Graduate Research Guide Final Report

1. **GENERAL INFORMATION:**
   a. **GRG name:** Pratik Samant
   b. **Instructor name:** Liangzhong Xiang
   c. **Course number & name:** ECE 2713, Digital Signals and Filters

2. **OVERVIEW:**
   The students were to use digital signal processing (DSP) techniques in order to generate a research project. They were to do this via MATLAB software in groups of 3-5. They were to present their findings in an end-of-semester poster presentation.

3. **BACKGROUND:**
   a. **Course description:**
      This is a sophomore course for electrical and computer engineers teaching the skills necessary for them to be able to process signals from instruments.

   b. **Typical students:**
      The typical student was involved in a group of 4, and helped their group members come up with, execute, or facilitate the project. It is tough to say what exactly an average student did because experiences varied greatly.

4. **LEARNING OBJECTIVES:**
   a. **Need for project:**
      Students were not learning any research skills. They were also not actually having any opportunities to apply their skills to solve real problems.
      What student struggles did the GRG address?
      I mostly addressed issues regarding what topic to choose, and occasionally I would provide suggestions regarding how they should structure their code.

   b. **Learning objectives:**

LEARNING OBJECTIVES "Students will understand/will be able to…"
Understand the role of digital signal processing in the context of solving real world problems
Practice and develop presentation skills in the context of describing their work to a layman audience as well as their peers in engineering
Gain an appreciation for where MATLAB computing software fits into the big picture of using DSP to solve problems

5. **IMPLEMENTATION:**

   a. **Activities:**

   I prepared and taught a couple lectures in class that had to do with the project, I also hosted two lab sections in which we used MATLAB to tackle some example problems. Once the project began, I facilitated it, met with every group to make sure that their timeline and project idea was feasible, I formed groups for people who were having trouble doing so, I kept students informed with regard to where they should be in the context of the project, I gave feedback to all groups so they could improve their poster after they had submitted a first draft, and I facilitated the poster presentation.

   b. **Activity log:**

ACTIVITY	# HOURS
1. **Research question consultation.**	
2. **Research design methodology (general).**	30
3. **Research design methodology (specific).**	10
4. **Refining their research process.**	10
5. **Assisting with the drafting of a final product.**	9
6. **Assisting with the refinement of a final product.**	5
7. **Professional development**	0
8. **Coordinating instruction from other OU units (libraries, Writing Center, etc.).**	0
9. **Meeting/planning with main instructor of course.**	3
10. **Other (please list).**	**MATLAB lab prep and presentation: 15** **Lecture prep and presentation: 10** **Helping students with MATLAB:12**
	TOTAL HOURS: 104

6. **DISCUSSION:**
   a. **Effectiveness of research project:**
   I think that for the most part student learning went quite well in the research project. The students themselves were largely engaged and interested in the work, the research project was also a lot of fun for many of the groups (or so they said during our meetings). The final products were impressive to both myself and Dr. Xiang, as students applied their skills from class to solve a host of different problems using DSP. The project was very effective in achieving the desired objectives, but only for groups that were engaged. The groups who were not engaged did not learn as much and their final product looked more rushed and incomplete. Logistically speaking it was largely a smooth ride, there were no big logistical problems that we encountered, save for perhaps assigning the groups and keeping track of them.

   b. **Plans for revision:**
   I would use an actual grouping software instead of just Microsoft excel to assign and keep track of groups. I would also present the students with sample projects from previous classes so they have an idea of the expectations we have for them. I would also coordinate more closely with the TA in the class regarding what the project is.

   c. **Have any other tips for future GRGs and instructors?**
   I think it would be a good idea to check up on all groups individually if they don't report in on their own accord. Make sure that the TA understands what this project is and what their role in it will be. Also try to challenge the students as much as possible, within reason. While it is important to keep feasibility in mind, one should hesitate before discouraging a student to proceed forward with a project, especially those that may seem interesting.

7. **PERMISSION:** Please indicate in which of the following ways, if any, you would be comfortable with the Office of Undergraduate Research sharing this report with others.
   a. __**X**__I am willing to have this report shared strictly with future GRGs and instructors. We would include your name with your report.
   b. __**X**_I am willing to have this report shared with others on a public website (on OUR website, etc.). The Office will contact you and the instructor of the course for final approval before publishing content online. *Note: if you are willing to share this report on our website and have any photos of class activities, please email us those photos along with this report.*