# Signal Processing Project
Due 05/10

## 1    Description

The final project is an open-ended project based on material you have been exposed to in the course. The main emphasis of the project will be the design and development of software processing systems using Matlab. I will try to be very accommodating with your project choice. A good project topic is concrete and narrowly-scoped enough to be completed with a few weeks of hard work. Suggested project topics are:

- Noise Reduction
- Music Equalization/Emphasis
- Speech Recognition
- Compression

- "Photoshopping" Tools
- Visual Object Recognition
- Target Tracking

The project should be completed individually. Each student will submit a project proposal for approval before beginning any programming and will generate a report and final presentation at the completion of the project.

## 2    Proposal

An initial project proposal must be submitted on M 03/18. The proposal is a very short document (half a page) which describes the high-level functionality of the project. It should specify what the project will do and any tools, libraries, or data sets that will be utilized. The proposal will be evaluated to ensure the difficultly level is appropriate and to get recommendations of other resources that may be helpful. It is recommended that you select your project based on your existing projects (e.g. research, Senior Design, etc).

The short proposal document should include:

1. Your name.
2. The description of your final project.
3. References

## 3    Report

At the completion of the project, a report must be generated to describe the project. The project report should be approximately 6 pages (using Latex for ECG682) and contain the following sections:

1. (5 points) Abstract - This brief summary of the project purpose presents a general overview of the project topic and solution.

2. (10 points) Description - The project description provides and introduction to the project topic and expands upon the abstract. This section completely explains the specifications of the project: e.g. the objectives, functionality, and components used.

3. (15 points) Implementation - The project implementation provides the details on how the specified problem was solved. This implementation will include the physical hardware utilized, your programming methodology, efforts to optimize the project code, and any difficulties encountered while implementing the design.

4. (15 points) Experimental evaluation - The experimental section describes how the project program performance was evaluated. This section should provide examples that highlight the input/output relationships of your system and how the results can be observed and confirmed.

5. (5 points) Summary - The conclusion of the report should provide a summary of the project aim and results as well as highlight both what was learned working on the project and what further directions would improve the project.

**Latex (ECG682)** While there is no required `documentclass` format that must be used, I would highly suggest either using `article`, `IEEEtran`, or another template from your own field (e.g. IEEE conference, CVPR, etc.). When using a field specific template, use appropriate sections rather than those above. Windows users should look into MiKTeX for a Latex distribution. Other popular options now are cloud-based which do not require you to setup your own environment (Overleaf). It is recommended that you use Overleaf.

# 4 Presentation

Each student will have a total of 10 minutes to present their projects in class on M 04/29. Each presenter must leave a few minutes for questions and discussion at the end. You should budget approximately 1 slide/min for a maximum of 10 slides. The presentation should highlight the problem, solution, and demonstrate your project in action either as a table-top demo or as a video (preferred). Please email your presentation files prior to class so they may be preloaded. Be sure to bring a backup copy either on a disk or flash drive (this can be your electronic submission).

# 5 Deadlines and Deliverables

The following highlight the important dates and items to be submitted for the project. The project will be worth 25% of your final grade.

## 5.1 Deadlines

1. 03/18 Project proposal
2. 04/29 Project presentation
3. 05/10 Project report

## 5.2 Deliverables

1. Hard copy version of report ($\sim 6$ pages)
2. Electronic submission including report, code, presentation, and demo video.

# References

1. http://www.mathworks.com/products/signal/

2. https://peer.asee.org/enhance-your-dsp-course-with-these-interesting-projects