MATH 2550 Course Syllabus

Welcome to Introduction to Multivariable Calculus. This course is designed for you to extend fundamental concepts you encountered in differential and integral calculus to several variables. All of our students play an important role in our educational mission, and I hope that you will find this to be a useful, fundamental course for your future studies. Please note: items on the syllabus are subject to change. Any changes to the syllabus will be relayed to the students in lecture and through T-Square.

Learning Objectives and Topics

Throughout this course, it is expected that students will do the following.

- **Construct** mathematical expressions involving multivariable functions, use them to **compute** and **interpret** mathematical quantities.
- **Write** logical progressions of precise statements to justify and communicate mathematical reasoning.
- **Apply** multivariable calculus concepts to solve real-world problems.

For example, students will be expected to **apply** multivariable calculus concepts to construct a vector function that represents the motion of an object, **compute** is curvature, and **interpret** what the curvature at a particular point tells us about the motion of the object. Some of the topics that are explored in this course include the following.

- Characterize the **motion of objects** in three dimensions using arc length, tangent and normal vectors, and curvature.
- Apply partial differentiates to study the **approximation and optimization** of multivariable functions.
- Apply **integration of functions defined over several variables** using Cartesian and other coordinate systems to calculate physical quantities such as centers of mass.

Meeting Times and Locations

MWF from 10:40-11:50 am, in Skiles 255.

Textbook and Course Websites


**Textbook and Homework:** www.mymathlab.com

**Course Website:** t-square.gatech.edu

**On-line Discussions:** piazza.com/gatech/summer2016/2550/home

Instructor and Teaching Assistant

**Instructor:** Dr. Greg Mayer

**E-mail:** greg.mayer@gatech.edu (outside of lectures e-mail is often the best way to contact your instructor)

**Office Phone:** 404-894-4397

**Office Hours:** Tuesdays from 2:00 to 4:00 pm, room Skiles 116; or by appointment. Additional office hours held prior to midterms and the final exam.

**Teaching Assistant:** Jun Tao Duan

**E-mail:** jt.duan@gatech.edu

**Office Hours:** Thursdays, 11:00 am to noon, Skiles 146A.
Expectations

As your instructor, my role is to articulate learning objectives that define what skills you are expected to be able to demonstrate, facilitate interactive lectures, coordinate with teaching assistants to grade student work and facilitate learning activities, provide you with assessments that both develop and measure your understanding and knowledge of the subject matter, provide feedback on your performance, provide solutions to quizzes, midterms, and assignments, and be available for assistance when requested.

The teaching assistant is responsible for assisting with learning activities during Friday lectures, holding office hours, marking, and responding to questions from students.

As students, you are expected to take your responsibility seriously, attend class, behave in a respectful manner to both your instructor and fellow students at each class meeting, complete all assignments in a timely and professional manner, study the subject matter outside of class time, and ask for help when necessary.

Announcements

You are responsible for obtaining any announcements or materials placed on T-square (t-square.gatech.edu). Please join our class page on Piazza (www.piazza.com) so you can view/participate in course-related discussions.

Preparing for Midterms and the Final Exam

Practice tests and additional office hours will be offered prior to midterms and the final exam. Depending on your own objectives, you may need to complete additional work beyond MML homework, worksheets, written assignments, quizzes, and practice tests to adequately prepare for midterms and the final exam.

Course Requirements and Grading

Books, cell phones, and calculators are not allowed during midterms and quizzes and the final exam. Unless students are asked to use a particular method or theorem, they are allowed to use any approach to solve any problem they are given on any quiz/midterm/exam/homework. Students must adequately justify their reasoning for full marks.

Formula Sheet

Students can bring 1 formula sheet to all quizzes, midterms, and the final exam, whose maximum size is 8.5x11. Students can use all sides of their sheet (front and back), and can use the same sheet all semester. Students do not need to hand-in their formula sheet at any point in this course, and their sheet can have anything they wish to have on it (the sheet can be entirely typed, entirely hand written, or some combination of both).

Participation

Participation grades will not be counted in the first and last weeks of the course. Students will have opportunities to receive participation marks through the following activities.

1) Learning Catalytics will be used on some Monday and Wednesday classes.
2) Presentations: students can present problems from Friday worksheets. Presentations are graded for participation only. Students and the TA are encouraged to ask the student that is presenting questions.
3) Group work: completion of select problems from Friday worksheets. Worksheet problems are graded
for completion, and students must work in groups of two or three students. Each question is graded using the scheme: 0 marks for no work or for students working by themselves, 1 mark for starting the problem or for a final answer with insufficient justification, 2 marks for an answer that is justified. Changes to the grading scheme will be announced using the course website and/or during lectures.

The lowest $N$ participation grades will be dropped, $N \geq 3$, and will be determined near the end of the course.

**MML Homework**

Homework are assigned on-line and consist of exercises on MyMathLab (MML). You are expected to understand all homework problems for all quizzes, midterms, and the exam. In order to increase the effectiveness of lectures, you should attempt MML problems before lectures. Students who are unable to submit their homework before they are due, for any reason, may contact their instructor to ask for an extension. There may be MML homework due the final week of class.

**Written Assignments (WAs)**

WAs will be posted on the course website, will consist of problems from the textbook, and students are write their assignment solutions on paper. Students are welcome to type their work. Not all WA questions may be graded. Tentative assignment due dates are listed on last page of the syllabus. WAs are due at the beginning of class, on the dates on the tentative schedule, located at the end of the syllabus. Late WAs are not accepted (because solutions are posted shortly after they are due).

**Quizzes and Midterms**

On Fridays we will have 10 to 15 minute quizzes and 50-minute midterms. Tentative dates are on the last page of the syllabus. **Quizzes cover material up to and including the most recent lecture**, as indicated on the course schedule (last page of the syllabus). Quizzes consist of questions similar to recent MML homework. Solutions to quizzes and midterms will be posted on the course website and/or Piazza. Tentatively, midterms cover the following sections.

- Midterm 1: Covers everything up to and including Section 13.4
- Midterm 2: Covers everything up to and including Section 14.6
- Midterm 3: Covers everything up to and including Section 15.4

**Final Exam**

All students are expected to write the final exam. The final exam is comprehensive. It covers all course concepts and is not focused on any particular part of the course. Students who are unable to attend the scheduled final exam for any reason are responsible for notifying their instructor prior to the exam and as soon as possible. Final exams will not be returned, but students are welcome to view their graded final exam with their instructor.

**Extra Credit Opportunities**

One bonus final exam question will be added to the final exam if the end of semester CIOS response rate is above 80% by the end of the last lecture. The bonus question will be worth roughly 5% of the final exam grade.

There are six bonus MML quizzes on a variety of topics that can be completed at any time before the end of the last lecture. $Q/100$ will be added to your final percentage grade before it is converted into a letter, where $Q$ is your average percentage grade on all bonus quizzes. For example, if you were to obtain a $Q = 42\%$ average on the bonus quizzes, then $Q/100 = 0.42\%$ would be added to your final percentage grade before it is converted to a letter grade.
Grades

Your final grade will be calculated using whichever of the following weights yields the highest grade.

<table>
<thead>
<tr>
<th>Component</th>
<th>5%</th>
<th>5%</th>
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</thead>
<tbody>
<tr>
<td>Participation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quizzes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MML Homework</td>
<td>10%</td>
<td>10%</td>
</tr>
<tr>
<td>Written Assignments</td>
<td>10%</td>
<td>10%</td>
</tr>
<tr>
<td>Midterms</td>
<td>45%</td>
<td>35%</td>
</tr>
<tr>
<td>Final Exam</td>
<td>25%</td>
<td>35%</td>
</tr>
</tbody>
</table>

Numerical grades are converted to letter grades based on the standard intervals: A: [90%, 100%), B: [80%, 90%), C: [70%, 80%), D: [60%, 70%), F: [0%, 60%). Students should not expect any changes to these intervals. Percentage grades are rounded to the nearest integer before conversion to letter grades. For example, 89.50% is converted to an A, while 89.49% is converted to a B, and so on.

Re-grading

- If any of your work has been graded in error, you should contact your instructor as soon as possible.
- Should you wish to have your work re-graded, do not change or add to the work on your paper.
- A re-grade request can only be submitted if you have done something correct that has been marked as incorrect.
- Re-grade requests **must be requested within two weeks** after the work has been returned to you.
- You must check your answers with the solutions before submitting such a request.

Illnesses, Emergencies, Absences

- Students who encounter last-minute technical issues or other emergencies can request an extension from their instructor for MML homework via email.
- Unless your instructor is provided with a reasonable explanation (severe illness, death in the family, etc.) for a late written assignment submission, you will receive a grade of zero.
- Students who will miss a midterm or quiz due to a university-sponsored event or athletics should provide their instructor with the official documentation in advance.
- Students who miss a quiz or midterm, with reasonable explanation, can either have their remaining quiz or midterm grades weighted more heavily, or they can write a make-up quiz/midterm up to 1 week after the quiz/midterm was held. It is up to the student as to which they prefer, but they should notify their instructor as soon as they can to make necessary arrangements.
Class Policies

Attendance
In the event of an absence, you are responsible for all missed materials, assignments, and any additional announcements or schedule changes given in class. Class disruptions of ANY kind will NOT be tolerated and may result in your removal from the classroom. Please show courtesy to your fellow classmates and instructor by adhering to the following class rules.

• Come to class on time and stay for the entire class period.
• Refrain from conversing with your fellow students.
• Put away any reading materials unrelated to the course.
• Please, unless we are using a Learning Catalytics activity, refrain from using laptops, they are a distraction to others.

Academic Dishonesty
All students are expected to comply with the Georgia Tech Honor Code (the honor code can be found at http://www.policylibrary.gatech.edu/student-affairs/code-conduct). Any evidence of cheating or other violations of the Georgia Tech Honor Code will be submitted directly to the Dean of Students. Cheating includes, but is not limited to the following.

• Using an unapproved calculator, books, or any form of notes on tests.
• Copying directly from any source, including friends, classmates, tutors, Internet sources (including Wolfram Alpha), or a solutions manual.
• Allowing another person to copy your work.
• Taking a midterm or quiz using someone else’s name, or having someone else take a test or quiz in your name.
• Asking for a re-grade of a paper that has been altered from its original form.
• Using someone else’s name to gain participation points for them, or to take quizzes or tests for them, or asking someone else to use your identity for any graded or participation submission.

Students with Disabilities and/or in need of Special Accommodations
Georgia Tech complies with the regulations of the Americans with Disabilities Act of 1990 and offers accommodations to students with disabilities. If you are in need of classroom or testing accommodations, please make an appointment with the ADAPTS office to discuss the appropriate procedures. More information is available on their website, http://www.adapts.gatech.edu.
**Tentative Course Schedule**

All dates in the table below are tentative. Cancellations of lectures due to inclement weather may result in moving through course material at a faster pace. WS = worksheet, WA = written assignment, HW = homework. Generally, WAs are due at beginning of lecture on Wednesdays, midterms and quizzes are held on Fridays, and MML homework is due Thursday evenings.

<table>
<thead>
<tr>
<th>Dates</th>
<th>Mondays</th>
<th>Wednesdays</th>
<th>Thursdays</th>
<th>Fridays</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Lecture Topics</td>
<td>Written Assignments</td>
<td>Lecture Topics</td>
<td>MML Due</td>
</tr>
<tr>
<td>1 May 16 – May 20</td>
<td>12.4, 12.5</td>
<td>12.6, 13.1</td>
<td>MML 1</td>
<td>WS 1</td>
</tr>
<tr>
<td>2 May 23 – May 27</td>
<td>13.2, 13.3</td>
<td>13.4</td>
<td>MML 2</td>
<td>WS 2 Quiz 1</td>
</tr>
<tr>
<td>3 May 30 – Jun 3</td>
<td>Holiday</td>
<td>WA 1 due</td>
<td>Review</td>
<td>Midterm 1</td>
</tr>
<tr>
<td>4 Jun 6 – Jun 10</td>
<td>14.1, 14.2</td>
<td>14.3</td>
<td>MML 3</td>
<td>WS 3 Quiz 2</td>
</tr>
<tr>
<td>5 Jun 13 – Jun 17</td>
<td>14.4, 14.5</td>
<td>14.6</td>
<td>MML 4</td>
<td>WS 4 Quiz 3</td>
</tr>
<tr>
<td>6 Jun 20 – Jun 24</td>
<td>14.7</td>
<td>WA 2 due</td>
<td>14.8, Review</td>
<td>Midterm 2</td>
</tr>
<tr>
<td>7 Jun 27 – Jul 1</td>
<td>14.9, 15.1</td>
<td>15.2, 15.3</td>
<td>MML 5</td>
<td>WS 5 Quiz 4</td>
</tr>
<tr>
<td>8 Jul 4 – Jul 8</td>
<td>Holiday</td>
<td>15.4</td>
<td>MML 6</td>
<td>WS 6 Quiz 5</td>
</tr>
<tr>
<td>9 Jul 11 – Jul 15</td>
<td>15.5, 15.6</td>
<td>WA 3 due</td>
<td>Review</td>
<td>Midterm 3</td>
</tr>
<tr>
<td>10 Jul 18 – Jul 22</td>
<td>15.7</td>
<td>15.8, Review</td>
<td>MML 7</td>
<td>WS 7</td>
</tr>
<tr>
<td>11 Jul 25 – Jul 29</td>
<td>Review</td>
<td></td>
<td>Reading/Final Exam Period</td>
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Course textbook chapters and sections correspond to those stated in the School of Mathematics course description for Math 2550 at [http://www.math.gatech.edu/course/math/2550](http://www.math.gatech.edu/course/math/2550). Chapters 12, 13, 14, and 15 are as follows.

- Chapter 12: Vectors and Geometry
- Chapter 13: Vector Functions and Motion
- Chapter 14: Partial Derivatives
- Chapter 15: Multiple Integrals

For further information on campus-wide dates see [http://www.registrar.gatech.edu/calendar](http://www.registrar.gatech.edu/calendar). For final exam schedules, see [http://www.registrar.gatech.edu/students/exams.php](http://www.registrar.gatech.edu/students/exams.php).

**Campus-Wide Dates**

- 05 16 16 First Day of Classes
- 05 30 16 Holiday
- 06 04 16 Withdrawal deadline: last day to withdraw with a grade of "W"
- 07 04 16 Holiday
- 07 25 16 Last lecture
- 07 27 16 Reading and final exam period begins
- 08 08 16 Grade submission deadline
- 08 09 16 Final grades posted

For further information on campus-wide dates see [http://www.registrar.gatech.edu/calendar](http://www.registrar.gatech.edu/calendar)

For final exam schedules, see [http://www.registrar.gatech.edu/students/exams.php](http://www.registrar.gatech.edu/students/exams.php)