Ongoing List of Topics:

- URL: http://www.ece.mtu.edu/faculty/bamork/EE5223/index.htm
- Term Project - last few proj/teams being firmed up and getting moving.
  - Follow timeline, see posting on web page (posted in week 5)
  - Formal outline w/complete references complete, get/keep cranking...
- Homework - example problem on Cap Bank configuration & protection
- Protection of Shunt Capacitor Banks (print out "Cap Bank Prot" at Week 11)
  - Capacitor Bank - Synchronized Switching
- Gen Protection - Ch. 8, IEEE Publication 95TP102 - Prot of Synch Gens
  - Basic Protection issues
  - Volts/Hz
  - Overspeed
- Next: Motor Protection, Real-time Communications
How to minimize transient?

SF₆ CB's - Can control each pole separately. Can control ±20°.
CB "timing"

- Statistical close times for each pole:

- When closing all 3 poles at once, the "pole span" is the time from 1st close to last.

EE 5210 - Power Systems Protection  Spring 2001
SYNCH GENERATORS

Effect of system (or load) Power Factor:

System Consists
VARs

LAGGING
OVER-Excited
(|\vec{E}_A| \text{ is } > \text{ rated voltage})

UNITY

LEADING
Under-Excited
(|\vec{E}_A| \text{ is } < \text{ rated voltage})

Per-Phase Equivalent

\[ E_{\text{rms}} = 4.44kW + N\Delta\Phi P \]
\[ E_{\text{rms}} = \frac{4.44 \cdot k \cdot B \cdot A}{f \cdot N} \]

Box: \[ E = \frac{E_{\text{rms}}}{f} \] volts/Hz