MSCI 301 Learning Objectives

When a student successfully completes MSCI 301, he/she should be able to:

1. Apply the Simple Equation of State to a water parcel to determine its density and predict how differences or changes in the density will affect its behavior.

2. Identify what forces are acting on a water parcel in any real-world situation, determine how that parcel moves, and predict what changes would occur in with changes in the situation.

3. Identify what heat fluxes are going into and out of a water parcel in any real-world situation, and determine its short-term temperature change and predict its long-term temperature changes.

4. Describe the upper- and lower-layer circulation of the ocean, and be able to analyze oceanographic data to identify and trace water masses by their distinctive characteristics.

5. Explain the causes of and processes influencing the upper and lower layer circulation of the ocean, and analyze and predict what effect changes in those processes would have on the ocean's circulation.

6. Interpret figures, graphs and images used in oceanography for the correct physical meaning. Select and analyze an appropriate oceanographic data-set to solve real-world problems, using graphic or numerical methods.

7. Explain the processes by which gravity waves (including wind waves and tides) are generated and propagate, analyze and predict how changes in conditions would change the resulting waves.

8. Explain the ocean/atmosphere interactions that produce phenomena such as hurricanes, ENSO, NAO, and global climate change, and analyze how future changes in these interactions may impact human society.

9. Explain how ocean, atmosphere and terrestrial forces affect the circulation of coastal waters, describe how that circulation impacts the coastal and near-shore environment, and predict how changes in that circulation would affect those environments.