Course Title: MATH 251 Engineering Mathematics III  
Term: Fall 2017  
Class Times and locations: Section 510: TR 12:45-2:00 Heldenfels 109  
Section 511: TR 2:20-3:35 Heldenfels 109

Instructor Information
Instructor: Joe Kahlig  
Phone number: Department of Mathematics: 845-3261  
e–mail: kahlig@math.tamu.edu  
Office: Blocker 245C  
Web page: http://www.math.tamu.edu/~joe.kahlig  
Office Hours: Monday, Wednesday, and Friday 9am-11am  
Monday and Wednesday: 1:30pm-3:30pm  
other times by appointment

Course Description and Prerequisites
Description: (Credit 3) Vector algebra, Calculus of functions of several variables, partial derivatives, directional derivatives, gradient, multiple integration, line and surface integrals, Stokes’ theorem.

Prerequisite: MATH 152 or equivalent.

Calculator Policy: Calculators are not allowed on exams, however may be needed for homework.

Learning Outcomes: We will cover chapter 12 to chapter 16 of the book. We will generalize notations already seen in two dimensional calculus to three dimensional space as vectors and we will cover different concepts used in physics, engineering and electronics. At the end of this course, students should be able to manipulate these concepts correctly in order to apply techniques seen in this course to engineering applications. In particular, students should be able to:

- Perform Calculus operations on vector-valued functions, including derivatives, integrals, curvature, displacement, velocity, acceleration, and torsion.
- Perform calculus operations on functions of several variables, including partial derivatives, directional derivatives, and multiple integrals.
- Find extrema and tangent planes.
- Apply the computational and conceptual principles of calculus to the solutions of real-world problems.

Textbook and Resources
  - A hard-back or loose-leaf copy available from the bookstores
  - As an eBook version available from the online system WebAssign.
- WebAssign Account Access Code to access the online homework and/or the eBook version of the textbook.
  - The loose-leaf book at the campus bookstore should include an access code.
  - Or purchase access online directly from WebAssign.

For access code and textbook purchasing information and options, please see the Student Information Page at http://www.math.tamu.edu/courses/eHomework/

Note: if you purchased the “lifetime” or ”multi-term” option for the old textbook for Math 151 or Math 152, then you will not need to purchase access again.

- The solution manual is optional but will give detailed solutions to the odd problems.

Grading Policies
Due to FERPA privacy issues, I cannot discuss grades over email or phone. If you have a question about your grade, please come see me in person.
• Grade Breakdown

<table>
<thead>
<tr>
<th>Activity</th>
<th>Date(tentative)</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework</td>
<td>Weekly</td>
<td>8%</td>
</tr>
<tr>
<td>Exam I</td>
<td>September 19</td>
<td>23%</td>
</tr>
<tr>
<td>Exam II</td>
<td>October 10</td>
<td>23%</td>
</tr>
<tr>
<td>Exam III</td>
<td>November 9</td>
<td>23%</td>
</tr>
<tr>
<td>Final Exam</td>
<td>Section 510: Wednesday, December 13, 8am-10am</td>
<td>23%</td>
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<tr>
<td></td>
<td>Section 511: Wednesday, December 13, 1pm-3pm</td>
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<tr>
<td>TOTAL</td>
<td></td>
<td>100%</td>
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• Grading Scale

<table>
<thead>
<tr>
<th>Range</th>
<th>Grade</th>
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<tbody>
<tr>
<td>90 ≤ Average ≤ 100</td>
<td>A</td>
</tr>
<tr>
<td>80 ≤ Average &lt;90</td>
<td>B</td>
</tr>
<tr>
<td>67≤ Average &lt; 80</td>
<td>C</td>
</tr>
<tr>
<td>57 ≤ Average &lt; 67</td>
<td>D</td>
</tr>
<tr>
<td>Average &lt; 57</td>
<td>F</td>
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**Homework:** Graded homework for this course will primarily consists of electronic assignments that will be worked and submitted in WebAssign.

- Important WebAssign information such as how to purchase access, how to log in and take assignments, the Student Help Request Form, and other WebAssign issues, can be found at http://www.math.tamu.edu/courses/eHomework.

- The homework for a section will be due approximately 3 days after the lecture over that material is completed. For every assignment, you may request an extension that will extend the original due date by two days. Any problem submitted during the extension period will only receive half credit. An extension will not be granted if it is requested more than two days after the original due date. Directions on how to use the webassign system can be found on my web page.

- Two homework assignments will be dropped when computing the average.

**Exams:** There will be three in class exams and a final exam. If you miss the exam for an university approved reason, a makeup can be taken. Once an exam is returned, I will not give a makeup for that exam. If you believe that you have a valid reasons for receiving a makeup after the exams have been returned, then talk to me.

- If you believe an error has been made in grading of an exam, you have one week from the return of the exam to let me know. After that one week period, no change to the grade will be made. The only exception to this is if the points on the exam were totaled incorrectly. If a grade has been recorded incorrectly, you may talk to me anytime during the semester about fixing the grade. I will need to see the exam before the grade will be changed.

**Final Exam:** The final exam will be a cumulative (comprehensive) exam and is required for all students. If your final exam grade is higher than your lowest test grade, the grade on your final will replace your lowest test grade. The day and time of the final exam are determined by the University.

**Attendance and Makeup Policies**

- The University views class attendance as an individual student responsibility. It is essential that students attend class and complete all assignments to succeed in the course. University student rules concerning excused and unexcused absences as well as makeups can be found at http://student-rules.tamu.edu/rule07.

  **Student Rule 7.3:** Students may be excused from attending class on the day of a graded activity or when attendance contributes to a student’s grade, for the reasons stated in Section 7.1, or other reason deemed appropriate by the student’s instructor...

- **Excused absences:** To be excused the student must notify me in writing (acknowledged e-mail message is acceptable) prior to the date of absence if such notification is feasible. In cases where advance notification is not feasible (e.g. accident, or emergency) the student must provide notification by the end of the second working day after the absence. In all cases where an exam is missed due to an injury or illness, whether it be more or less than 3 days, I require a doctor’s note.
– I will not accept the University Explanatory Statement for Absence from Class form.
– An absence due to a non-acute medical service or appointment (such as a regular checkup) is not an excused absence.
– Providing a fake or falsified doctor’s note or other falsified documentation is considered academic dishonesty, will be reported to the Aggie Honor Council, and will result in an F* in the course.

• Makeup exams will only be allowed provided the absence is excused. All make-up exams must be scheduled by me for one of the scheduled makeup times provided by the Math Department. According to Student Rule 7.3, you are expected to attend the scheduled makeup unless you have a University-approved excuse for missing the makeup time as well. If there are multiple makeup exam times, you must attend the earliest makeup time for which you do not have a University-approved excuse. The list of makeup times will be available at http://www.math.tamu.edu/courses/makeupexams.html

Additional Course Information and Policies

Q-drop: The last day to Q-Drop this class is November 17th.

Old Papers: All papers not picked up after the semester ends will be disposed of. If you want your papers, be sure to pick them up before the semester is over.

Class Announcements, E-Mail Policy and Communications: Class announcements will be posted to my class web page and sent to your university e-mail account. If you send me an e-mail, please include your name and course information (i.e. class and section) as well as any additional information that I might need to help respond to your e-mail.

Copyright: All printed handouts and web-materials are protected by US Copyright Laws. No multiple copies can be made without written permission by the instructor.

Additional Helpful Links: All of these links (and others) are on my webpage.

• Help Sessions http://www.math.tamu.edu/courses/helpsessions.html
• Academic Calendar http://registrar.tamu.edu/General/Calendar.aspx
• Final Exam Schedule http://registrar.tamu.edu/General/FinalSchedule.aspx

Americans with Disabilities Act (ADA)

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, currently located in the Disability Services building at the Student Services at White Creek complex on west campus or call 979-845-1637. For additional information, visit http://disability.tamu.edu

Academic Integrity

An Aggie Does Not Lie, Cheat, or Steal or Tolerate Those Who Do. Upon accepting admission to Texas A & M University, a student immediately assumes a commitment to uphold the Honor Code, to accept responsibility for learning, and to follow the philosophy and rules of the Honor System. Students will be required to state their commitment on examinations, research papers, and other academic work. Ignorance of the rules does not exclude any member of the TAMU community from the requirements or the processes of the Honor System. For additional information on the Honor Council Rules and Procedures, consult http://aggiehonor.tamu.edu.
## Course Topics (Tentative weekly schedule)

<table>
<thead>
<tr>
<th>Week</th>
<th>Topics</th>
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| 1    | 12.1: Three Dimensional Coordinate System  
|      | 12.2: Vectors  
|      | 12.3: The Dot Product  
|      | 12.4: The Cross Product  
| 2    | 12.5: Equations of Lines and Planes  
|      | 12.6: Cylinders and Quadric Surfaces  
|      | 13.1: Vector Functions and Space Curves  
|      | 13.2: Derivatives and Integrals of vector-valued functions  
| 3    | 13.3: Arc Length and Curvature  
|      | 13.4: Motion in Space: Velocity and Acceleration  
|      | review  
|      | Exam 1  
| 4    | 14.1: Functions of Several Variables  
|      | 14.2: Limits and continuity  
|      | 14.3: Partial Derivatives  
|      | 14.4: Tangent Planes and Differentials  
| 5    | 14.5: The Chain Rule  
|      | 14.6: Directional Derivatives and the Gradient Vector  
|      | 14.7: Maximum and Minimum Values  
| 6    | 14.8: Lagrange Multipliers  
|      | 15.1: Double Integrals over Rectangles  
|      | review  
| 7    | 15.2: Double Integrals over General Regions  
|      | 10.3: Polar Coordinates  
| 8    | 15.3: Double Integrals in Polar Coordinates  
|      | 15.4: Applications of Double Integrals  
|      | 15.5: Surface Area  
| 9    | 15.6: Triple Integrals  
|      | 15.7: Triple Integrals in Cylindrical Coordinates  
| 10   | 15.7: Triple Integrals in Spherical Coordinates  
|      | 15.9: Change of Variables in Multiple Integrals  
| 11   | 16.1: Vector Fields  
|      | Review  
|      | Exam 3  
| 12   | 16.2: Line Integrals  
|      | 16.3: The Fundamental Theorem for Line Integrals  
| 13   | 16.4: Green’s Theorem  
|      | 16.5: Curl and Divergence  
| 14   | 16.6: Parametric Surfaces and their Areas  
|      | 16.7: Surface Integrals  
|      | 16.8: Stokes Theorem  
| 15   | 16.9: The Divergence Theorem  
|      | Review  
|      | Exam 4  
|      | Review  

Exam 1

Exam 2

Exam 3