ELEX 3525 : Data Communications
2013 Winter Session

Mid-Term Review

Material Covered

The mid-term exam will cover the material in lectures 1-7. The style and difficulty of the questions will be similar to those on the assignments.

Hints

Answer the Question

- answer the exact question that is asked, nothing more, nothing less
- but make sure you understand what is being asked
- I cannot give you marks for answering a different question, even if that answer is correct, neatly written and took you a long time to figure out
- I can't give you marks if your answer is ambiguous because of poor handwriting (1 and 7 confused, 1 C vs k, mW vs uW)
- use the same numbering as in the questions (if the questions are numbered 1,2,3, don't answer a,b,c)

Check the Units, Check your Math

- do dimensional analysis: multiply/divide the units in your formula to make sure you end up with the units required for the answer. If you add/subtract variables they must have the same units.
- double-check your results by hand, don't depend on the calculator: round off all values in your calculation to the nearest integer value (or even to nearest power of ten). Then check your result by hand.
- units matter: stating your answer is in mA instead of A means your result is off by 1000X and just as wrong

Topics Covered

Data

- bit and byte order
- number base conversions
- number base notation
- character codes (bring ASCII table to exam)

Transmission Media

- differential signalling
- differential and common-mode voltages (note error in lecture notes)
- Zo from TP and co-ax dimensions
- Zo from per-length L and C
- velocity factor from dielectric constant
- optical fiber, single- vs multi-mode dimensions, loss, cost vs metallic cable
- wire gauge
- free-space propagation
- wired vs wireless channels

Channel Characteristics

- transfer function
- baseband vs bandpass channels
- bandwidth definitions
- phase shift, delay and frequency
- group delay
- thermal noise power calculations
- Gaussian noise probability distribution
- crosstalk, FEXT vs NEXT

Serial Interfaces

- DTE vs DCE
- character transmission format
- RS-232
- data vs handshaking signals
- voltages
- RS-422

ISI

- Nyquist no-ISI criteria
- excess bandwidth parameter (alpha)

Baseband Interfaces

- current loops
- slew rate
- impedance matching
- noise margin
- tri-state and open-collector(drain) outputs
- transformers: impedance, voltage, current transformation
- optoisolators

Line Codes

- baseband vs bandpass channels
- purpose of line codes
- properties of line codes
- common line codes

Exam Format

Short problems similar to those on the assignments plus true/false, multiple-choice and matching-type questions.