ENEL 200 CAD/Mechanical Design Assignment 2018

Scenario…

You have been tasked with designing a better water delivery component (WDC) for a small hydro-electric generator, Figure 1. The turbine and alternator exist and you will adapt your design to suit. The new WDC will be 3D Printed and tested in term 3. There will be a prize for the best performing generator.

Because the generator is a bought component there are no drawings available so you must make a complete solid model of the existing parts and your WDC. Several items as shown in Figure 1 will be made available for measuring in Machines laboratory in ECE.

Figure 1 Hydro-electric generator

Your tasks:

Make solid models of the supplied parts. Add screws but do not model the screw threads. Also, don't model the generator windings and make an approximate representation of the electronics board, don't show the three small red wires. Make a representation of the two wires exiting the body and taking a 90 degree bend at 50mm from the body on the plane of the bolted clamping surface as represented in Figure 2.

Design a new water delivery component that will direct the water flow onto the turbine giving the best performance measured by electric output. A

“garden hose tail” for garden hose must be included for connecting to the water supply and drain. The drain hose will be 300mm long and can exit in any orientation. The supply hose can also enter at any chosen angle.

The system must be sealed so that there is no water leakage when operating.

To cope with extra power from the generator a taller, by 10mm, electronics board cover plate must be designed. This part will be injection moulded in production so a full manufacturing drawing is required.

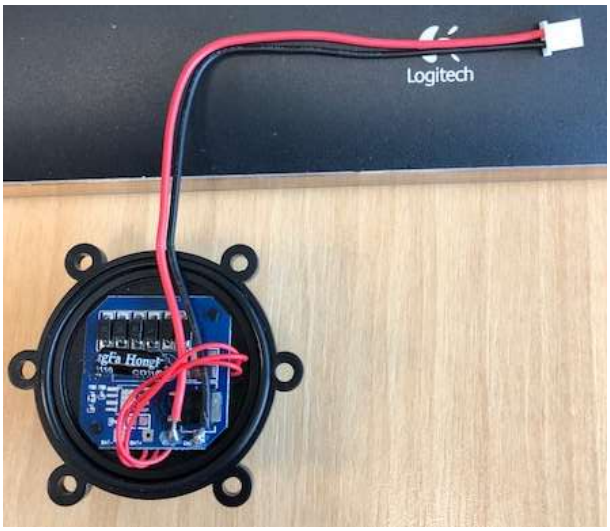

Figure 2 Approximate wire orientation

You are required to produce:

- A colour layout drawing with a single, angled for best presentation, view of the complete assembly. Annotate any special features/specifications. 5% of your course grade.
- An exploded view with a BOM. Identify in the BOM whether parts are bought standard parts eg. bolts, or the manufacturing process to used and the material to be used. 3% of your course grade. (The impellor, winding and electronics board will be manufactured by your company say “misc.” in these cases.)
- A dimensioned manufacturing drawing of the electronics cover that is 10mm longer than the supplied one. This must include at least one section view and a shaded isometric view in the top right corner. 2% of your course grade.

- A STL faceted model file for 3D printing the prototype WDC. 3% of your course grade. Consider functionality and aesthetics of your design. Upload this file to a folder to be advised. The file name must be your student code eg. GKT304.stl. Failure to do this will result in zero for this section.

Your WDC part will be printed during the mid-year break and a competition will be held in term 3.

Each drawing must be submitted on an A3 page using the UC templates and unless stated in black and white. Print the attached grading sheet and with a single staple on the top left corner attach it and 3 drawings. Fill out the top declaration section of the grading sheet. Do not fold your drawings.

Professional layout of the pages and presentation will be considered for grading. Clearly fill out all title blocks, including your name.

Due: 9:00am Friday 31st of May.

Location: Deposit your work in the labelled assignment hand in box at E545. (Top floor of the Civil/Mechanical Building)

Late penalty: 50% of your assignment grade deducted between the due time and 5:00pm, May 31.

100% of your assignment grade deducted after 5:00pm, May 31.

Be aware: Among other reasons, these are not valid reasons for lenience on the late penalties….

- Other college students may also have assignments due that day or a tutorial may be being held that afternoon, preventing you using the computers.
- Printer toner low or other printer/computer problems may mean you can't print your assignment.
- Your computer failed.
- You lost your files and did not have a backup.

Avoid the stress….Leave plenty of time to allow for such problems.

ENEL 200 2019 Mechanical Design Assignment

Declaration and Marking Schedual

DEPARTMENT OF MECHANICAL ENGINEERING

STUDENT NAME: ..... **STUDENT ID NUMBER:** _ _ _ _ _ _ _ _

COURSE CODE: ENME ___ ___ ___ **DUE DATE:** .....

ASSIGNMENT TITLE: .....

Return of work after marking (TICK ONE ONLY)

☐ I agree to this work being returned to me in a pool of other students' work, with the markers' comments and mark being hidden from casual view

☐ I request that this work be treated as strictly confidential between the Department and myself, and returned to be directly and personally, upon my providing suitable identification

DECLARATION (MUST BE SIGNED):

I (we, if group work) have read and fully understand the Department's statement regarding Dishonest Practice and hereby certify that this item of work submitted for assessment is entirely my/our own work.

Signed: .....

Date: .....

Layout drawing…… /5

Exploded view and BOM…… /3

Dimensioned drawing…… /2

3D Print file…… /3

Total… /13