Math 137: Calculus II

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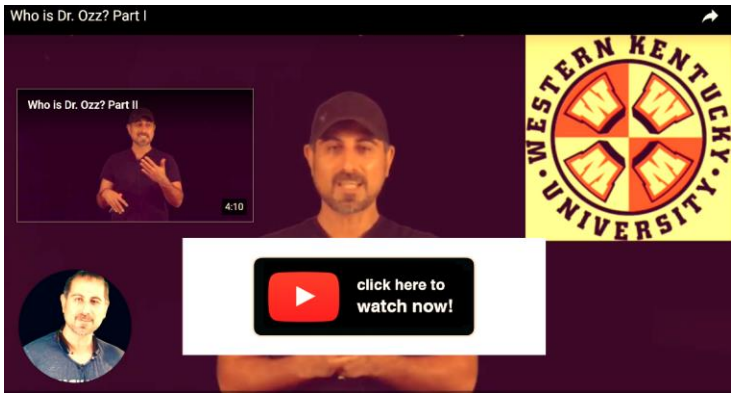
Who is Dr. Ozz? Part I (click here or on the picture to watch)



LEARNING OBJECTIVES

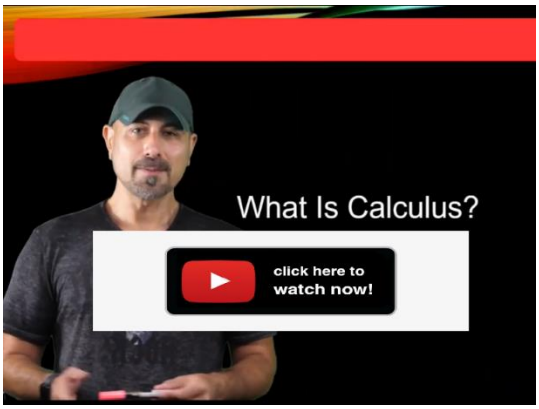
Upon completion of the course students will:

1. Be able to differentiate and integrate the inverse trigonometric and hyperbolic functions using different techniques such as integration by parts, trigonometric substitutions, partial fractions, and other methods.
2. Be able to apply the integration techniques to real world problems such as finding the area between curves, volume or surface area of a revolution, arc length, work, moment, center of mass, etc.
3. Be able to understand infinite series and test their convergence or divergence using appropriate tests, i.e. the ratio test, nth root test, telescoping series, geometric series; alternating series.
4. Be able to expand functions in power series.
5. Be able to work with parametric curves using differential and integral techniques.
6. Be able to analyze functions and their graphs in polar coordinates.

Check the end of the syllabus to learn about specific learning objectives for each chapter.

PREREQUISITES: A grade of C or better in Math 136.

WHAT is CALCULUS?
Click here or on the video to watch



COURSE DESCRIPTION
Calculus II

MATH 137 is the second course in one-variable calculus for math, science, and engineering majors. Topics include inverse trig functions, hyperbolic trig functions, various methods of integration, sequences and series, polar and parametric functions

This course is enriched by recitations (problem sections), which guide students through practice exercises via videos recorded by the instructor. There are around 5-13 fully-solved recitation problems for each section.

COURSE WEBSITE

We will be using WKU's Blackboard (as the homepage) and Cengage's WebAssign as technology based instruments for this course. Lecture notes, recitations, course videos, and announcements are all in Blackboard. All assignments will be taken in WebAssign. Please note, all course announcements posted in Blackboard will be sent to your WKU EMAIL address.

REQUIRED MATERIALS

Textbook: Calculus of a Single Variable: Early Transcendental Functions (with WebAssign Access), 7th Edition, by Larson, ISBN 281000002784B
ISBN for optional low-cost loose-leaf copy: 281000002783B
(Also available online at www.webassign.net)

WebAssign access code is required for tests, quizzes, and homework assignments. Course ID is not needed. Register through Blackboard.

Calculator: A graphing calculator (TI-83 Plus or TI-84 Plus or Silver Edition), except the TI-92 or TI-89 or equivalent, is recommended for the class. The software Mathematica output may also be used by the instructor time to time in lecture notes and video recitations.

Textbook Information: (Please read before purchasing anything for this course.)
This course participates in The WKU Store's Day One Access program. This program is designed to provide immediate access to required materials for all students at prices cheaper than any other option.

Required materials will be available to you automatically (via Blackboard) by enrolling in this course unless you choose to opt-out. By participating in this program, The WKU Store will bill your Student Billing account, and you will see a charge appear under this Term along with Tuition and Fees ("Account Summary by Term" under the Student Services tab) labelled as either "The WKU Store Purchases" or "Day One Access." For more information on this program or to opt-out of participation, please visit the Day One Access information page.

The cost of the e-book and WebAssign is approximately $80, which will be charged to your student bill one week following your enrollment in the course. Students who stay enrolled in Day One Access are also eligible to purchase an optional low-cost loose-leaf copy of the textbook for only $45.00. (Students who opt-out of Day One Access are not eligible to purchase this low-cost loose-leaf version of the book.)

Students who wish to opt-out of this program may do so. However, you must opt-out within the first week of your enrollment to avoid being charged for Day One Access. By opting out, you agree to have your e-book and Webassign access terminated and you will be responsible to obtaining the required materials on your own. If you have purchased the optional low-cost loose-leaf book from The WKU Store, you must return it before the opt-out deadline in order complete the opt-out process. It must also be in its original shrink-wrap.

**********Contact WebAssign directly if you have a technical issue with the website. The phone number is (800) 955 8275********

RECITATIONS VIDEOS

Recitations for this course are designed via recorded videos. At every course submodule, there is a PowerPoint file where you can find the links to the recitation questions and the videos. For each section, there are 5-13 videos with solved exercises by Dr. Ozz, which are similar to the ones in the assignments. It is recommended to read the lecture notes first, and get engaged with recitation videos next.

HOMEWORK and CHAPTER REVIEWS (15%)

In total, 30 homework assignments and 4 chapter reviews are to be completed in the online assessment system, WebAssign. It is your responsibility to keep up with the

homework assignments. You will be allowed TEN tries for each question. A grade of at least 70% will be necessary on each assignment for a student to be allowed to take the next available assignment. Technical difficulty is not a valid excuse for missing homework. For each homework assignment, there are 0-3 questions to turn in your hand-written work for instructor feedback. Simply take a picture of your hand-written work, and upload the file to WebAssign. The feedback of the instructor will be provided back to you in a few days after the assignment is turned in. Your five lowest homework scores will be dropped at the end of the course before calculating your final grade.

Please email the instructor when you have completed each homework to prompt him to provide constructive feedback for your hand-written solution(s).

QUIZZES (30%)

In total, 14 quizzes are to be completed in the online assessment system, WebAssign. Every quiz involves questions from the preceding two sections. You will have 75 minutes to complete each quiz. You will be allowed ONE try for multiple-choice questions and THREE tries for all other questions. In each quiz, there are 1-2 questions for which you will need to turn in your hand-written work for instructor grading. Simply take a picture or your hand-written work, and upload the file to the system at WebAssign. For those questions, WebAssign grading will not be taken into consideration. Your graded work will be provided back to you in a few days after the assignment is turned in. Your four lowest quiz scores will be dropped before calculating your final grade.

Please email the instructor when you have completed each quiz to notify him grade the written portion of the quiz.

TESTS (20+15%) and FINAL EXAM (20%)

There will be two 120-minute tests and a final exam. All exams will be taken online in WebAssign. Only non-graphing TI-83/84 calculators (except the TI-92 or TI-89 or equivalent) are allowed on exams. Formula sheet(s) will be provided. You will need to provide the details of each question (show your work) on scratch paper and upload images documenting your work to WebAssign.

Test 1 and the Final Exam must be taken at a testing center, at either WKU or a certified proctoring location near you. Please keep in mind that there may be an associated proctoring fee at non-WKU testing centers. For more information on scheduling proctored exams, please visit On Demand's website.

Please email the instructor when you have completed each exam to prompt him grade the written portion.

FORMATIVE COURSE ASSESSMENT SURVEY (100 POINTS OF EXTRA CREDIT)

To close the teaching-to-learning loop with your meaningful feedback, a formative course assessment surveys are given. The survey consists of questions examining your overall learning experience and impression of the instructional videos, quizzes, homework assignments, online assessment system, and other course resources. The survey will also contain a series of open-ended questions, which are my favorite because they give you the freedom to express your perception of the course. The survey will be available in Blackboard at the end of the Chapter 7 module. The feedback you provide is very essential for me and will be used to affect immediate adjustments in the day-to-day operations of the course. You will be given extra credit of 100 points by participating in each survey.

GRADING (100%)

The course contains 30 homework assignments, 4 chapter review assignments, 14 quizzes, 2 tests, and a final exam.

Here is the grading scheme:
15% Homework (online)
30% Quizzes (online)
20% Test 1 (proctored at a testing center)
15% Test 2 (online)
20% Comprehensive Final Exam (proctored at a testing center)
1% Formative Course Assessment Surveys (Extra Credit)
The grading scale will be as follows:
A = 90-100%
B = 80-89%
C = 70-79%
D = 60-69
F = 59% and lower

MEETING TIMES

As this is an online course, no physical meetings are required. This is also a self-paced course, so you can complete this course in as little as seven weeks or take up to nine to twelve months to complete the course. Contact WKU On Demand to learn the exact deadline for completion of the course.

COMMUNICATION BY THE INSTRUCTOR

The best way to contact me is via email. My email address is provided at the beginning of the syllabus. I usually check my email on a daily basis during the school year and at least every few days during the summer and winter breaks. If I am out of the country or the

state, the frequency I check my email will vary depending on my access to the internet, but I can still usually check it at least every few days. Regardless of the time of year, if you send me email over the weekend it may take more time for me to respond than through the weekdays. If necessary, we may be able to arrange a meeting over the phone, Zoom, Google Phone, or face-to-face.

STUDENT RESOURCES PORTAL

There is a student resource portal (http://www.wku.edu/online/srp/) that you can access to help succeed in the course.

TITLE IX MISCONDUXT/ASSAULT STATEMENT

Western Kentucky University (WKU) is committed to supporting faculty, staff and students by upholding WKU's Title IX Sexual Misconduct/Assault Policy (#0.2070) at at https://www.wku.edu/policies/docs/182.pdf and Discrimination and Harassment Policy (#0.2040) at https://www.wku.edu/policies/docs/251.pdf.

Under these policies, discrimination, harassment and/or sexual misconduct based on sex/gender are prohibited. If you experience an incident of sex/gender-based discrimination, harassment and/or sexual misconduct, you are encouraged to report it to the Title IX Coordinator, Andrea Anderson, 270-745-5398 or Title IX Investigators, Michael Crowe, 270-745-5429 or Joshua Hayes, 270-745-5121.

Please note that while you may report an incident of sex/gender based discrimination, harassment and/or sexual misconduct to a faculty member, WKU faculty are "Responsible Employees" of the University and MUST report what you share to WKU's Title IX Coordinator or Title IX Investigator. If you would like to speak with someone who may be able to afford you confidentiality, you may contact WKU's Counseling and Testing Center at 270-745-3159.

ADA STATEMENT

In compliance with University policy, students with disabilities who require academic and/or auxiliary accommodations for this course must contact the Student Accessibility Resource Center located in Downing Student Union, 1074. SARC can be reached by phone number at 270-745-5004 [270-745-3030 TTY] or via email at sarc.connect@wku.edu. Please do not request accommodations directly from the professor or instructor without a faculty notification letter (FNL) from The Student Accessibility Resource Center.

ACADEMIC DISHONESTY

Students who commit any act of academic dishonesty may receive from the instructor a failing grade in that portion of the coursework in which the act is detected or a failing

grade in the course without possibility of withdrawal. The faculty member may also present the case to the Office of Judicial Affairs for disciplinary sanctions.

CHAPTER OBJECTIVES in details

By the end of the course, you will be able to:

Chapter 5 (5.8-5.9). Integration of Inverse Trigonometric and Hyperbolic Functions

- Integrate functions whose antiderivatives involve inverse trigonometric functions
- Differentiate and integrate functions involving inverse hyperbolic functions
- Use the method of completing the square to integrate a function
- Review the basic integration rules involving elementary functions

Chapter 7 (7.1-7.4, 7.6). Applications of Integration

- Find the area of a region between two curves or between intersecting curves using integration.
- Describe integration as an accumulation process
- Find the volume of a solid of revolution using the disk method or washer method
- Find the volume of a solid with known cross sections
- Find the volume of a solid of revolution using the shell method
- Compare the uses of the disk method and the shell method
- Find the arc length of a smooth curve and the area of a surface of revolution
- Find the center of mass of a in one or two dimensions
- Use the Theorem of Pappus to find the volume of a solid of revolution

Chapter 8 (8.1-8.5, 8.8). Basic Integration Rules

- Review procedures for fitting an integrand to one of the basic integration rules
- Find an antiderivative using integration by parts
- Solve trigonometric integrals involving powers of sine, cosine, secant, tangent, and sine-cosine products
- Use trigonometric substitution to find an integral
- Use integrals to model and solve real-life applications
- Use partial fraction decomposition with linear/quadratic factors to integrate rational functions
- Find an indefinite integral involving rational functions of sine and cosine
- Evaluate an improper integral that has an infinite limit of integration
- Evaluate an improper integral that has an infinite discontinuity

Chapter 9 (9.1-9.10). Infinite Series

- Write the terms of a sequence, determine whether a sequence converges or diverges
- Write a formula for the *n*th term of a sequence
- Use properties of monotonic sequences and bounded sequences
- Understand the definition of a convergent infinite series
- Use properties of infinite geometric series
- Use the *n*th-Term Test for Divergence of an infinite series
- Use the Integral Test to determine whether an infinite series converges or diverges
- Use properties of *p*-series and harmonic series
- Use the Direct Comparison Test, Limit Comparison Test, Ratio Test, Root Test, or Alternating Series Test to determine whether a series converges or diverges
- Use the Alternating Series Remainder to approximate the sum of an alternating series
- Classify a convergent series as absolutely or conditionally convergent
- Rearrange an infinite series to obtain a different sum
- Find polynomial approximations of elementary functions and compare them with the elementary functions
- Find Taylor and Maclaurin polynomial approximations of elementary functions
- Use the remainder of a Taylor polynomial
- Find the radius and interval of convergence of a power series
- Differentiate and integrate a power series
- Find a geometric power series that represents a function
- Construct a power series using series operations
- Find a Taylor, Maclaurin, or a binomial series for a function
- Use a basic list of Taylor series to find other Taylor series

Chapter 10 (10.1-10.5) Conics, Parametric Equations, and Polar Coordinates

- Analyze and write equations of parabolas, ellipses, and hyperbolas
- Sketch the graph of a curve given by a set of parametric equations
- Eliminate the parameter in a set of parametric equations
- Find a set of parametric equations to represent a curve
- Understand two classic calculus problems, the tautochrone and brachistochrone problems
- Find the slope of a tangent line to a curve given by a set of parametric equations
- Find the arc length of a curve given by a set of parametric equations
- Find the area of a surface of revolution (parametric form)
- Rewrite rectangular coordinates and equations in polar form and vice versa
- Sketch the graph of an equation given in polar form
- Find the slope of a tangent line to a polar graph

- Identify several types of special polar graphs
- Find the area of a region bounded by a polar graph
- Find the points of intersection of two polar graphs
- Find the arc length of a polar graph
- Find the area of a surface of revolution (polar form)
- Analyze and write polar equations of conics