Real-world Problem Solving

Use engineering models as a basis for developing solutions to real-world problems

**Real-world Challenge**
Something needs to be designed or improved to meet real-world needs

**Engineering Problem Statements**
Textbook-like problems that can be solved with engineering techniques

**Engineering Models**
Solutions to engineering problems with parameters that can be varied to explore multiple outcomes

**Ideal Answers**
Appropriate values for model parameters based on model assumptions and performance tradeoffs

**Real-world Answers**
Actual answers used in the real world, based on the ideal answers from the engineering domain

**Develop**
Use the 5 Ps of problem definition to guide you as you define a set of linked engineering problems that apply to the real-world challenge. Consider multiple alternatives before selecting the best problem statements.

**Solve**
Apply the SAFER method along with specific engineering techniques you have learned. Try to develop parametric solutions, with variables left in the relevant equations as long as possible. Consider implementing your solution in a program or spreadsheet to make parameter value changes easy.

**Communicate**
Prepare a concise, clear, and convincing summary of your model results as they apply to the real-world challenge. Recommend appropriate answers to the real-world challenge. Justify your recommendations with the engineering work you have done. Effective plots are often vital to this communication.

**Explore**
Exercise your model with the ConVerSAnT method to understand more about its behavior. Vary parameters in a systematic and coordinated way, not just one at a time. Use design of experiments techniques. Use statistical techniques and sensitivity analysis to build confidence in your results.