completed.

Withdrawal

The withdrawal deadline for this course is **Tuesday, February 23, 2010**.

Course Website

The address for the course web page is the following:

srandby.org/2010.1/152.007/152.007.html

The course web page contains links to all the documents used in this course. It also contains a section entitled **Course News** in which information about each class meeting appears. Check with classmates, the syllabus, and the course web page before asking the instructor for non-mathematical information.

Office Hours

My office hours are given above. You may come to my office anytime, not just during my office hours. If I am in my office when you arrive and I am not working on something urgent, then I will be happy to help you. Please note that office hours are for discussing homework problems, clarifying concepts discussed in class, and discussing general mathematical issues. I do not give make-up lectures during office hours nor will I discuss material that was covered in a class you missed and for which you have not obtained the class notes.

If you come to my office for help, please be sure to bring your class notes, any work you have done, a calculator, a writing instrument, and paper. If you lack any of these items, then you may be asked to go get them and come back later.

Student Responsibilities

Conduct

Students are required to follow The University of Akron's *Student Code of Conduct* and they are required to behave in a manner that complies with the expectations outlined in the *A Civil Climate for Learning: A Statement of Expectations* section of the *Undergraduate Bulletin*. The *Student Code of Conduct* is available on the website of *The Office of Student Judicial Affairs* (www.uakron.edu/sja). The undergraduate bulletin is available at the following link:

www.uakron.edu/academics_majors/undergraduate_programs/ugrad.pdf

Attendance

Students are expected to attend every class, arrive to each class on time, and stay for the entire length of all classes. Students are responsible for all material covered in each class as the instructor does not give lectures outside of the classroom. If you miss a class, then you are required to obtain the notes for that class from a classmate.

Students are not permitted to bring children, family members, friends, or any other person to class for any reason.

Homework

Students are expected to turn in all homework assignments on time. Unless the instructor agrees otherwise, points will be deducted from late homework using the scale given above.

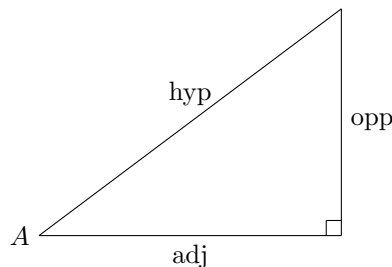
Exams

Students are required to take every exam during its scheduled date and time unless the instructor agrees to schedule a make-up exam. Make-up exams are given only under special circumstances. Early exams will not be given under any circumstances.

Calculators

All students are **required** to have a **scientific** or graphing calculator with minimum functionality equivalent to that of the **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. No exceptions to this policy will be made by the instructor.

Students are required to bring an acceptable calculator to each class.



Copyright Notice

The copyrights for this document and all other documents used in this course are owned by Dr. Scott Randby. Copies (electronic, printed, or otherwise) of these documents may be made without permission for personal use only. Distribution or any other use of these documents is permitted only with the written permission of Dr. Randby.

$$\sin(A) = \frac{\text{opposite of } A}{\text{hypotenuse}} \quad \csc(A) = \frac{1}{\sin(A)}$$

$$\cos(A) = \frac{\text{adjacent of } A}{\text{hypotenuse}} \quad \sec(A) = \frac{1}{\cos(A)}$$

$$\tan(A) = \frac{\text{opposite of } A}{\text{adjacent of } A} \quad \cot(A) = \frac{1}{\tan(A)}$$

Formula Policy

The formulas that students are required to know by heart at the beginning of this course are listed below.

$$a^2 - b^2 = (a - b)(a + b)$$

$$x^2 + (a + b)x + ab = (x + a)(x + b)$$

$$acx^2 + (ad + bc)x + bd = (ax + b)(cx + d)$$

Let $ax^2 + bx + c = 0$ where a , b , and c are constants with $a \neq 0$.

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

The formulas that students are required to know by heart at the end of this course are listed below.

Assume a line passes through (x_1, y_1) and (x_2, y_2) with slope m and y -intercept b .

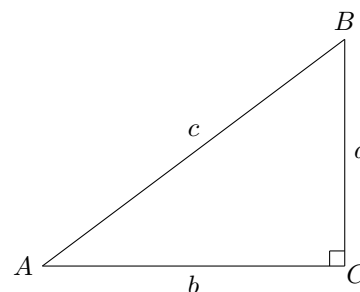
$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$y = mx + b$$

Let d be the distance between (x_1, y_1) and (x_2, y_2) .

$$d = \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$$

Suppose two lines have slopes m_1 and m_2 respectively. If the lines are parallel, then $m_1 = m_2$. If the lines are perpendicular, then $m_2 = -\frac{1}{m_1}$.



$$a^2 + b^2 = c^2 \quad A + B = 90^\circ$$

$$\sin(A) = \frac{a}{c} \quad \cos(A) = \frac{b}{c} \quad \tan(A) = \frac{a}{b}$$

$$\csc(A) = \frac{c}{a} \quad \sec(A) = \frac{c}{b} \quad \cot(A) = \frac{b}{a}$$

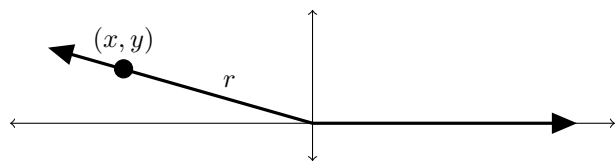
$$\sin(B) = \frac{b}{c} \quad \cos(B) = \frac{a}{c} \quad \tan(B) = \frac{b}{a}$$

$$\csc(B) = \frac{c}{b} \quad \sec(B) = \frac{c}{a} \quad \cot(B) = \frac{a}{b}$$

$$A = \sin^{-1}\left(\frac{a}{c}\right) = \cos^{-1}\left(\frac{b}{c}\right) = \tan^{-1}\left(\frac{a}{b}\right)$$

$$B = \sin^{-1}\left(\frac{b}{c}\right) = \cos^{-1}\left(\frac{a}{c}\right) = \tan^{-1}\left(\frac{b}{a}\right)$$

Angle θ is shown below in standard position. Point (x, y) is a point on the terminal side of θ , and r is the distance from $(0, 0)$ to (x, y) .



$$r^2 = x^2 + y^2$$

$$\sin(\theta) = \frac{y}{r} \quad \csc(\theta) = \frac{r}{y}$$

$$\cos(\theta) = \frac{x}{r} \quad \sec(\theta) = \frac{r}{x}$$

$$\tan(\theta) = \frac{y}{x} \quad \cot(\theta) = \frac{x}{y}$$