

Math 17100: Multidimensional Mathematics (Class No: 21460)

Meets: MW 10:30-11:45 in IT 162

Final Exam: Friday, May 8, 10:30–12:30p

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Office Hours: M 12:15-1:15, Tu 11:00-12:00, Th 11:40-1:00, or by appointment

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Info: Canvas page or Webpage: <http://www.math.iupui.edu/~ccowen/Math171.html>

General Information and Goals

Math 17100 is, as the course title suggests, an introduction to multidimensional mathematics. In high school geometry, you studied ‘plane geometry’, the geometry of figures in a 2-dimensional plane. We believe we live in a 3-dimensional world. In a plane, there can be 2 lines meeting at 90° degree angles, whereas in the world we live in, at a corner in a room where two walls and the ceiling meet, there are 3 lines meeting with each line perpendicular to the other two. Later in your mathematical course work, you might consider spaces where any number of lines can meet at a point, each perpendicular to all the others, and physics sometimes describes things as happening in a 4-dimensional space-time world. In this course we will think about calculus, geometry, and solution of linear equations in 2 and 3 dimensional worlds.

The ‘textbook’ for this course is the same as the textbook for the Calculus courses 16500, 16600, and 26100:

Text: *Calculus*, 8th edition, by James Stewart, Cengage Learning, (2016).

In addition, for the Linear Algebra part of the course, you can download a PDF file for the notes *Math 171 Basic Linear Algebra*, by Bruce Kitchens and diagrams by Roland Roeder, both faculty members in the IUPUI Mathematical Sciences Department. The download is from:

https://math.iupui.edu/sites/default/files/171_notes_linalg_032619.pdf

or from the course website or Canvas.

As a part of the curriculum, the overall goal of this course is to prepare you for Math 26100, which covers the ideas of calculus in 3-dimensional settings, linear algebra, Math 35100, and science and engineering courses that study phenomena in our 3-dimensional world.

My goals for you in this course are

Short term goal: That you master the ideas and computations of the course, both theoretical and applied.

Long term goal: That you recognize and can use the ideas of mathematics in three dimensions in your later studies and your professional and personal life.

Homework, Quiz, Test, Exam, and Grading Policies

There will be homework to hand in at the beginning of class most Wednesdays and there will be previously announced quizzes at the end of several classes. There will be 3 tests spaced throughout the semester, with the first two scheduled before Spring Break and the last day to drop the class. The comprehensive Final Exam will be 10:30-12:30 on Wednesday, May 6. Grades for the course will include input from the grades for the homework and quizzes, a little less than 10% for each, but both the lowest two homework grades and the lowest two quiz grades will be dropped. Each midterm test will count 15 to 20%, and the comprehensive final exam will count 30 to 35% of

the final grade. Late homework assignments may be handed in for feedback if you wish, but they will be recorded in the gradebook as 0's.

Boost: Indiana University has developed a smartphone app to help students stay on top of classwork in Canvas. Students in this class are welcome to use this app. It is free, provides notifications and reminders for classwork in Canvas, helps keep track of assignment deadlines, important announcements, and course events. For more information, see <https://boost.iu.edu>

General Academic Policies

The work you submit for quizzes, tests, and the final exam must be your own. For homework, you will probably find it beneficial to consult with other students about the material and this kind of conversation and collaboration is encouraged. At the end of the consultation, however, each participant should prepare their own summary of the discussion and their own solutions to the problems because that will be required on quizzes and tests. The policies for this class will be those derived from IUPUI's policies on academic conduct and adaptive services.

More information concerning adaptive services for learning or other disabilities at IUPUI can be found at <http://aes.iupui.edu/>

COURSE POLICIES: IUPUI has certain policies that apply to every course; this course will follow these policies also. See "IUPUI Syllabus Supplement" on the Canvas page for this course.

Some Important Dates

January 13	First day of classes
January 19	Last day to withdraw with no record and 100% refund
January 20	Martin Luther King Day, no classes
March 4 or 9	Midterm Test
March 13	Last day to withdraw with automatic "W" (with permission of advisor)
March 14–22	Spring Break, no classes
May 4	Last day of classes, review day for us
May 8	Final Exam, 10:30-12:30 , in the regular classroom