

Marshall University – Course Syllabus

Course Title/Number	MTH 231 – Calculus and Analytic Geometry III
Semester/Year	Fall 2015
Days/Time	MTWR: 2:00 – 2:50 PM
Location	Smith Hall 511
Instructor	Dr. Ari Aluthge (Pronounced: A-luth-gay)
Prerequisites	MTH 230 (a grade of C or better)
Office	Smith Hall 714
Phone	(304) 696 3050
E-Mail	aluthge@marshall.edu
Office/Hours	MTW: 9:30 – 10:30 AM & 12:30 – 1:30 PM or by appointment
University Policies	By enrolling in this course, you agree to the University Policies listed below. Please read the full text of each policy by going to www.marshall.edu/academic-affairs and clicking on “Marshall University Policies.” Or, you can access the policies directly by going to http://www.marshall.edu/academic-affairs/?page_id=802 Academic Dishonesty/ Excused Absence Policy for Undergraduates/ Computing Services Acceptable Use/ Inclement Weather/ Dead Week/ Students with Disabilities/ Academic Forgiveness/ Academic Probation and Suspension/ Academic Rights and Responsibilities of Students/ Affirmative Action/ Sexual Harassment.

Course Description: Vectors, curves, and surfaces in space. Derivatives and integrals of functions of more than one variable. A study of the calculus of vector-valued functions. 4 hours.

Course Topics: Chapters 11 – 17 in the textbook

- Vector Geometry
- Calculus of Vector Valued Functions
- Multivariable Calculus – Differentiation
- Multivariable Calculus – Integration
- Line and Surface Integrals
- Fundamental Theorem of Vector Analysis (time permitting)

Course Learning Outcomes:		
Course Student Learning Outcomes	Students will practice each outcome in this Course	Student achievement of each outcome will be assessed by
Students will have an understanding of the fundamental concepts of calculus and an appreciation of its many applications.	Class lectures and discussion, and exercises or worksheets.	Homework, projects, and tests.
Develop critical thinking skills by asking students to convert real-world problems into forms suitable for calculus, and interpret the results of calculus in real-world problems.	Class lectures and discussion, and exercises or worksheets.	Homework, projects, and tests.
A deeper understanding of the mathematics that is used in their science and engineering courses.	Class lectures and discussion, and exercises or worksheets.	Homework, projects, and tests.
Students will develop facility in using graphing calculators to solve mathematics problems.	Class lectures and discussion, and exercises or worksheets.	Homework, projects, and tests.
<i>Reasoning:</i> Calculus is a collection of reasoning techniques that allows one to understand how changing quantities behave. This understanding is fundamental to progress in science and engineering. Students will use mathematical reasoning in their study of calculus concepts to verify properties of the concepts they study, and they will use scientific reasoning to determine whether possible solutions are reasonable for a given situation.	Class lectures and discussion, and exercises or worksheets.	Homework, projects, and tests.

<i>Representations:</i> Students will work with information specified in verbal, graphical, tabular, and symbolic forms. Many problems will require students to take information in one of these forms, analyze it, and create a solution in a different form. Students will be required to produce verbal explanations of the meanings of mathematical concepts, both in general and in the context of specific problems.	Class lectures and discussion, and exercises or worksheets.	Homework, projects, and tests.
<i>Information literacy:</i> To solve the applied problems in this course, students must determine which information in the problem is relevant to the solution, access this information and use it to obtain a mathematical solution, and then translate the mathematical solution back into the language of the original problem.	Class lectures and discussion, and exercises or worksheets.	Homework, projects, and tests.

MUonline: Information about the course such as syllabus, assignment schedules, and your grades will be posted on Blackboard. Students should log in to MUonline on a regular basis to check their assignments schedule and grades.

Required Texts, Additional Reading, and Other Materials:

1. Calculus, 2nd Edition, by Rogawski, W.H. Freeman, 2012, ISBN 13: 978-1-4292-6009-1
2. A graphing Calculator (TI-83 plus is recommended). Calculators will not be allowed on some exams.
3. Mathematica manuals (provided by the instructor).
4. Computer access

Course Requirements / Due Dates

1. Weekly WebWork (online) homework assignments due by each Sunday midnight, starting September 6. (Go to <http://webwork.marshall.edu/webwork2> and click on "F15 –Math-231-Aluthge" and log on with your usual Marshall Username and password.)
2. Tests on September 17, October 15, November 19, Final Exam on Monday, December 7 (12:45 – 2:45)
3. Other assignments such as selected worksheets and *Mathematica* projects. Due dates: TBA

Grading Policy

Grade will be based on:

- Selected worksheets – 100 points
- Mathematica Projects – 100 points
- Ten WebWork assignments – 150 points
- Three written tests – 300 points
- Comprehensive Final Exam (Multiple Choice) – 150 points.
- Total Possible Points = 800
- Latter Grades Scale: A = [720, 800], B = [640, 719], C = [560, 639], D = [480, 559], F = [0, 479).

Attendance Policy

Daily attendance will be taken. When a student is absent from class, he/she is responsible for any and all material covered or assigned. Make-up exams will be given only if the student has an excused absence. Excused absences must be approved by the office of the dean of students.

Class Assignments:

1. Ten Weekly WebWork homework assignments due by 11:59 PM on each Sunday.
2. Worksheets – one per each section. Some of these will be collected and graded.
3. Two projects, some involving Mathematica. Due dates TBA.
4. Four tests on September 17, October 9, October 31 and November 22.

5. Final Exam on December 10 (10:15 – 12:15)

About Mathematica: Mathematica is a software package that can be used to do many mathematical tasks including graphing functions, solving equations, and finding derivatives and integrals symbolically. Students will be introduced to Mathematica in class during the early part of the semester. Mathematica is available on every computer on campus.

About WebWork: WebWork is a learning management system (LMS) similar to Blackboard. Students can log onto WebWork by going to <http://webwork.marshall.edu/webwork2> and the clicking on [F13-Math-231-Aluthge](#). Students will use their regular Marshall username and password. They will find their homework assignments there. They should start with the assignment “Orientation” to learn basics of the program, especially how to type mathematical expressions.

Class Projects: Students will do several class projects that will require them to think outside the box. Some of the projects will involve Mathematica. Some of the projects will be group projects. Students will present some of their work

Cell Phone Policy: Please turn off your cell phone or at least put it in silent mode before entering the class.

Class Schedule:

Week of	Coverage (textbook sections)	Topics
August 24 - 27	12.1 – 12.3	Vectors in \mathbb{R}^2 and \mathbb{R}^3
Aug 31 – Sep 3	12.3 – 12.5	Dot product, cross product, planes in the space.
September 7 - 10	12.6 - 13.1	Quadratic surfaces, cylindrical and spherical coordinates, Vector valued functions
September 14 - 17	13.1 – 13.3, Test 1 on 12.1 – 13.3	Calculus of vector valued functions, arc length and speed, Test 1
September 21 - 24	13.3 – 13.5, Skip 13.6	Curvature, motion in space.
Sep 28 – Oct 1	14.1 – 14.3	Functions of two or more variables, partial derivatives.
October 5 - 8	14.3 – 14.5	Differentiability, tangent planes, gradient and directional derivatives.
October 12 - 15	14.6 – 14.7, Test 2 on 13.4 – 14.6	The chain rule, optimization. Test 2
October 19 - 22	14.7 – 14.8	Lagrange multipliers, more on optimization.
October 26 – 29	15.1 – 15.3	Double integrals and triple integrals
November 2 - 5	15.3 – 15.5	More on triple integrals and integration in polar, cylindrical, and spherical coordinates, applications of multiple integrals.
November 9 - 12	15.6 – 16.2	Change of variables, vector fields
November 16 - 19	16.2 – 16.3, Test 2 on 14.7 to 16.3	Line integrals, conservative vector fields, Test 3
November 23 - 26	Thanksgiving	No classes
Nov 30 – Dec 3	16.4 – 17.1	Parameterized surfaces, surface integrals of vector fields.
December 9 - 13	Final Exam on Dec 10	Comprehensive final exam

