

Georgia Institute of Technology
Math 2605 - Calculus III for Computer Science – Fall 2010

	<u>Room</u>	<u>Days</u>	<u>Time</u>
Lecture (D1,D2)	Skiles 202	TR	9:35am – 10:55am
Recitation (D1)	Skiles 256	MW	10:05am – 10:55am
Recitation (D2)	D. M. Smith 207	MW	10:05am – 10:55am

Instructor: Anton Leykin, see webpage for office hours

Office: Skiles 220

Phone: (404) 894-2710

Email: leykin@math.gatech.edu

Webpage: <http://people.math.gatech.edu/~aleykin3/math2605fall10>

Teaching Assistants:

Section D1: Becca Winarski rwinarski@math.gatech.edu

Section D2: Ke Yin kyin@math.gatech.edu

Texts:

Required:

- Notes by Eric Carlen (see webpage);
- Salas, Hille, and Etgen, *Calculus: One & Several Variables*, 10th edition;

Recommended:

- Notes on linear algebra (see webpage);
- Olver and Shakiban, *Applied Linear Algebra*.

Prerequisites and Description: Math 2605 is an introduction to multivariable calculus and linear algebra. Topics covered include: Topics in linear algebra and multivariate calculus and their applications in optimization and numerical methods.

Prerequisites for the course are Math 1502 or Math 1512 or (Math 15X2 + Math 1522).

Attendance and make-up exams: Attendance is required for all lectures. The student who misses a class meeting is responsible for any assignments and/or announcements made. *In the event of an absence due to travel representing Georgia Tech, such as an intercollegiate sports competition, you must notify the professor at least two weeks in advance to arrange an early test or other alternative.* Otherwise, such absences will be treated as personal.

Homework: This course will have daily homework assignments, which should be done before the next class. Homework will not be collected, however, being able to solve homework problems will be crucial for successful performance on quizzes and exams.

Quizzes: There will be quizzes every Wednesday except the weeks of mid-term exams and the last week of classes.

Exams: This course will have 2 mid-term exams, and a comprehensive final exam. The exams for the course will take place on:

Exam 1	Sep 23 (Thu)
Exam 2	Oct 28 (Thu)
Final Exam	Dec 16 (Thu) 8:00am - 10:50am

Projects: You may turn in *two* or *three* computer projects by the following deadlines:

Project 1	Oct 2 (Sat) 11:00pm
Project 2	Nov 6 (Sat) 11:00pm
Project 3	Nov 21 (Sat) 11:00pm

Please, complete at most one project per deadline; if you are planning to complete two projects, then you may aim for any two of the deadlines above. If three projects are submitted, two best scores will count. The list of potential projects and detailed instructions will be posted on the course web-page.

Calculators: By default calculators are not allowed.

Learning Disabilities: It is the right of any student with a certified learning disability to request necessary accommodation. Such requests must be made well in advance of the time that the accommodation is required and a letter of documentation from the **ADAPTS** office must be presented at the time of any request.

Academic Honesty: It is expected that all students are aware of their individual responsibilities under the **Georgia Tech Academic Honor Code**, which will be strictly adhered to in this class.

Additional Resources: In addition to the textbook, lectures, and office hours there are other resources available that might be of use for you during the course. All Georgia Tech students are eligible for 1-on-1 tutoring, see the website associated with the **Office of Success Programs**. There is also the **Math Lab** in the School of Mathematics where tutoring services are provided. Links to more resources are posted on the webpage.

Grades: The usual ten-point scale will be used (A: 90-100%, B: 80-89%, C: 70-79%, D: 60-69%, F: 0-59%), however, if necessary, adjustments will be made to arrive at a standard grade distribution. Grades will be based upon quizzes (Q), the mid-term exams (E1, E2), projects (P), and the final exam (F) and the total scores will be computed using the following formula: $E1 + E2 + Q + P + 2F$, where maximal values of all symbols are equal to 100. (Each quiz is 10 points, 10 best quizzes count. Each project is worth 50 points, two best projects count.)

Tentative list of topics:

- Parametric (explicit) and equational (implicit) presentation of lines and planes.
- Decomposition of a vector into the parallel and orthogonal parts with respect to another vector, reflections, distances (point to line, point to plane), distance between two lines.
- Vector functions, curves.
- Functions of several variables, partial derivatives, gradient, level sets.
- Linearization of functions, gradient, Jacobian, Newton's method.
- Critical points, Hessian, local minima and maxima.
- Optimization with constraints, Lagrange's method.
- Diagonalization of symmetric matrices.
- Singular value decomposition.
- Schur factorization.
- Householder and Givens methods for QR.
- Iterative methods for eigenvalues/vectors.
- Integrals of functions of two variables, changing coordinates.
- Applications of integrals (area, centroid, mass).

Important Dates for Fall 2010:

Aug 23	First day of classes
Aug 27	Last day to register
Sep 6	No class
Oct 15	Last day to drop individual courses with a grade of "W" by 4:00 pm ET
Oct 18-19	No classes
Oct 31	Last day to withdraw from school with "W" grades in all courses by 4:00 pm ET
Nov 25-26	No classes
Dec 10	Last day of classes

Georgia Institute of Technology
Math 2605 - Calculus III for Computer Science – Spring 2010

	<u>Room</u>	<u>Days/Time</u>
Lecture (C1,C2)	Skiles 202	MWF 10:05am – 10:55am
Lecture (M1,M2)	Skiles 202	MWF 15:05am – 15:55am
Recitation (C1)	Skiles 256	TR 10:05am – 10:55am
Recitation (C2)	Skiles 249	TR 10:05am – 10:55am
Recitation (M1)	Skiles 202	TR 15:05am – 15:55am
Recitation (M2)	Skiles 154	TR 15:05am – 15:55am

Instructor: Anton Leykin, see webpage for office hours

Office: Skiles 220

Phone: (404) 894-2710

Email: leykin@math.gatech.edu

Webpage: <http://people.math.gatech.edu/~aleykin3/math2605>

Teaching Assistants:

Sections C1 and M1:	Alan Diaz	adiaz@math.gatech.edu
Section C2:	Kangkang Wang	kwang63@math.gatech.edu
Section M2:	Yi Huang	yhuang@math.gatech.edu

Texts: Salas, Hille, and Etgen, *Calculus: One & Several Variables*, 10th edition (required);
Notes by Eric Carlen (see webpage);

Olver and Shakiban, *Applied Linear Algebra* (recommended);

Additional notes on linear algebra (see webpage).

Prerequisite and Description: Math 2605 is an introduction to multivariable calculus and linear algebra. Topics covered include: Topics in linear algebra and multivariate calculus and their applications in optimization and numerical methods.

Prerequisites for the course are Math 1502 or Math 1512 or (Math 15X2 + Math 1522).

Attendance and make-up exams: Attendance is required for all lectures. The student who misses a class meeting is responsible for any assignments and/or announcements made. *In the event of an absence due to travel representing Georgia Tech, such as an intercollegiate sports competition, you must notify the professor at least two weeks in advance to arrange an early test or other alternative.* Otherwise, such absences will be treated as personal.

Homework: This course will have daily homework assignments, which should be done before the next class. Homework will not be collected, however, being able to solve homework problems will be crucial for successful performance on quizzes and exams.

Quizzes: There will be quizzes every Thursday except the weeks of mid-term exams and the last week of classes.

Exams: This course will have 3 mid-term exams, and a comprehensive final exam. The exams for the course will take place on:

Exam 1	February 18
Exam 2	March 18
Exam 3	April 22
Final Exam	TBA

Projects: There will be required computer projects throughout the course. A list of potential projects will be posted on the course web-page. You will be required to turn in *two* computer projects through out the semester. Exact details will be posted on the webpage later.

Calculators: Be default calculators are not allowed. Exceptions will be made for the quizzes and exams that involve routine floating point calculations. *Calculators that can do calculus symbolically shall not be used:* no credit will be given on tests for a correct answer without the intermediate steps.

Learning Disabilities: It is the right of any student with a certified learning disability to request necessary accommodation. Such requests must be made well in advance of the time that the accommodation is required and a letter of documentation from the **ADAPTS** office must be presented at the time of any request.

Academic Honesty: It is expected that all students are aware of their individual responsibilities under the **Georgia Tech Academic Honor Code**, which will be strictly adhered to in this class.

Additional Resources: In addition to the textbook, lectures, and office hours there are other resources available that might be of use for you during the course. All Georgia Tech students are eligible for 1-on-1 tutoring, see the website associated with the **Office of Success Programs**. There is also the **Math Lab** in the School of Mathematics where tutoring services are provided. Links to more resources are posted on the webpage.

Grades: The usual ten-point scale will be used (A: 90-100%, B: 80-89%, C: 70-79%, D: 60-69%, F: 0-59%), however, if necessary, adjustments will be made to arrive at a standard grade distribution. Grades will be based upon quizzes (Q), the mid-term exams (E1, E2, E3), projects (P), and the final exam (F) and the total scores will be computed using the following formula: $E1 + E2 + E3 + Q + P + 2F$, where maximal values of all symbols are equal.

Topics Covered During the Semester:

<u>Topic</u>	<u>Lectures</u>
Lines and planes. Scalar and vector product	3
Review of elementary linear algebra	3
Vectorspaces, maps and their matrices, change of basis	6
Review of Gram-Schmidt, QR and least squares	3
Diagonalization, spectral theorem, SVD	3
Introduction to numerical methods	1
Partial pivoting, LU factorization	2
Householder and Givens methods for QR	2
Fixed point method	1
Iterative methods for $Ax=b$ and eigenvalues/vectors	3
Vector calculus, curves	3
Functions in several variables, partial derivative	3
Linearization of functions; gradient, Jacobian, Newton iteration	3
Min-max problems	3
Double integral	3

Important Dates for Spring 2010:

January 11	First day of classes
January 15	Last day to register
January 18	No Class
March 5	Last day to drop individual courses with a grade of "W" by 11:59 pm ET
March 19	Last day to withdraw from school with "W" grades in all courses
March 22-26	No Class
April 30	Last day of classes

Math 2605, Calculus III for CS

Sections T1 and T2

Lectures : MW 16:35-17:55 pm in Weber SST III, Room 2

by Michael Loss (loss@math.gatech.edu)

Office; Skiles 214 B

Office hours : M11 -12, T 12-1
or by appointment

Recitations:

Section T1: Robert Krone, (rkrone3@math.gatech.edu) TR
17:05-17:55 in Skiles 269

Section T2: Tianjun Ye (maolilan@math.gatech.edu) , TR
17:05-17:55 in Skiles 271

A student note taker is needed in this course to take notes for a student with a disability. The note taker will be paid a stipend for this assignment. Skills needed are the ability to take accurate, legible, and organized notes and a commitment to attend every lecture. If interested, please contact Libby Mixon or Tina Allen via email at notetaker@vpss.gatech.edu as soon as possible. Be sure to indicate the Professor's name, time, day and course number in the subject line of the announcement.

Course Outline and Calendar:

[Course Outline and Calendar:](#)

This link takes you to a specification of course objectives, topics of study, a course calendar with week by week reading assignments, test dates and other important dates.

[Homework Solutions](#)

[Practice Tests](#)

[Quizzes and their solutions](#)

[Tests and their solutions](#)

[Projects](#)

Grading Policy

There are three tests, several quizzes, two required computer projects and a comprehensive final exam. The lowest test grade will be dropped. Each of the remaining test grades count 20%, the two projects together count 20%, the final exam counts 30%, and the quizzes 10% of the course grade.

There will be homework, but the homework will not be graded directly. In recitation you will be provided with solutions to the homework problems, and have a chance to discuss them at length. Please use this chance. You will be quizzed on the homework material at regular intervals during the semester. This amounts to indirect grading of the homework. The quiz problems will be such that if you have been keeping up with the homework, you will find them simple enough. If you do not, you may well find them impossible. So please keep up with the homework -- there is an easy 10 percent of the grade at stake here.

There will be a menu of 4 projects. You can do two additional projects, and use the project grade on these to replace your lowest test grade. Each of the 4 projects has its own due date. These are absolute, so plan ahead. If you miss one, go on to the next.

There will be make up tests only for jury duty, institutionally approved activities and illness. Official documentation is required as proof.

The Georgia Institute of Technology
Fall 2009

Math 2605 - Calculus III for Computer Science

Lecture: Room: Skiles 202 - Time: TTH 9:35am – 10:55am

Recitation (D1): Room: Skiles 256 - Time: MW 10:05am – 10:55am

Recitation (D2): Room: Skiles 249 - Time: MW 10:05am – 10:55am

Instructor: Brett D. Wick Office: Skiles 224
Office Phone: 404-864-4311 Office Hours: T/W/TH 11:00am – 12:00pm
Email: wick@math.gatech.edu or by appointment
Webpage: <http://people.math.gatech.edu/~bwick6/math2605.html>

Teaching Assistants:

Section (D1): Thao Vuong Office: Skiles 149
Office Phone: 404-385-3839 Office Hours: TBA
Email: tvuong@math.gatech.edu

Section (D2): Anh Tran Office: Skiles 165
Office Phone: 404-894-8770 Office Hours: TBA
Email: tran@math.gatech.edu

Text: The following text will be used during the course for the calculus portion of the class:

Title: “Calculus: One & Several Variables”

Authors: Salas, Hille, and Etgen

Publisher: John Wiley and Sons, Inc.

Edition: 10th

Additionally, notes by Professor Eric Carlen have been posted at:

<http://people.math.gatech.edu/~bwick6/math2605.html>.

Additionally, an alternate presentation of the linear algebra topics and applications can be found at: <http://www-old.math.gatech.edu/academic/courses/core/math2601/Web-notes/>.

Prerequisite and Description: Math 2605 is an introduction to multivariable calculus and linear algebra. Topics covered include: Topics in linear algebra and multivariate calculus and their applications in optimization and numerical methods, including curve fitting, interpolation, and numerical differentiation and integration.

Prerequisites for the course are Math 1502 or Math 1512 or (Math 15X2 + Math 1522).

Attendance: Attendance is required for all lectures. The student who misses a class meeting is responsible for any assignments and/or announcements made. Office hours will not be utilized to re-teach material presented in class. However, questions to better understand the course are always welcome.

There will be no opportunities for make-up tests after the fact. **In the event of an absence due to travel representing Georgia Tech, such as an intercollegiate sports competition, you must notify the professor at least two weeks in advance to arrange an early test or other alternative.** Otherwise, such absences will be treated as personal.

Homework: This course will have daily homework assignments which should be done before the next class. Homework will not be collected, but will help with the quizzes and exams.

Quizzes: There will be weekly quizzes through out the semester.

Exams: This course will have four mid-term exams, and a comprehensive final exam. The exams for the course will take place on:

Exam Dates:

Exam 1	September 21
Exam 2	October 12
Exam 3	November 2
Exam 4	November 23
Final Exam	Wednesday, December 9 8:00am - 10:50am

Projects: There will be required computer projects throughout the course. A list of potential projects will be posted on the course web-page. You will be required to turn in *two* computer projects through out the semester. Exact details will be provided later.

Calculators: No restrictions will be placed on the use of calculators that do elementary mathematics on the tests. **Calculators that can do calculus symbolically shall not be brought to tests.** No credit will be given on tests for a correct answer without the intermediate steps.

Learning Disabilities: It is the right of any student with a certified learning disability to request necessary accommodation. Such requests must be made well in advance of the time that the accommodation is required and a letter of documentation from the **ADAPTS** office must be presented at the time of any request.

Academic Honesty: It is expected that all students are aware of their individual responsibilities under the **Georgia Tech Academic Honor Code**, which will be strictly adhered to in this class.

Additional Resources: In addition to the textbook, lectures, and office hours there are other resources available that might be of use for you during the course. All Georgia Tech students are eligible for 1-on-1 tutoring, see the website associated with the **Office of Success Programs**. There is also the **Math Lab** in the School of Mathematics where tutoring services are provided.

The following additional links also provide useful information on how to study mathematics and a different presentation of some of the material that has been covered in this course.

How to Study Mathematics:

http://www.math.ohio-state.edu/students/how_to_study.html

MIT Online Mathematics Courses:

<http://ocw.mit.edu/OcwWeb/web/courses/courses/index.htm#Mathematics>

Grades: The usual ten-point scale will be used (A: 90-100, B: 80-89, C: 70-79, D: 60-69, F: 0-59), however, if necessary, adjustments will be made to arrive at a standard grade distribution. Grades will be based upon quizzes, the mid-term exams, projects, and the final exam and will be computed with the following formula:

$$(E1 + E2 + E3 + E4 + Q + F - \min(E1, E2, E3, E4, F)) + P + \frac{F}{2}$$

where the components of this formula correspond to the ingredients mentioned above. The dropped grade in the formula is the only mechanism for coping with personal events such as illness and family emergencies.

Topics Covered During the Semester:

<u>Topic</u>	<u>Lectures</u>
Lines and planes. Scalar and vector product	3
Review of elementary linear algebra	3
Vectorspaces, maps and their matrices, change of basis	6
Review of Gram-Schmidt, QR and least squares	3
Diagonalization, spectral theorem, SVD	3
Introduction to numerical methods	1
Partial pivoting, LU factorization	2
Householder and Givens methods for QR	2
Fixed point method	1
Iterative methods for $Ax=b$ and eigenvalues/vectors	3
Vector calculus, curves	3
Functions in several variables, partial derivative	3
Linearization of functions; gradient, Jacobian, Newton iteration	3
Min-max problems	3
Double integral	3

Important Dates for Fall 2009:

August 17	First day of classes
August 21	Last day to register
September 7	Labor Day - No Class
October 3-6	Fall Student Recess - No Class
October 16	Last day to drop or withdraw with a grade of "W"
October 25	Last day to withdraw from school with a grade of "W"
November 26-27	Thanksgiving Break - No Class
December 4	Last day of classes