HOMEWORK #4 – MATH 5405
SPRING 2016

These are mostly taken from Trappe and Washington.
(1) Two codewords were sent using the Hamming [7,4] code and were received as 0100111 and 0101010. Each one contains at most one error. Correct the errors.
(2) Let C be the binary code $\{(0,0,1),(1,1,1),(1,0,0),(0,1,0)\}$. Show that C is not linear and compute $d(C)$.
(3) Let $C \subseteq \mathbb{F}^n$ be a linear code and let $u+C$ and $v+C$ be cosets of C. Show that $u+C = v+C$ if and only if $u - v \in C$. Further show that every element of $\mathbb{F}^n$ is in exactly one coset.
(4) Let C be the cyclic binary code of length 4 with generating polynomial $g(x) = x^2 + 1$. Which of the following polynomials correspond to elements of C?
$$1 + x + x^3, 1 + x + x^2 + x^3, x^2 + x^3$$