Marshall University – Course Syllabus

Course Title/Number	MTH 231 – Calculus and Analytic Geometry III
Semester/Year	Spring 2016
Days/Time	MTWR: 2:00 – 2:50 PM
Location	Smith Hall 518
Instructor	Dr. Ari Aluthge (Pronounced: A-luth-gay)
Prerequisites	MTH 230 (a grade of C or better)
Office	Smith Hall 714
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E-Mail	aluthge@marshall.edu
Office/Hours	Mon & Wed: 10 AM – 1 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 be 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 12 – 16 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, tests, and class participation.
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, tests, and class participation.
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, tests, and class participation.
Students will develop facility in using graphing calculators to solve mathematics problems.	Class lectures and discussion, and exercises or worksheets.	Homework, projects, tests, and class participation.
Reasoning: 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, tests, and class participation.

Representations: 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, tests, and class participation.
Information literacy: 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, tests, and class participation.

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 January 24. (Go to http://webwork.marshall.edu/webwork2 and click on "S16 –Math-231-Aluthge" and log on with your usual Marshall Username and password.)
2. Exams on Feb 1, Feb 22, March 14, April 11, and the Final Exam (Exam 5) on Monday, May 2 (12:45 – 2:45)
3. Selected worksheets collected on Thursdays starting January 21.
4. Several Projects including some *Mathematica* projects. Due dates: TBA
5. Daily attendance and class participation.

Grading Policy

Grade will be based on:

- Selected worksheets – 150 points
- Projects – 100 points
- Ten WebWork assignments – 150 points
- Five written exams – 500 points (100 points each). Final exam will be like an Exam 5 (not comprehensive)
- Daily attendance and class participation 100 points
- Total Possible Points = 1000
- Latter Grades Scale: A = [900, 1000], B = [800, 900), C = [700, 800), D = [600, 700), F = [0, 600).

Attendance Policy

Daily attendance will be taken (1 point for each day). 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 collected on Thursdays.
3. Three projects, some involving Mathematica. Due dates TBA.
4. Four exams during the semester (on Feb 1, Feb 22, March 14, April 11)
5. Final Exam (like an exam 5) on May 2 (12:45 – 2:45)

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 S16-Math-231-Aluthge. Students will use their regular Marshall username and password. Students 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 projects that will require them to think outside the box. Some of the projects will involve Mathematica. Some of the projects can 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
January 11 - 14	12.1 – 12.3	Vectors in plane ($\mathbb{R}^2$) and three dimensional space ($\mathbb{R}^3$)
January 18 - 21	12.3 – 12.5	Dot product, cross product, planes in the space.
January 25 - 28	12.5 – 12.7	Quadratic surfaces, cylindrical and spherical coordinates. Review for Exam 1
February 1 - 4	Exam 1, 13.1 – 13.2	Exam 1 (on Cha 12), Vector valued functions, Calculus of vector valued functions
February 8 - 11	13.3 – 13.5, Skip 13.6	Arc length and speed, Curvature, motion in space.
February 15 - 18	13.5 – 14.2	Finish Cha 13, Functions of two or more variables, limits and continuity. Review for Exam 2.
February 22 - 25	Exam 2, 14.2 – 14.3	Exam 2 (on Cha 13), Finish limits, Partial derivatives
Feb 25 – Mar 3	14.4 – 14.6	Differentiability and tangent planes, The chain rule,
March 7 - 10	14.6 – 14.7, Skip 14.8	Finish chain rule, optimization, Review for Exam 3
March 14 - 17	Exam 3, 15.1 – 15.2	Exam 3 on Cha 14, Double integrals
March 21 - 25	Spring Break	No classes
March 28 - 31	15.3 – 15.4, Skip 15.5	Triple integrals, integration in polar, cylindrical, and spherical coordinates
April 4 - 7	15.6 – 16.1	Change of variables, vector fields, Review for Exam 4
April 11 - 14	Exam 4, 16.2 – 16.3	Exam 4 on Cha 15, Line integrals, conservative vector fields
April 18 - 21	16.3 – 16.5	Parameterized surfaces, surface integrals of vector fields.
April 22 - 28	16.5 – 17.1	Finish Cha 16, Green's theorem (time permitting), Review for Exam 5.
May 2	Exam 5 (final exam)	Exam 5 on Chapter 16 on Monday, May 2, 12:45 – 2:45