Preparation of ESE 488 Lab Reports:

There are several reports required for this course. The preferred format to adopt is outlined below:

**Abstract**: The abstract should contain a brief statement of what you accomplished in the lab, followed by a concise summary of your important findings. This section is where you make a "sales pitch" to the prospective reader to grab his/her attention. Exciting statements like "we designed, constructed and tested a LabVIEW VI .... that demonstrates ... by graphically displaying ..." are appropriate here (and not in the technical exposition sections that follow). Note that it is customary to include quantitative measurements of performance and complexity in the abstract. For example: Our VI samples and processes data at xxx kHz while simultaneously refreshing four graphs on the front panel.

**Introduction**: Introduce the topic that was explored in lab. This is your opportunity to present any background material necessary for the reader to understand the report. Write the report as if you were explaining your design to a classmate who is not taking ESE 488. Important design specifications should be placed in this section of the report. In other words, the introduction is the appropriate place to explain to the reader in detail what you have been asked to design. You can list the potential or known approaches to this design to familiarize the reader with the problem.

**Design**: Present your design in a clear and thoughtful manner. An overall block diagram of the design is essential for the reader to get a quick grasp of your work. Remember “A figure is worth 1K words!” Carefully go through a discussion of all design alternatives that you considered. Show any important formulas used or calculations required in doing the design. Justify all engineering decisions. Convince the reader that you made sound choices based on facts rather than fiction. Be careful when claiming that an approach you rejected is “more complex” or “slower” than the one you chose. You need to be fair and show that you really understand both approaches. Unless you are discussing some detail that is best illustrated by a diagram, all diagrams in the Design portion of the report should be simple, clearly labeled block diagrams. Always introduce figures before including them in the report (text first, figure later).

**Operation/Testing**: Describe the operation of the VI and the manner in which you went about testing the design to make sure it worked properly. Present data. Don't be afraid to present data even if the data would seem to indicate that the VI didn't perform as well as expected. This section should contain "the facts and nothing but the facts". Do not guess at the cause of problems. As engineers you should be figuring out the causes.

**Discussion/Conclusions**: Discuss the quality of the design. There is no disgrace in admitting that the design didn't work as well as you might have liked, especially if, as a result of the testing, you came up with a better way to design the VI. No one is necessarily expecting the same design that an experienced designer would have produced. The important thing is that in this section of the report you demonstrate that you are learning and at least are making a concerted effort to practice sound engineering judgment. There is no substitute for experience. Better designs will come with time. The best way to improve as a designer is to spend time going over your own work and looking for ways to improve it. This section affords the writers an opportunity to suggest a superior design or propose changes that could be made to the existing design to improve performance. Be careful not to mention that a simple modification that would have taken five minutes to wire and test was not done for "lack of time". The point of raising other design alternatives is for showing you can devise more than one way to "meet the spec". Discuss what was learned during the course of the assignment.
GENERAL:
All members should participate in the production of the report. Every group lab report to be handed in should be initialed by all members of the group. When a group member initials the report he/she is in effect saying that he/she has read the report and approves of the content and is willing to accept the group grade.

All reports need to be typed and they must be legible and neat. (You will lose points fast if the instructors must "decipher" your reports.) With computers and word processing programs readily available to engineering students here at Washington University, spelling errors are inexcusable (use that spellchecker!)

Define all abbreviations before using them in your report. [ e.g. ... Analog to Digital Converter (ADC) ]

Keep the reports as short as possible. Do not attach miscellaneous figures to the report but do describe all of the figures and drawings that were important enough to be included in the report. Remember, your reports will not be graded by weight! On the other hand, one or two page lab reports are rarely acceptable! After all, a group has spent many hours working on a design; it is unreasonable to expect to be able to explain that much work in just a few paragraphs.

Don't show that you have taken more precise measurements than is possible with equipment in the lab. For example, one cannot measure to 8 significant figures with an oscilloscope!!

You should include data used to generate final results. Please, do not include just the final results. Show all calculations!!! Report your actual results even if they are not what you had expected. Real life does not always mimic the simplicity and ideality of theoretical models.

BE CURIOUS!!! It is alright to try something to see what happens (within reason), especially if you think that you know what is going to happen. That is what this class is all about!!!

Comment ALL code. Use the Text Block of LabVIEW to add comments in your wiring diagrams. It may be a nuisance adding detailed comments when you are typing them, but it's better than having to rewrite code YOU wrote but which YOU no longer understand! (it happens!!!!)

Be sure that you have ALL read the report before you turn it in. It is your responsibility to check the quality of the writing and organization of the report before the instructor reads it. If it sounds clumsy to you, it will sound clumsy to the instructor too.

Justify all of your claims in the report! If you say that you have an efficient design you should be absolutely sure that there are no superfluous blocks that may be removed by redesign. If you state that one design approach/architecture is simpler, faster, easier or whatever than another one. Fully compare both of them to substantiate your claim!

FIGURES:
Label all figures and introduce them in the text with a phrase such as: “Figure 2 below shows the output of the ramp generator circuit.” Always have text first, then the figure. Never have a figure appear in the report before it has been introduced and discussed.

Label all figures with descriptive captions (such as: Figure 1: Filtered output voltage vs. time), and show test points on wiring diagrams (i.e., places that you have taken waveform snapshots to include in figures in the report). Both axes of graphs illustrating waveforms should be labeled with the proper units and scales.

The first figure in the design section of your report should be an overall block diagram of your design. It will be very useful for discussing the overview of your design.

When describing subVI of the design it is helpful to the reader (ME!) to have a figure of the subVI included on the same page as the text describing it (always following the text that describes it, of course!). Long winded sentences describing processing such as “the sampled output is filtered and detected and resampled to produce the signal…” are very hard to follow without a wiring diagram on the same page. Do not expect the reader to flip back and forth to the overall diagram to understand your subVIs.