Title: Characteristics of a Compressor using CO\textsubscript{2} as the Refrigerant
Ref: COMPCO2
Type: Departmental
Vacancy: 1 Student
Duration: 1 Semester

Project Description:
The vapor compression cycle using refrigerant CFC and HCFC is widely used in refrigeration, air-conditioning and water heating industries. Utilization of these gases is prohibited by the Montreal Protocol. CO\textsubscript{2} is a good alternative that meets the environmental requirements. However its utilization creates problems due to the critical temperature that is much lower than other refrigerants, namely 31.06°C. The gas cooling process, condensation which occurs at a constant pressure and temperature for regular refrigerants takes place at constant pressure but at variable temperatures for CO\textsubscript{2}. Domestic type refrigerators use smaller compressor capacities between 100 W to 300 W. Data on CO\textsubscript{2} refrigeration cooling cycle applications and calorimetric measurements are not available in the market and literature. Yıldız Technical University, thermodynamics laboratory has a setup, built to test the refrigerator model. Our research group is determining the performance characteristics of a commercially available CO\textsubscript{2} compressor at different pressures and temperatures.

Work Description:
- Learning of the essentials of the CO\textsubscript{2} refrigeration cycle.
- Modeling various components of the system with MATLAB or another code (in the latter case, some programming may be necessary).
- Performing performance tests in the laboratory.
- Comparing numerical and experimental results and writing of a report

Qualifications and Skills:
- Motivation for academic research.
- Interest and a good background in thermal sciences.
- A taste for experimental work.
- MATLAB programming experience (may be gained during the semester).
- Report writing skills.