MS Thesis Outline

This is a suggested outline for a master's thesis. Actual contents are to be determined between the student and the advisor. Final document needs to be formatted according to Graduate School standards.

1. Literature Review: To show that the student understands the overall field, the major results and where they are trying to fit in
    a. Important results summary for general topic area
        i. Identify overall organization of the field topics and their relationships
        ii. Identify major contributors and their contributions in time order

    b. Specific topic area summary
        i. Major results for specific topic area in time order
        ii. Identify major problem areas for topic area
        iii. Summarize major research techniques used

2. Problem Definition: To show that the student has framed a problem that can be solved in a reasonable time period
    a. Identify problem to be solved
        i. Relate to the overall topic idea
        ii. Provide as much detail as can be done at this stage to specify the problem
        iii. Why is the problem an important one to be solved and what might be the potential impact of the solution

    b. Explain how you have validated problem approach and methodology
        i. What previous theoretical work have you duplicated via simulations or analysis, etc.
        ii. What previous investigations have you duplicated via analysis, simulations, etc.

    c. Discuss any preliminary results developed
        i. Show simulations, data collected, analysis work, etc.
        ii. If you are attempting a novel solution to a known problem, explain how it is novel and why it is expected to be substantially better than previous solutions

    d. Hypothesis Statement
        i. Outline the problem to be investigated
        ii. Provide one or more testable hypotheses that will be investigated by the work

    e. Proposed solution methodology

i. Justify techniques to be used and why they are appropriate to the problem
ii. If possible, explain why alternate techniques might not be able to provide a solution or are inadequate

3. Actual Investigation
   a. Experiments
      i. Explain experiment design methodology (how the measurements will be made and how the measurements that are made will be used to test the experimental hypothesis)
      ii. What statistical measures will be applied to the data to produce confidence intervals and related statistical measures
      iii. Equipment needs (computer time, equipment, sensors, etc.)

   b. Experiment results
      i. Perform the actual work product to test the hypothesis (simulations, models, confidence levels, etc. as appropriate)

4. Analysis of Results: To give confidence that the results of the research will be valid and useful to the community
   a. Hypothesis Testing
      i. What are the limits of validity on the results
      ii. What are possible sources of error in the results
      iii. Show how the stated hypothesis of the thesis is confirmed or rejected by the results
   b. Outline how work will extend the field of knowledge and build upon existing results

5. Reference List
   a. Typically 25 to 50 references (as needed)