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5 Stage Reverse Osmosis Pedal Powered Water Pump Purification System Faculty of Applied Science & Technology (FAST)

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2017

### Pedal Powered Water Pump / Purification System (Installation Instructions)

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# WSC2017 INDUSTRIAL MECHANIC'S (MILLWRIGHT) TEST PROJECT "WATER BIKE"

## TASK SHEET

1. **16 hours of competition time to build 5 Stage Reverse Osmosis Pedal Powered Water Purification Bike**
2. (3 hours Machining - Lathe and Milling Machine) - Competitor produces detail parts (6, 12, 13, 19, 20) with a Vertical Milling Machine, Centre Lathe, Arbor Press & broaches as per blueprints
3. (3 hours - Welding/Fabrication) - Competitor fabricates and welds detail parts (1-1, 2, 3, 4, 5; 2-1, 2, 3; 3-1, 2, 3) with supplied equipment as per blueprint drawings.
4. (10 hours - Pedal Powered Water Purification Project Build) - Competitors use their layout, hand tools, alignment of components, tube bending and mechanical assembly skills with the supplied detail parts, machined detail parts, pre-purchased parts and components in the building of the pedal powered water pump purification unit to given tolerances as per blueprints.
5. How the Pedal Powered Water Pump and Filtration System – "Water Bike" works
  - The individual sits into the seat and places one's feet on the pedals
  - As the pedals begin to turn the chain attached to the pedals drives a set of gears
  - These gears are lined up and in mesh
  - They turn a shaft that is attached to an "overdrive" gearbox
  - The interaction with this gearbox through the shaft allows the shaft attached to the rubber vane pump to turn at a very high speed
  - This creates a partial vacuum in the hose that is in the dirty water
  - The vacuum draws water through the hose and into the rubber vane pump and on into the stainless-steel tubing that is attached to the 5-stage reverse osmosis filtration unit
  - The dirty water now moves through the reverse osmosis unit cleaning the contaminants out of the water
  - The water now exits the osmosis unit clean and fit for drinking
  - At approximately 30 to 40 rpm at the pedals every 30 to 40 seconds a half litre of clean drinking water is delivered