**EE 380 - Test 3 Review Checklist**  
(Date of this Draft: 8 Feb 2000)

**Coverage:** Basically, all material related to Chapters 5 and 6, as these have been on the class reading/study assignment over the last 3 weeks. Key sections are 5.1 thru 5.5, 5.7 thru 5.9, and 6.1 thru 6.7. Sections 5.6 and 6.8 should also be read to achieve an overview and general understanding. The study questions at the end of each chapter are very helpful in focusing on the key topics. Also, anything covered to date in lectures, reading (book, handouts, and recommended URLs), and homework. Much of this material is listed below to refresh your memory. This list is not guaranteed to be complete, but should be nearly so.

**Concepts:** know and be able to *explain*

- All pre-requisite circuit analysis skills.
- Phasor analysis pre-requisites
- Single-phase and three-phase circuits
- Definition of loads: P, Q, S, PF, efficiency
- Voltage regulation
- Voltage dip or “flicker”
- Circuit breakers
- X/R ratio
- DC offset in short-circuit current
- Interrupting media in circuit breakers, pros and cons, typical voltage levels used for:
  - Air
  - Vacuum
  - Oil
  - SF₆
- AC, DC, and total (true) RMS short-circuit current
- Voltage regulation
- Surge Arresters
- Disconnect Switches
- Load Disconnect Switches
- Reclosers
- Sectionalizers
- Fuses
- Melt and clear times.
- Load current, Minimum vs. maximum fault current
- Coordination of recloser, sectionalizers, fuse
- Bus configurations:
  - Ring Bus
  - Breaker and a half
  - Double Bus Double Breaker
  - Main and Transfer
- Automatic Transfer (Automatic “Throwover”)

**Calculations, Determinations:**

- Calculations involving V, I, P, Q, S, Z, R, X, θ for single phase 60-Hz circuit
- Calculate V, I, PF, S, P, Q, using phasor diagrams and power triangles as visual aid.
- Calculate phasor line currents flowing into single-phase or 3-phase sources and loads.
- Determine phasor line currents flowing into “black box” load. Draw power triangle, calculate P, Q, S, θ.
- Voltage regulation related to line sections (as in Fig. 3.7) or transformers (as in Section 4.7)
- Induction motor starting current (according to NEC, NESC)
- Voltage dip
- Induced forces between bus bars
- Calculate ratios needed for CT and VT
- X/R ratio, time constant, and short-circuit current: AC, DC, and total (true) RMS

**Format and Proctoring of Test:**

The test will be 3-4 pages long. Problems may be either calculation or short explanation. Space for working problems is provided on the test - no additional sheets of paper (except for one 5" x 8" note card) are allowed on your desk. Test seating is close-packed, but please spread out as much as possible. To avoid MTU Academic Integrity concerns (i.e. cheating) please focus on your own paper. Take off your baseball cap or rotate it to the back. No dark glasses, talking, or glances at other test papers. If you have a question, please raise your hand. Clear your throat if you need to get attention. Don’t hesitate to ask your professor questions during the test. If there is a typo or if a clarifying hint can be given, your professor will notify the entire class, usually by writing it on the board.

**Preparation Hints:**

The test will be designed to be worked in 40 minutes. Please come early and get situated. The room is open during the preceding hour, so you can come in at 8am to study if you wish. If he's available, the professor may also come early to answer your pre-exam questions.

There will be a cover sheet on the test. Put your name on the cover sheet in bold capital letters. Don’t open
the test until you get the go-ahead, at approximately 5 minutes after the hour. If you’ve come to every class, studied the handouts, reading assignments, recommended web pages, done the homework, and understand the pre-requisite material from EE 232 and EE 280, you will be very well-prepared for the test. No partial credit can be given if work is not shown – it helps to show the equations used, sketch the circuit, label things, and make note of assumptions.

A 5” x 8” equation card can be used during the test. Place your name on the upper right corner of the card. Equations in algebraic form, sketches of sample circuits, and “typical” phasor diagrams are allowed. Things that are not allowed are: pre-written answers to anticipated essay questions, worked-out problems, and photocopied (or laser-printed) equation cards used by groups of students.

Keep in mind that the purpose of the equation card is to help you recall a concept or non-obvious equation that you already understand. Unfortunately, you’ll not have time to figure out concepts “on the run” during the test. You are strongly encouraged to put time in on the course on an ongoing basis, and avoid cramming the night before each test. Ideally, the night before the test should involve a relaxed review of lecture notes, homeworks, and reading assignments.

For the “short explanation” questions, give a concise explanation based on cause and effect and other interrelationships (i.e. don’t just recite unconnected facts – how do the “pieces” fit together and why?) Two or three short sentences and perhaps a simple sketch should be sufficient.

I’ll attempt to schedule a review session on Thursday evening, but I’m not available until after 8pm. Check your e-mail tomorrow for confirmation, room number, and time.

Hope you all do well on the test. See you Friday morning.