
SECTION HEADING

MECH 2100: Advanced Systems Calculations

Description

Advanced Systems Calculations provides students with knowledge and skills of calculating and sizing systems in both mobile and industrial fluid power applications.

Credits

3

Prerequisite

Successful completion of year one in the Mechatronics diploma or A.A.S. degree program or equivalent work experience

Corequisite

None

Topics to be Covered

1. Hydraulic motor displacement and selection factors.
2. Applications for motor/gear reducer combinations.
3. Hydraulic pump selection and displacement factors and efficiencies.
4. Pneumatic systems components calculations.
5. SCFM, CV, pressure, efficiency, velocity, and torque calculations.
6. Tractive effort/drawbar pull, vehicle torque, RPM, resistance calculations.
7. Accumulator sizing, selection, and applications.
8. Open, closed, center, tandem and horse power limiting systems.
9. Cylinder selection, force, and pressure calculations.

Learning Outcomes

1. Demonstrate the ability to size and select hydraulic and pneumatic components to meet different system requirements.
2. Calculate hydraulic motor efficiencies, pressures, torque, displacement.
3. Examine gear reducer application requirements and ratios.
4. Identify hydraulic pump selection factors and efficiencies.
5. Calculate cylinder force/pressure.
6. Calculate resistances, vehicle tractive effort/drawbar, pull/torque, and wheel RPM.
7. Identify accumulator applications, sizing and selection factors.
8. Calculate SCFM, CV, pressure, efficiency, velocity, and torque for pneumatic system components.
9. Design and implement systems using various directional, pressure and flow control components.
10. Identify and control potential safety hazards and implement safe working practices.

Credit Details

Lecture: 2

Lab: 1

OJT: 0

MnTC Goal Area(s): None