

Youngstown STATE UNIVERSITY

Department of Mathematics and Statistics Course Outline for Mathematics 2673

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Course Title: Calculus 3

Course Number: MATH 2673

Semester: Spring 2020

Course Credit: 4 s.h.

Text: *Calculus* 7th Edition with Enhanced Web Assign, Stewart; Brooks Cole

Course Prerequisite: MATH 1572/1572H

Course Description: The course is an introduction to the study of calculus in three or more dimensions. The main concepts to be studied include the geometry of three-dimensional space, vectors and vector-valued functions, functions of several variables, differentiation and integration of these functions, and applications. The computer will be used to assist this study.

Course Objectives: The goals for the course include:

- Developing an understanding of the fundamental concepts of vector-valued functions of one and several variables and scalar-valued functions of several variables, and their applications.
- Understanding the techniques and applications of derivatives, partial derivatives, and integrals of these kinds of functions, where appropriate, and their applications.
- Developing the ability to read mathematics with understanding and to write mathematics understandably.
- Use MATLAB to aid in the development and understanding of all concepts outlined above.

Learning Outcomes:

- Perform and apply vector operations, including the dot and cross product of vectors, in the plane and space. Graph and find equations of lines, planes, cylinders and quadratic surfaces.
- Differentiate and integrate vector-valued functions. For a position vector function of time, interpret these as velocity and acceleration.
- Evaluate limits and determine the continuity and differentiability of functions of several variables.
- Describe graphs, level curves and level surfaces of functions of several variables.
- Find arc length and curvature of space curves, including the use of unit tangents and unit normals; identify and interpret tangential and normal components of acceleration.
- Find partial derivatives, directional derivatives, and gradients and use them to solve applied problems.
- Find differentials of functions of several variables and use them to solve applied problems.
- Find equations of tangent planes and normal lines to surfaces that are given implicitly or parametrically.
- Use the chain rule for functions of several variables (including implicit differentiation).
- For functions of several variables, find critical points using first partials and interpret them as relative extrema/saddle points using the second partials test. Find absolute extrema on a closed region. Apply these techniques to optimization problems.
- Use Lagrange multipliers to solve constrained optimization problems.
- Evaluate multiple integrals in appropriate coordinate systems such as rectangular, polar, cylindrical and spherical coordinates and apply them to solve problems involving volume, surface area, density, moments and centroids.
- Evaluate line and surface integrals. Identify when a line integral is independent of path and use the Fundamental Theorem of Line Integrals to solve applied problems.
- Find the curl and divergence of a vector field, the work done on an object moving in a vector field, and the flux of a field through a surface. Use these ideas to solve applied problems.
- Use Green's Theorem, the Divergence (Gauss's) Theorem and Stokes's Theorem.
- For a complete list of learning outcomes, see <https://www.ohiohighered.org/transfer/transfermodule/learningoutcomes>

Blackboard: This class will be using the Learning Management System Blackboard. Blackboard can be accessed: <https://ysu.blackboard.com/>. Here you will find a copy of this syllabus, assignments, notes, solutions, etc. You are required to regularly check Blackboard for documents.

Faculty Evaluations: At the end of the semester you will be asked to evaluate the instructor and the course in general. We ask that you take these evaluations seriously and provide honest feedback as these are reviewed by the Chair of the Department of Mathematics and Statistics.

Honors Contracts: The contract honors option is not available for this course.

YSU Policies:

Students with Disabilities: In accordance with University procedures, if you have a documented disability and require accommodations to obtain equal access in this course; please contact me privately to discuss your specific needs. You must be registered with the Center for Student Progress Disability Services, located in

Kilcawley Center – RM 2082, and provide a letter of accommodation to coordinate reasonable accommodations. You can reach CSP Disability Services at 330-941-1372.

Non-Discrimination from the University: Youngstown State University does not discriminate on the basis of race, color, national origin, sex, sexual orientation, gender identity and/or expression, disability, age, religion or veteran/military status in its programs or activities. Please visit www.yzu.edu/ada-accessibility for contact information for persons designated to handle questions about this policy.

Academic Integrity: As outlined in The Student Code of Conduct, all forms of academic dishonesty are prohibited at Youngstown State. This includes plagiarism, the unauthorized use of tools or notes in taking tests or completing assignments, fabrication of data or information used for an assignment, working with others without permission from the instructor, and more. A student who is believed to have violated the academic integrity policy will meet with the instructor to discuss the allegations. The student may accept responsibility for the violation and any sanctions selected by the instructor, or they have the right to ask for a hearing before a hearing panel. The full Academic Integrity policy can be found in Article III. 1. of The Student Code of Conduct, while further information on University procedures for alleged academic integrity violations can be found in Article V.

Cancelled Class Policy: If this class is being cancelled for any one day because of instructor illness, or other reasons, a notice will be sent to your YSU email address as soon as possible. University-wide class cancellation is a decision made by the President's Office, and officially announced via the YSU homepage and on WYSU (88.5 FM) radio. Students may also register at the YSU Portal to receive a text message about University-wide closures via the Emergency Alert Notification System. Please familiarize yourself with the University's Cancellation and Closing Procedures: <https://ysu.edu/cancellation-and-closing-procedures>.

Important Semester Dates:

- *Monday, January 13, 2020* – Term Begins
- *Monday, January 20, 2020* – Martin Luther King Day (University closed)
- *Tuesday, January 21, 2020* – The last day to add a class or change the grade option
- *Sunday, January 26, 2020* – The last day to withdraw with a full refund
- *Monday, March 9 through Sunday, March 15, 2020* – Spring Break
- *Wednesday, March 25, 2020* – The last day to drop the course with a grade of “W”
- *Monday, May 4 through Saturday, May 9, 2020* – Final Exams
- *Saturday, May 9, 2020* – Term Ends

Mathematics Assistance Center (MAC):

For all your mathematics needs:

- Tutoring
- Solutions Manuals
- Computers
- Study Area

Location: Lincoln Building / Room 408

Website: MAC Webpage

(<https://cms.yzu.edu/mathematics-assistance-center/math-assistance-center>)

Email: mathassist@ysu.edu

Phone: 330-941-3274

Hours: Monday – Thursday 9:00 am – 6:00 pm

Friday 9:00 am – 3:00 pm

Check for services available for your course.

Additional Information:

[The Penguin Service Center](#) - A One Stop for Campus is an enrollment resource established to help students access and manage their academic record and student accounts. Please visit the Penguin Service Center or call (330) 941-6000 for assistance with financial aid, records access, registration processes, and tuition charges/billing. The office is located on the second floor of Meshel Hall.

[College/University Career Advisement](#)

[University Counseling Services](#)

The following information is provided by your instructor:

Faculty Information:

Instructor:	Dr. Eric J. Wingler
Office Location:	536 Lincoln Building
Email:	ejwingler@ysu.edu
Phone:	330-941-1817
Office Hours:	Monday – 1000–1050, 1300–1350 Wednesday – 1000–1050, 1300–1350 Friday – 1000–1050 (Or by appointment)
Section Information	CRN: 22541 Days/Times: MTWF, 1400–1450 Location: 202 Lincoln Building

Grading Policy:

Exams, quizzes, and special assignments will determine 70% of your grade. The remaining 30% of your grade will be determined by the final exam. Neither homework nor class attendance will be used to compute your grade unless you are auditing the course. In this case you must attend at least 40% of the time to receive the grade AU; otherwise you will receive the grade W.

Although homework will not be used directly in the computation of your grade, it should not be inferred that doing homework is unnecessary. This is one of the best ways to learn calculus. Occasionally, homework may be collected in order to monitor your understanding of the material.

Partial credit will be given on all quizzes and exams. Hence, it is necessary that you show all work in order to receive proper credit. The solution to a problem includes the process involved in reaching the final answer. Failure to show this work may result in your not being given full credit.

If you have a valid reason for missing an exam or quiz, you will be given a makeup. If possible, you should notify the instructor in advance of missing an exam to make arrangements to take a makeup.

On all exams and quizzes it is expected that you will do your own work and not copy from others. Failure to comply with this policy may result in losing a significant amount of credit and could result in being assigned a failing grade for the course.

The following grading scale will be used.

90 - 100%	A
80 - 89%	B (at least)
70 - 79%	C (at least)
55 - 69%	D (at least)

Below 55%

F (at least)

Course Topics:

Sections(s)	Week(s)	Topic(s)
12.1-12.6	2	Vectors and the Geometry of Space
13.1-13.4	1.5	Vector-Valued Functions and Motion in Space
14.1-14.8	3	Partial Derivatives
15.1-15.4, 15.7, 15.8, 15.9	3.5	Multiple Integrals
16.1-16.5, 16.7-16.9	3.5	Vector Calculus