

# ECE6606

## Homework 3

Do the following problems from Chapter 2 in textbook: 14, 28, 30c-h, 32, 35,  
Chapter 3 7, 9, 12, 13(a-d)

Old exam questions

### 15 points

(Chapter 3) 1. a) Construct  $GF(8)$  using an appropriate primitive polynomial. Express  $GF(8)$  as a linear vector space using some basis.

b) Find the conjugacy classes of  $GF(8)$  w.r.t.  $GF(2)$ .

c) Factor  $x^7 + 1$  as a product of irreducible polynomials

### 15 points

(chapter 3) 2. Describe a *nonexhaustive* approach to finding all irreducible polynomials of degree 5 with coefficients in  $GF(2)$ . (You DO NOT need to give the polynomials, rather give an approach to finding them)

### 10 points

(chapter 3) 3. In this problem you are to prove that the following facts are either true or false.

a)  $GF(4)$  is a subfield of  $GF(1024)$ .

b)  $GF(16)$  is a subfield of  $GF(1024)$ .