

Mechanical Engineering ENME301, ENMT301 Design

Assignment 1: Concept Design 15% (Either: Report 5 Sketch 5 & Oral 5%, **OR** Report and Sketch 7.5% each)*

Two important components of design are (i) to develop a concept and (ii) to communicate it to others. This communication will often be to non-technical people, accountants or managerial staff. A competent engineer will be able to present ideas and designs clearly, quickly and logically. (Refer Shigley Pg.8). This assignment provides you an opportunity to both develop a concept and to communicate it effectively.

There are three options for this project. You should choose only one.

Communicating your idea:

1. Write a brief report of no more than 500 words outlining:
 - what your concept is
 - how it works
 - its special benefits, features and advantages
 - possible problems or risks and their solutions
 - closest existing concept and why yours is different
 - estimated cost and/or selling price
2. Make a hand sketch on an A4 page of your idea, giving sufficient detail to clearly illustrate its features, and in broad terms, how it works.
3. Fill out the cover sheet: "Assignment 1: Concept Design Coversheet" on LEARN in the Assignment 1 section. Scan and save your assignment, including the cover sheet, sketch and report, as a single pdf with the filename: *lastnamestudentnumber.pdf* For example: Alexander12345678.pdf
4. Submit by 9.00 am Monday 8th March to the online submission portal "Assignment 1: Concept Design Submission" on LEARN in the Assignment 1 section.
5. You also have the option to give an oral presentation of 2 - 3 minutes describing your design to the class during the tutorial sessions of 12th of March (or subsequently depending on numbers).

*Note: If you do not do the oral presentation, your marks will comprise the Sketch and Report marks scaled to be out of 15%. But if you do the oral presentation, then your mark will be the better of (a) your scaled Report+Sketch mark, or (b) your Report+Sketch+Oral mark.

Assessment

A "Marking Sheet" outlining how marks will be allocated for this project will be handed out in class and will also be on LEARN in the Assignment 1 section. Marking will be done and returned on LEARN.

You are reminded that no client is able to fully appreciate the implications of a specification they have written. You will be going into it in much more detail than they have. That is your job. So you should always be prepared to question, clarify and ask for more information on a specification or assignment that you have been given.

Intellectual Property: Your ideas are your property and may have commercial value. If you do not want your idea disclosed, you can mark your sketch "Confidential", and this will be respected. Remember however that you must have something to discuss if you are doing an oral presentation. Alternatively you can keep your best idea secret and use a different one for your assignment.

UC Innovators, UC Centre for Entrepreneurship and Entre: The University has a mentored summer programme "UC Innovators" for students to develop potentially commercial ideas within the Entrepreneurship Centre in Rehua. It also has a student-run competition programme, "Entre" for commercial ideas. You might enter your idea in one of these. www.entre.canterbury.ac.nz
<http://www.research.canterbury.ac.nz/innovation/ucinnovators.shtml>

OPTION 1: Household or Kitchen Accessory

Your first job as a graduate is with a small company making and selling high quality, kitchenware and household utensils. However the company needs to expand its product range for stability, and is looking especially for hi-tech options. Your boss was impressed with ideas you had in your CV, so agrees to give you 15 hours to propose a concept for a household accessory that would add to the company product profile. His outline specification is:

- You will be expected to do some research to see what is available in this field
- Your proposal should be novel, but it could be a significant improvement on an existing accessory
- Ideally it will solve a common problem, be very popular and generate a lot of sales
- It may be purely mechanical or electromechanical or purely electronic
- It should not cause injury or be a risk to small children
- The home environment, with heat, humidity, dust and splashes should be considered
- How much it is likely to sell for should be given some consideration, but a novel and effective function is the most important at this early stage

OPTION 2: Transfer a frail elderly person from lying on a bed, to seated on a mobile chair

An increasing number of elderly people are living in their own homes and making strenuous efforts to remain there. A large fraction of these are unable to get themselves to a seated position from lying down. This makes it difficult for carers to get them up and into a wheelchair or a toilet chair. While “sling-hoists” are available, these strictly require two carers, to roll the person from side to side to get the sling underneath them. For this assignment, imagine yourself as a consulting engineer working for Mr Albert, the owner of a company that specialises in aid equipment. He has agreed to pay you for 15 hours of conceptual engineering work to come up with a new process, and/or equipment that would make this transfer easy for a single carer, such as the person’s elderly partner. Your idea should meet the following specifications that Mr Albert has provided:

- You will be expected to do some research to see what is available in this space, and you should include your references and web-links as part of your report.
- While your aim is for a novel concept, it may instead be a significant improvement on something that already exists, as long as you can convincingly demonstrate what your improvement is.
- It may be purely mechanical or electromechanical, or a whole new process
- While it is novelty is the main aim, an outline of the sale price will be expected
- You should be aware that frail elderly need to be handled carefully as they easily bruise, and their skin is easy to tear
- It is an advantage if the person’s dignity can be preserved throughout the transfer process

OPTION 3: Low Cost, Automated Possum Trap

A small but growing engineering company working in the forestry sector, wants to develop a product it can manufacture and sell, in the down-time between contracts. It is especially interested in helping New Zealand to be free of imported species that harm our environment. For this assignment, you are being asked to see yourself as undertaking your practical work with this company, and the boss has asked you to head up this project by spending 20 of your practical work hours on a concept for presentation and discussion by the company. Your boss has asked that it should meet the following specifications:

- There are several such traps being developed so you will be expected to do some research, and include references and web-links as part of your report.
- There are several harmful species and while each may require a different approach, it may be possible that one universal design could be adapted for all
- Ideally your concept will be designed around existing bait systems
- Your proposal must consider how to avoid harm to native species and birds
- While your aim is for a novel concept, it may instead be a significant improvement on something that already exists, as long as you can convincingly demonstrate what your improvement is.
- A low selling price for the final product is specified so some discussion of cost will be necessary.