**Lab Supplementary Information**

**MEGN 481 Machine Design – Fall 2016**

There will be a total of four labs in this course. Each lab will be graded on a 100 point scale. The following topics will be covered:

* Lab 1: Design of structures, structural analysis, and static failure
* Lab 2: Vibration analysis and fatigue failure
* Lab 3: Bearings, gearing, drive systems, and shafting
* Lab 4: Presentation on one of the three prior labs

All four of the labs will be with respect to a single project. As such, by the end of the semester you will have completed a full analysis of an existing themed mechanical system (more on that later). An example engineering package has been provided to you so that you can clearly understand the expectations prior to the start of work. You will work in groups of three throughout the semester to complete these labs. At the end of each lab we will break up the groups, and you will be able to reassign yourselves into groups again (same group members or new group members). All team members share equal responsibility for the labs. As such, working together is key in this, and any other, engineering situation.

***EACH LAB WILL CONSIST OF:***

* Design phase (33%),
  + The design phase includes: conceptual design (10%) and a drawing package sufficient for manufacturing purposes (20%). The drawing package must include an acceptable bill of material (3%).
* Analysis phase (33%),
  + The analysis phase must include all supporting calculations to complete the lab. Each calculation must be accompanied by a free body diagram (10%), the analysis (20%), and each solution/conclusion clearly indicated (circled or squared) (3%).
* Report phase (34%).
  + The report phase consists of a complete engineering package to include: Letter of transmittal (3%), cover letter (3%), an executive summary (28%), and the analysis performed in the analysis phase of the lab. The executive summary must include the following:
    1. an introductory paragraph outlining the project and any applicable design criteria (4%),
    2. written overview of the physical project once completed (see “general construction” in example below) (3%),
    3. boundary and initial conditions as applicable (4%),
    4. material specifications (4%), and
    5. findings (13%). The findings section must include EVERY conclusion of interest (material size and type, maximum deflection/stress/strain/etc., factor of safety for deflection/stress/strain/etc.).

An example Executive Summary is provided in the example engineering package.