Writing a Scientific Thesis

Although scientific/engineering theses/dissertations are written according to the technical interests of the individual writer, they typically follow the same structure. This format is quite similar to the IMRAD structure that you have likely already been using for papers in your field. Generally, dissertations and theses are separated into the following sections (or chapters):

I. Introduction
   The introduction typically contains an overview of work that others in the field have completed preceding your thesis and tells the reader, broadly, what your work will add to the field. Major texts in the field as well as specific work that was important to your thesis should be referenced here as part of building the context for the document that follows. Additionally, you will establish the importance of your work to the field and, perhaps, beyond the field as well.

   *In some fields, the body of the dissertation is essentially three papers on a similar topic or that use a similar technique. Each of those chapters will have its own introduction, the following three sections, and a conclusion. These chapters will be bracketed by the larger introduction and conclusion that ties them together.*

   *For fields that do not take this approach, the following sections are typical of the chapters that make up the body of the dissertation or the sections of the thesis.*

II. Theoretical/Experimental Setup and Methods
   This section establishes how the data or new insight that follows was gathered. If the approach is theoretical, it is established and explained here. If following sections depend upon specialty instruments, these should be described here. If data were collected, the methods used should be documented in this section. If that data were then processed or analyzed, the methods for that processing should also be described here.

   *In some fields, the following two sections (results and discussion) will be combined into one section. In other fields, these steps must be kept clearly separated. If you are not sure which is usually done in your field, ask your advisor.*

III. Results
   In this section, you tell your reader what results were obtained using your methods. If the approach is theoretical, use this section to explore the results of the application of the theory. If the approach was experimental, this is the section that contains the results of the experiments.
IV. Discussion
This is the section of the thesis in which you explain the implications of the data for the reader. In short, what is meaningful about the results of your experiment or application of a new theoretical approach?

V. Conclusions and Recommendations for Future Work
All theses and dissertations will close with a consideration of the broader meaning of the work that preceded it and some recommendations for the future directions other scientists could take given what the work has uncovered. In some disciplines, the conclusions and recommendations may be presented separately.

VI. Works Cited / References
All theses should include a list of cited works formatted using disciplinary standards.

VII. Appendices
What additional information should be included in the appendices will vary significantly by project. Some things that previous authors have included are lists of acronyms, lists of commonly used symbols, additional images, and additional data tables.