ELEC – 5705
FUNDAMENTALS OF DATA CONVERTERS
LECTURE -1

Masum Hossain

Today's Topics

- Course information
  - Course instructor info. and office hours
  - Textbook and Syllabus
  - Exam Dates
  - Marking scheme
- Course overview
- Background Review

Course Information

Instructor information	
Name:	Masum Hossain
Office:	EDC – D4528
Office hours:	Online zoom meeting, encouraged to make an appointment by e-mail
E-mail:	masumhossain@cunet.carleton.ca Add 5705 in the subject line
Website:	Not set up yet

Lecture Section:	LEC	Monday: 11.35 to 12.55 Wednesday: 11:35 to 12:55

Course Information

Item	Weight
Midterm (1st Week of Nov)	40%
Project	30%
Class participation and assignments	30%
Total	100%

Topics to cover

- **Fundamental concepts of ADCs and DACs**: SNDR, SFDR, ENOB, Quantization noise etc.
- **Nyquist rate data converters**: Flash ADC, SAR ADC, Pipeline ADC, Sub-ranging ADC
- **Oversampled data converters**: 1st order delta-sigma ADC, Higher order delta-sigma ADC
- **Components of ADCs**: Sample and hold, Comparator, reference generation, and clock generation.
- **Digital to Analog Converter (DAC):** Current mode DAC, Voltage mode DAC, Capacitive DAC.

Topics to cover

- **Recent trends in data converters:** time/phase domain data converter
- **Characterization of ADCs and DACs**
- **Time interleaved ADCs**
- **Calibration of ADCs and DACs**
- **Example of ADCs:**
  - **56 GS/s 6-bit ADC**
  - **100 GS/s 5 to 6-bit ADC**
- **Example of DACs:**
  - **56 GS/s DAC**
  - **100 GS/s 7-bit DAC**

Background Material

- Transistor (MOSFET) functionality: I-V curve
- Small signal Gain of different config: CS, CG & SF
- Frequency Response & Bandwidth
- Differential amplifier
- Linearity
- Feedback
- discrete time signal processing