

# Some extra notes from lecture 1

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Digital vs. Analog

↳ Allow manipulation of data

↳ compression

↳ error control → more robust

→ duplication

→ repeater

↳ Encryption (security)

Digital modulation vs Analog modulation ← ECS 332

↳ AM, FM, PM

What does "modulation" mean?

So far, modulation is simply a process that shifts the frequency content of the message (to center (approximately) around some carrier frequency  $f_c$ .)

Why do we need to perform modulation?

1) to transmit in the "suitable" channel freq. band

↳ potentially required by some governmental organization(s)

some governmental organization(s)  
↳ avoid "bad" freq. band  
↳ severe attenuation

2) to have reasonable antenna size  
 $\alpha \lambda \propto \frac{1}{f}$

3) to allow multiple uses of the frequency spectrum by communicating in different frequency bands.

Ex. Think about multiple radio stations transmit audio signal simultaneously without interfering one another.