Math 107 Syllabus – Summer II 2006.

Course description:
Systems of linear equations, matrix operations, vector spaces, linear transformations, orthogonality, determinants, eigenvalues and eigenvectors, diagonalization, linear differential equations and systems with constant coefficients and applications, computer simulations. Intended primarily for engineering and science students.

Textbook:
Linear algebra and differential equations, by Gary L. Peterson and James Sochacki. Published by Addison Wesley, ISBN 0-201-66212-4.

Daily coverage and homework assignments:

Lesson	Topic(s)	Section(s)	Page / Homework
1	systems of linear equations	1.1	15 / 2,8,15,18,19,22,23,26,28 16 / 30 (intro to Matlab) *Additional Problem* 1
2	matrices and matrix operations	1.2	26 / 5,9,11,12,14,18,20,21,23,28-30,37
3	inverses of matrices	1.3	36 / 1,6,7,10,11(b),13,14,16,26
4	special matrices; determinants	1.4 & 1.5	41 / 4,12,17,20,22(c),24(d),26,32,33 50 / 5,8,12,15,16
5	proofs and applications	1.6	57 / 4,6,10,11,13,15(c),16,17
6	proofs and applications	1.7	64 / 5-7
7	linear independence in $\mathbb{R}^n$	2.3	93 / 1-3,6
8	vector spaces; subspaces	2.1 & 2.2	73 / 2,3,9 81 / 1(c,d),2(b,d),3(c),5,11-13,21,22
9	linear independence; dimension	2.3 & 2.4	93 / 7,10,14,17,21,24,25,27,28,32 104 / 2,3(a,b),4(c,d),7,10,14,18,21,26
10	Wronskians	2.5	110 / 5-8,12,14,16
11	**Test I - Monday July 17, in class**		
12	intro differential eqns	4.1	188 / 2,3,6,10,11,15,17,24 119 / 1,4,7
13	homogeneous CCLDE (i)	4.2	201 / 2,5,23 *Additional Problems* 3 and 4
14	CCLDE (ii); undeterm coeff	4.2 & 4.3	201 / 7,10-13,20,22,24,29,30,37,40-42 211 / 1,4,9,11,18,36
15	applications (i)	4.5	228 / 5-8,11,13
16	applications (ii)	4.5	228 / 1,3,15,16,18

17	linear transformations	5.1	243 / 3,4,7,12,13,18,20,33,35,36
18	algebra of LT	5.2	252 / 6,11,14,18,20,23
19	matrices; eigenvalues	5.3 & 5.4	267 / 1,5,7,9,17
			277 / 5,8,9,16,17,20,26,32
20	similar matrices, Jordan	5.5	277 / 32 (is A diagonalizable?)
			286 / 5,8,9,16,17,21,24,30,31,36,40
21	**Test II - Monday July 31, in class**		
22	systems of LDE	6.1	301 / 1,4,5,9,17,27,28
23	constant coeffs diag; nondiag	6.2 & 6.3	311 / 3,5,11,15,22,25,28,30
			314 / 3,17
24	nonhomogeneous systems	6.4	318 / 1,5,11,13,15
25	converting eqns	6.5 & 6.6	322 / 4,5,13
			331 / 2,4,11,15
26	inner product spaces	9.1	419 / 6-8,12,16,18,20-22
27	orthonormal bases	9.2	429 / 2,6,9,13
28	Review		

Final Exam - Friday Aug 11, 9-12pm

Additional Problems.

1. Assume that the given system is consistent. For each system determine all possibilities for the numbers r and $n-r$ where r is the number of nonzero rows of the (reduced) row echelon form of the augmented matrix and n is the number of the unknowns of the given system.
(a) $Ax = b$ where $A = [a_{ij}]_{3\times 2}$.
(b) $Ax = b$ where $A = [a_{ij}]_{3\times 4}$.

3. In each of the following write the given expression in the form $a + ib$:
(a) $\frac{3+i}{4-5i}$, (b) $\exp(2-3i)$, (c) $e^{i\pi}$, (d) $e^{2-i\pi/2}$, (e) 2^{1-i}, (f) π^{1+2i}.

4. Solve each of the following equations:
(a) $x^4 + 2x^2 + 1 = 0$, (b) $x^5 + 1 = 0$.

Help Room:
The help room is located in Physics 299. Math 107's preferred tutor is **Mike Jenista**. Tutors available daily from Monday July 3 until Friday August 11 according to the following schedule:

	M	T	W	Th	F
12-1pm	Gonzales	Cesa	Gonzales	**Jenista**	**Jenista**
1-2pm	Lam	Cesa	Gonzales	Cesa	**Jenista**
2-3pm	Lam	Lam	Gonzales	Cesa	**Jenista**
3-4pm	Lam	Lam	Gonzales	Cesa	**Jenista**

Grades:
Tests are worth up to 100 points each.
Final Exam is worth up to 150 points.
Homework is worth up to 60 points.