MATH 108 B ADVANCE LINEAR ALGEBRA WINTER 2011

INSTRUCTOR : Gustavo Ponce (off: SH 6505) (phone : 893-8365)

TEACHING ASSISTANT : Keith Thompson (off. 6431 N)

SCHEDULE : 12^{30} pm - 1^{50} pm.

ROOM : Phelp 1260

OFFICE HOURS (instructor) : W & TH 5 pm - 6^{30} pm. (T.A.) TH 4 pm - 5 pm.

TEXTBOOK : "Linear Algebra" by S. Freidberg-A. Insel-L. Spence

PROGRAM : review of Math 108A, and Chapters 4, 5, 6, and 7.

EVALUATION : First Midterm (30%) Nov. 3

(5) Homeworks (30%) Label your work clearly and **staple** your papers together. Solutions to selected problems will be available online in my web page.

Second Midterm, (40%) Dec. 1

HOMEWORK #1 (due Oct. 4 in class) from the textbook
Chapter / Section / Problems :
3 / 2 / 2(f), 4(b), 5(d), 6(b) /// 3 / 3 / 3(c), 8 /// 3 / 4 / 2(b), 5 /// 4 / 2/ 10

EXTRA PROBLEMS :

1) Let $V_1, V_2, ..., V_n$ be a finite collection of sub-spaces of the vector space E. Prove that the union of $V_1, V_2, ..., V_n$ is a sub-space of E if and only if there exists $j = 1, 2, .., n$ such that V_j contains all the V_k's, $k = 1, 2, .., n$.

2) Given the vectors $\vec{v}_1 = (1,1,0)$, $\vec{v}_2 = (0,1,0)$, $\vec{v}_3 = (0,0,2)$, describe geometrically the following sets

$$B_1 = \{(x,y,z) \in \mathbb{R}^3 \,:\, (x,y,z) = \sum_{j=1}^{3} \alpha_j \vec{v}_j, \quad \alpha_j \geq 0\},$$

$$B_2 = \{(x,y,y) \in \mathbb{R}^3 \,:\, (x,y,z) = \sum_{j=1}^{3} \alpha_j \vec{v}_j, \;\; 0 \leq \alpha_j, \;\; \sum_{j=1}^{3} \alpha_j = 1\},$$

$$B_3 = \{(x,y,z) \in \mathbb{R}^3 \,:\, (x,y,z) = \sum_{j=1}^{3} \alpha_j \vec{v}_j, \;\; 0 \leq \alpha_j, \;\; \sum_{j=1}^{3} \alpha_j \leq 1\},$$

$$B_4 = \{(x,y,z) \in \mathbb{R}^3 \,:\, (x,y,z) = \sum_{j=1}^{3} \alpha_j \vec{v}_j, \quad \sum_{j=1}^{3} \alpha_j = 1\}.$$

Typeset by $\mathcal{A}\mathcal{M}\mathcal{S}$-TEX