MMAN2130 T3 2019
Manufacturability Review Assignment 1(b)
Weighting: 25%
Due: 11:55pm Monday 21st October 2019 (Week 6)

Manufacturability Review Assessment Guide

This document is written as a guide to the Manufacturability Review. The Manufacturability Review covers two major areas:

Engineering Drawing using AS1100

Engineering Drawing is essential to communicate at a high level of technical detail and the ability to read engineering drawings allows you to obtain important design information.

In order to communicate your drawings to other individuals such as clients, manufacturers or workshop personnel they need to be exact and consistent with the AS1100.

Failure to do so may result in your manufacturer or client unable to extract design information and could possibly lead to time violations if drawings are sent back for clarification. During this time, machines may remain idle and projects may need to be halted to accommodate for your mistakes.

Manufacture Process Planning

Manufacture Process Planning is vital to design, create and select the best manufacturing method for a certain manufactured product based on engineering drawings provided to you by the product engineering/ design engineering section.

An engineer working with manufacturing operations will need to perform an operations analysis by considering various factors such as available processes, component design, tolerances, material, manufacturing sequence, setup and tooling, material handling, plant layout and work study.

Operations analysis results in documentation such as assembly charts, routing sheets and routing charts which are then used to ensure predictable and efficient component and product manufacture.

In Design and Manufacture: MMAN2130 you are assessed on your engineering drawing, knowledge of the Australian Standard: AS1100, CAD skill and Process Planning skill based on the following:

Outcomes	Students Learn about	Students Expected to
Engineering Drawing allow students to attain design information AS1100 allows students to create and analyze engineering drawings CAD provides students with a tool to develop engineering drawings quickly and effectively As an example of a CAD package which is used throughout industry SOLIDWORKS is an important tool for engineers Manufacture Process Planning allows students to increase productivity in a manufacturing environment	Understanding the importance of engineering drawing. Understanding and deriving physical properties such as features, dimensions, tolerances and surface finishes etc. Understanding the importance of AS1100in engineering drawing. Demonstrating the ability to use AS1100 in order to extract critical information from engineering drawings. Understanding the importance of CAD as a tool to develop engineering drawings. Demonstrating the ability to develop engineering drawings using SOLIDWORKS as an example of a CAD package. Understanding the importance of Manufacture Process Planning in a manufacturing environment. Demonstrating the use of process planning in order to increase productivity at TAFE.	Justify the use of engineering drawing during the design process. Read engineering drawings using AS1100 to analyze technical detail of other designs. Justify the use of CAD packages as a development tool for engineering drawings. Apply AS1100 to engineering drawings developed with SOLIDWORKS. Develop a product assembly chart, component routing sheet and component and product routing charts Apply developed plan during component/product manufacture at TAFE.

Content information

The assignment has an individual element AND a group element. The individual elements will be marked individually while the group element will be marked as a group.

The marking is conducted according to the information provided within this assessment guideline and will consider the dot points shown in the table.

Marks may be deducted if the following are not fulfilled in your submission:

Group Element

1. A signed and completed group submission coversheet (clearly indicating who designed which part and what your group number is).
2. An exploded assembly drawing of the entire pump with a Bill of Materials table. (Include off the shelf sub-components in exploded view e.g. springs and balls).
3. A Product Assembly Chart (Product Structure Diagram) of the entire pump.
4. A Product Routing of all the pumps components.
5. Your group number MUST be in the submission file name.
6. It must be a PDF file
7. Only **one** member to submit the group component for each team.

Individual Element:

1. A signed and completed individual submission coversheet.
2. An AS1100 engineering drawing(s) of your component(s), as outlined below. (No drawings necessary for off the shelf sub-components e.g. springs and balls). Your drawing/part number must match the drawing/part number allocated to it on the group assembly drawing/BOM.
3. A Work Method Sheet of your component(s). (Again – part numbers must match the ones on your Exploded Assembly/BOM in the group element)
4. A Routing Chart of your component. (Again – part numbers must match the ones on your Exploded Assembly/BOM in the group element
5. Your group number and zID MUST be in submission file name
6. It must be a PDF file

Marking Guideline

Group Component

Assembly Drawing (13 marks, scaled to 5%)

1. All components should be labelled correctly in a neat manner.
2. A Bill of Material table is required with the headings of: Part number, Drawing number, Part name and Quantity.
3. All required components for the pump must be visible.
4. Must be A4/A3.

Assembly Chart (4 marks, scaled to 1%)

1. Your assembly chart should show a hierarchy of Pump components and each of its subcomponents with quantity specified.
2. Components presented in this chart should match that of your assembly drawing in the order the parts are to be assembled.

Routing Chart (13 marks, scaled to 2%)

1. A routing chart detailing the manufacturing process of your pump overall is required.
2. The group routing chart should show how each component come together to create the whole pump.
3. Processes presented in this chart should be derived from the individual routing chart.
4. Part title, raw materials and amount must be clearly specified for each pump components.

Individual Component

AS1100 Engineering Drawing (50 marks, scaled to 10%)

1. You must prepare an engineering drawing of your part.
2. Your engineering drawing shall be from the 3rd angle projection. You must include the minimum number of views and dimensions to fully specify the part.
3. Your engineering drawing shall conform to the AS1100 standards, I.e standard scales & tolerances and correctly fitted and complete title block (using the drawing checklist).
4. Your engineering drawing shall use the UNSW drawing template from SolidWorks.
5. If your component (e.g. valve) contains sub-components (e.g. top and bottom half) then you shall provide separate engineering drawings for each component (I.e your report will be 4-5 pages in length). You do not need to provide drawings for off the shelf components such as springs, bearings and fasteners.
6. Must be A4/A3.

Work Method Sheet (26 Marks, scaled to 4%)

1. A work method sheet which outlines in detail the steps undertaken to manufacture your assigned part is required. Information such as timing, excess material, dimensions must be shown.
2. Tools and its operation properties if applicable (such as drilling speed) must be specified.

3. Safety precautions needs to be presented for each process undertaken in the WMS.
4. Appropriate inspection and centre marking steps are required to be shown as good practice in manufacturing.
5. Part title, input material and material amount should be clearly presented.

Routing Chart (24 marks, scaled to 3%)

1. An individual routing chart outlining the processes undertaken to manufacture your assigned part is required.
2. Part title, input material and material amount should be clearly presented.
3. The processes and the identification number in the routing chart should match that shown in the Work Method Sheet.
4. Expected time which a process may take needs to be presented next to each step.
5. Normal processes step should be represented by a circle and inspections step by a square.

There will be **ONE GROUP** submission per group **AND ONE INDIVIDUAL SUBMISSION** for everyone.

Structure of the submission:

Group: (1 per group)

Page 1: Group Submission sheet (which clearly says which parts people are responsible for)
Page 2: Exploded Assembly Drawing + BOM
Page 3: Group Product Assembly Chart
Page 4: Group Routing chart

Individual: (1 per person)

Page 1: Individual coversheet
Page 2: AS1100 Drawing (Of the part you are designing for the group)
Page 3: Individual Work Method Sheet for your part that you're designing for the group
Page 4: Individual Routing Chart of the part you're designing for the group.

Submission Instruction:

Only one member from each group needs to submit the group component.
Your group submission MUST be named as follows:
"GROUP_<GROUP NUMBER>"
Including the underscores

Everyone must submit the individual component.
Your individual submission MUST be named as follows:
"GROUP_<GROUP NUMBER>_<zID>"
Including the underscores

Addendum
AS1100 – as per the guidance given in the Course Outline, you can download AS1100 at:

http://subjectguides.library.unsw.edu.au/engineering go to Standards tab on right-hand side; Australian standards (via SAI Global). Log in with zPass, search Australian Standard AS1100 Technical drawing in several parts – ensure you access current version.