

# Syllabi for the new Lower-level Courses

## Fall 2015, GaTech

*Math 1550: Introduction to Differential Calculus*

Textbook: Thomas

Topic	Sections	Lectures
Real numbers, absolute value, lines, circles, parabolas	A.1, A.3	1
Functions, transcendental functions, inverses, and graphs	1.1-1.3, 1.5-1.6	3
Limits and continuity, asymptotes	2.1-2.6	3
Differentiation: computations, related rates, differentials	3.1-3.11	5.5
Max/min problems, mean value theorem, curve sketching	4.1-4.4	2
Optimization, Newton's method	4.6, 4.7	1.5
Indefinite integrals	4.8	1
Fundamental theorem of calculus	5.4	1

*Math 1551: Differential Calculus*

Textbook: Thomas

Topics	Sections	Lectures
Review of functions	1.1-1.8	4
Limits and continuity	2.1-2.6	6
Differentiation	3.1-3.11	9
Max/min problems, mean value theorem, curve sketching	4.1-4.4	5
Optimization, Newton's method	4.6, 4.7	3
Indefinite integrals	4.8	2
Fundamental theorem of calculus	5.4	1

*Math 1552: Integral Calculus*

Textbook: Thomas

Topics	Sections	Lectures
Review of differentiation and indefinite integration	Ch. 3, 4.8	2
Riemann Sums and the fundamental theorem of calculus	5.1-5.4	4
Integration by substitution, area	5.5-5.6	3
Transcendental functions: logarithms, exponentials	7.1-7.2	2
Techniques of integration	8.2-8.5, 8.7	7
L'Hôpital's rule, improper integrals	4.5, 8.8	4
First-order linear differential equations	9.2	1
Infinite sequences and series	10.1-10.2	3
Convergence tests, power series	10.3-10.7	6
Taylor polynomials and Taylor approximation	10.8-10.9	4
Applications: volumes, length, work, center of mass	6.1-6.6	6

Math 1553: Introduction to Linear Algebra

Textbook: Lay

Topics	Sections	Lectures
Solving systems of linear equations	1.1-1.2	3
Vectors, geometry of $\mathbb{R}^n$ , solution sets	1.3-1.5	4
Linear independence and linear transformations	1.7-1.9	2
Matrix operations and matrix inverses	2.1-2.3	2
LU factorization	2.5	2
Subspaces, bases, dimension, rank	2.8-2.9	2
Determinants	3.1-3.2	2
Vector spaces	4.3	1
Eigenvalues and eigenvectors	5.1-5.3	3
Diagonalization of symmetric matrices	7.1-7.2	2
Inner products and orthogonality	6.1-6.3	3
Gram-Schmidt and QR decomposition	6.3-6.4	3
Method of least squares	6.5	1

Math 1554: Linear Algebra

Textbook: Lay

Topic	Sections	Lectures
Solving systems of linear equations	1.1-1.2	2
Vectors, geometry of $\mathbb{R}^n$ , and solution sets	1.3-1.5	3
Linear independence and linear transformations	1.7-1.9	3
Matrix operation and matrix inverses	2.1-2.3	3
LU factorization	2.5	1
Leontief model	2.6	1
Applications to computer graphics	2.7	1
Subspaces, bases, dimension, rank	2.8-2.9	3
Determinants	3.1-3.3	3
Markov chains	4.9	1
Eigenvalues, eigenvectors, and diagonalization	5.1-5.3	4
Google PageRank	Notes	1
Complex eigenvalues and eigenvectors	5.5	2
Inner products and orthogonality	6.1-6.3	4
Gram-Schmidt and QR	6.3-6.4	3
Least squares	6.5-6.6	1
Diagonalization and symmetric matrices	7.1	2
Quadratic forms and constrained optimization	7.2-7.3	2
Singular value decomposition	7.4	2

Math 1555: Calculus for Life Sciences

Textbook: Neuhauser

Topic	Sections	Lectures
Discrete models, sequences and difference equations	2.1 and 2.2	3
L'Hôpital's rule, antiderivatives	5.5, 5.8	2
Integration and the fundamental theorem of calculus	6.1-6.3	6
Techniques of integration	7.1-7.4	6
Taylor approximations	7.6	2
Differential equations	8.1, 8.2	6
Multivariable calculus	10.1-10.4	9
Systems of differential equations	11.1-11.3	8

Math 1564: Linear Algebra with Abstract Vector Spaces

Textbook: Hefferon

Topic	Sections	Lectures
Solving Linear Systems and Gaussian Elimination	One.I.1-3	3
Reduced Echelon Form	One.III.1-2	2
Geometry of vectors	One.II.1-2	1
Abstract vector spaces	Two.I.1	1
Subspaces and spanning sets	Two.I.2	2
Linear independence	Two.II.1	1
Bases	Two.III.1	2
Dimension	Two.III.2	2
Vector spaces and linear systems	Two.III.3	1
Isomorphisms	Three.I.1-2	2
Linear transformations	Three.II.1-2	3
Computing linear maps	Three.III.1-2	2
Matrix operations	Three.IV.1-3	2
Inverses	Three.IV.4	1
Markov chains	Three.Topic	1
Change of basis	Three.V.1-2	2
Orthogonal projection	Three.VI.1,3	1
Gram-Schmidt orthogonalization	Three.VI.2	1
Line of best fit	Three.Topic	1
Determinants	Four.I.1-2	2
Laplace's expansion	Four.III.1	1
Complex vector spaces	Five.I.1-2	1
Similarity	Five.II.1	1
Diagonalizability	Five.II.2	1
Eigenvalues and eigenvectors	Five.II.3	2
Method of Powers and Page Rank	Five.Topics	2
Jordan canonical form	Notes	1