Mathematics 173

Advanced Linear Algebra

$C^n(R)$			$\nu_j(A)$
C^∞	A_{ij}	$f(T)$	$N(T)$
$C(R)$	A^{-1}	$\mathcal{F}(S,F)$	nullity(T)
$C([0,1])$	$A^\dagger$	H	O
C_x	A^*	I_n or I	per(M)
D	$\tilde{A}_{ij}$	I_V or I	$P(F)$
det(A)	A^t	K_λ	$P_n(F)$
δ_{ij}	$(A\|B)$	K_ϕ	ϕ_β
dim(V)	$B_1 \oplus \cdots \oplus B_k$	L_A	R
e^A	$\mathcal{B}(V)$	$\lim_{m\to\infty} A_m$	rank(A)
e_i	β^*	$\mathcal{L}(V)$	rank(T)
E_λ	β_x	$\mathcal{L}(V,W)$	$\rho(A)$
F	C	$M_{m\times n}(F)$	$\rho_i(A)$
$f(A)$	C_i	$\nu(A)$	$R(T)$
F^n			

Time and Place: T & R 9:35- 11:00 am, RN 105, Spring 2012

Instructor: Asuman Guven Aksoy

Office: Adams 215, Campus x72769 Off-Campus: dial 607-2769

Email: aaksoy@mckenna.edu

http://www.asumanaksoy.com

Office Hours: T & R 11:00 am – 12:00 and by appointment.

Text: *Linear Algebra Done Right,* second edition by S. Axler. Springer UTM

Prerequisites: Math 60 Linear Algebra

Course Description:

Possible topic include, fundamentals of vector spaces, linear mappings and duality, spectral theory, diagonalization, spectral mapping theorem, Cayley-Hamilton Theorem, invariant subspaces, Jordan canonical forms, Inner product spaces and operators on inner product spaces. i.e., self-adjoint, normal, positive operators, polar and singular decomposition, isometries. Matrix valued functions, matrix inequalities. These topics will provide basic knowledge of functional analysis and Hilbert space theory. These set of tools can be used on any sub-branch of mathematics as well as in quantum physics.

References:

Friedberg, Insel and Spence, *Linear Algebra,* (4th edition)

Peter D. Lax, *Linear Algebra and its Applications* (2nd edition)

Steven Roman, *Advanced Linear Algebra* (3rd edition)

Gilbert Strang, *Linear Algebra and its Applications* (4^{th} edition)

Exams, Homework and Papers:

2 Midterms Exams on February 28 and April 12^{th}.

Homework (10-15 questions), generally due on Thursdays.

Comprehensive Final Exam Tuesday, May 8^{th} at 9:00 am

There will be **NO** make-ups for any exams unless there is a very good reason.

It is expected that you will write **two five page expository papers.** Following are two examples of such topics:

1. *The Fundamental Theorem of Linear Algebra* by Gilbert Strang, Amer. Math. Monthly 100 (1993), no. 8, pp 848-855.
2. *Visualization of Matrix Singular Value Decomposition* by Cliff Long, Mathematics Magazine, Vol. 56, No.3 (1983), pp 161-167.

Grading Scheme:

Final grade is computed as follows:

Homework: 20%, Papers: 10%, Midterm I : 20%, Midterm II: 20%, Final Exam: 30%.

Tutoring:

Tutor: Connor Ahlbach, his e-mail: c_ahlbach@yahoo.com

Tutoring will be held in the Math Commons. Math Commons Room is located at 208 Adams Hall-down the hall from Poppa lab.