**EE 2212**

**General Laboratory Information**

**Fall 2021**

**S. G. Burns**

**General Information**

* Sebastine Ogbuka, Graduate Teaching Assistant, will serve as your laboratory instructor and laboratory report grader. His e-mail is [ogbuk001@d.umn.edu](mailto:ogbuk001@d.umn.edu)
* Labs will all be in person unless there are changes in University policy.
* You must have a numbered page quad-ruled laboratory notebook. I’ll show some examples during class.
* Flash drive for data collection and saving text and graphical files.
* I suggest setting up a computer file on your computer to store lab materials and data.

**Laboratory Notebook**

* You must keep an individual patent-style notebook in conjunction with any computer files. I will discuss what is meant by a patent-style notebook in class. Your computer files are also considered “intellectual property”. You must reference the location of any computer files in your written notebook. In general, everything you do prior to lab (prelabs) and during lab including data and references to accessible computer files must be in a dated, bound notebook. **Noting key points, observations,**  and **conclusions** as you work through the lab facilitates report preparation and is a **big plus** when it comes to notebook evaluation.
* Note that a “laboratory notebook” implies not only a hard copy notebook but any associated computer files. This is a common industrial practice
* Absolutely no data is to be kept on scratch paper, back of your hand, etc.
* The material in your notebook is referred to as “intellectual property and is a key element to establishing invention priority in the eyes of the patent office and the legal profession.
* In conjunction with Sebastine Ogbuka, I will review your notebook periodically using ZOOM and your notebook must be kept up to date.

**Laboratory Report Guidelines**

* Laboratory reports are submitted individually with your own interpretation of the work. I will be grouping labs by topic areas for a report submission. Laboratory reports are due one week after your work in the lab during your lab section on Thursday.
* You will submit your lab reports as an e-mail attachment (pdf, jpeg, WORD) to Sebastine Ogbuka. Laboratory reports must be submitted as a word-processed documentwith all figures and calculations included in the document’s content. Valid formats are Microsoft Word (.doc(x)) or PDF format. Use of an equation editor is strongly encouraged. No less than 10-point font, single-spaced, with a minimum of 1 inch margins.
* Lab write-ups are graded on a 20 point scale using the grading rubric on page 3 of this document.

**Laboratory Report Format**

* Cover page: Your name, titles of the experiments, date submitted, and an abstract.
* Abstracts:
* Abstracts are very important in the technical, conference, and trade literature.
* The abstract is a very important summary of the work (without graphs, diagrams).
* It is not the same as an introduction or conclusion.
* Most abstracts for these laboratory experiments should be on the order of 200-300 words, i.e. essentially utilize the entire cover page. It is typically written at the completion of the report when you have had the opportunity to synthesize your thoughts and ideas.
* Examples of quality abstracts can be found in professional publications (e.g. IEEE Transactions) via the Internet (e.g. IEEExplore) or through the UMD library. As a student, you have access to the UMD library data base. I also can provide examples from the technical literature.
* A **maximum** of **three** additional pages. These three pages include an introduction, background and relevant literature, procedure, key circuit diagrams, measurements and analysis of results, comparison of results with theory and simulations, graphs, summary and conclusions. Clearly, you must edit your efforts to distill what is important and representative of the experiment.
* **Introduction**-An introduction must be presented at the beginning of the report that introduces the objectives of the experiment.
* **Background-**This section should describe the theory utilized to complete the experiment and cite any material thatwas used in the design process. For novel implementations (e.g. for a more open-ended designassignment), literature and related work completed by others should also be described and cited.
* **Procedure-**Briefly describe the steps taken to complete the experiment. This should include circuit diagrams, etc. Component values are important. Use standard symbols for circuit elements and label signals where appropriate. SPICE allows you to save circuit diagrams to the clipboard so that you can embed these circuit diagrams in your report.
* **Measurements and Analysis of Results-**Be sure to include units on all measurements and label axes of any graphs accordingly. Any questions posed in the lab guidelines should be answered here. Include a comparison of results with theory and simulations
* **Summary and Conclusions**
* Include some comments about the lab accomplishments and what was learned. Any comments or suggestions for future improvements of the labs can be included here.

**Laboratory Report Grading Rubric (20 Point Scale)**

Experiment: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Report submitted by: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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| ATTRIBUTE  (2.5 or 5.0 Points) | **0-0.5 for 2.5 Attributes**  **0-1.5 for 5.0 Attributes**  **Unacceptable** | **0.75-1.5 for 2.5 Attributes**  **2.0-3.5 for 5.0 Attributes**  **Below Expectations** | **2.0-2.5 for 2.5 Attributes**  **4.0-5.0 for 5.0 Attributes**  **Meets or Exceeds Expectations** | Points |
| Format and  Organization  (2.5 Points) | * Inappropriate content in most sections of report * Tables and figures   cannot be read or understood   * Fonts difficult to read * So many format errors   as to make the report  difficult to use and evaluate | * Sloppy * Difficult to read * Graphs and circuit diagrams are illegible * Contain some format errors | * Content appropriate in all   sections of report   * Text, tables, figures are   readable and understandable   * Looks professional |  |
| Grammar,  Punctuation, Spelling  (2.5 Points) | Excessive spelling,  grammar, and  punctuation errors | Some spelling, grammar,  and punctuation errors | Few (if any) spelling,  grammar, and punctuation  errors |  |
| Abstract  (2.5 Points) | Abstract is essentially omitted | Abstract is not succinct or does not highlight important aspects | Abstract is :   * Succinct * Highlights most, if not all important aspects * Complete * Publication quality |  |
| Introduction and Conclusion  (2.5 Points) | * Problem not stated * Conclusions omitted | * Problem stated poorly * Conclusions do not include what was learned or what was accomplished | * Problem clearly stated, * Conclusions essentially complete |  |
| Background and  Procedure  (5 Points) | Background and/or  procedure not included  or is/are so minimal that  what was done or the  theory behind it is not  readily understood | * Background missing   important theory that was used in the experiment   * Procedure missing portions such as circuit diagrams and component values. | * Background and procedure are essentially complete * All work is shown in an orderly fashion |  |
| Measurements and  Analysis of Results  (5 Points) | * Large portions of results are missing or not labeled * Measurement results are not explained * Virtually no comparison between results, theory, and simulation * Answers to most of questions posed are omitted. | * Some results, labels, and/or units missing * Some explanations are incomplete or incorrect * Minimal comparison between results, theory, and simulation * Some questions are   answered incorrectly | * Measurements thoroughly   documented with appropriate labels and units,   * Analysis is correct and   thorough with comparison of results with theory and simulations   * Most, if not all, questions are answered correctly. |  |
| **TOTAL 20 Points** | **xxxxxxxxxxxxxxxxxxx** | **xxxxxxxxxxxxxxxxxxx** | **xxxxxxxxxxxxxxxxxxx** |  |