III. OCEAN WAVES AND SURF FORECASTING

1. OCEAN REGIONS AND GLOBAL CLIMATE PATTERNS
   Ch. 1 “The Paradox of Impossible Knowledge” from Surf Science
   Required. Very short chapter. Note the emphasis on uncertainty and the state of the science. Figure 1.1 is useful as a visual depiction of how processes / concepts are related in climate / wave / reef interaction.

   Ch. 2 “Large-Scale Weather Patterns” from Surf Science
   Required. This chapter contains extremely important material on global climate circulation including circulation patterns under various simplification (landless, not rotating, etc), discussion of role of specific heat capacity land / water, seasonal (Jan, Jul) statistical highs / lows (Fig. 2.4), and Coriolis force, and rotation of air near lows and high.

   Required. This has a good discussion of ocean and subregions of oceans with characteristics of each. The characteristics of interest are summarized in the lecture slides. It also has an even more abbreviated discussion of storm and wave formation than the Surf Science text. The primary material of interest is the discussion of ocean regions. You should also be able to look at the maps showing storms (the one I showed in the review) and be able to interpret process underlying them.

2. SURFACE WINDS AND PRESSURE CHARTS
   Ch. 3 “The Formation of a Depression” from Surf Science
   Required. Another critical chapter that covers the development of low pressure systems including cold fronts, warm fronts, occluded fronts.

   Required. A much more detailed description of the material covered in Surf Science, Ch.3. The discussion of constant height charts (such as surface analysis charts) versus constant pressure (isobaric – such as the 500mb analysis charts) is important. The two charts routinely provided by the Ocean Prediction Center are of each type. It provides good discussions of pressure gradient, pressure gradient force, Coriolis, surface friction, surface winds versus winds aloft, and convergence/divergence zones. You don’t need to understand all the physics (mostly in the boxes) but you do need to have a solid conceptual understanding of the material.

3. OCEAN WAVES I: OPEN OCEAN WAVES
   Ch. 4 “The Growth of Ocean Waves” from Surf Science
   Ch. 5 “Propagation of Free-Traveling Swell” from Surf Science
   Both of these are required reading. These match up well with the lectures on wave propagation and dispersion but the lectures actually contain more detail. You can skip the section on “Empirical models, parametric models, and real physics.”

4. OCEAN WAVES II: NEAR SHORE WAVES
   Ch. 6 “Refraction” from Surf Science
   Also required. Deals with refraction as would be indicated by the title. The whole chapter is important.
Ch. 7 “Wave-Breaking” from Surf Science
Not required. I never discussed this chapter.


5. WAVE CLIMATE, MEASUREMENT, AND FORECASTING
Ch. 13 “Wave climate” from Surf Science
Required. You can skip the discussion of wave-current interaction (Biggest waves on Earth). Figure 13.1 is important and the regional wave climate descriptions on pages 116-118 are important (see notes for specific areas).

Ch. 14 “Forecasting” from Surf Science
Required. The whole chapter is important. You don't need to know the material in Box 10 – Sources of Error. Note that the lecture slides associated with this chapter are available on-line in html format and there are links to each of the three computer sources he discusses.


6. REGIONAL FOCUS: NORTH ATLANTIC / NORTH SEA
You are not required to read anything from this section. The regional focus on this test is global in extent and focused on oceans and ocean regions as described in the review session.