CHME-CHEMICAL & MATERIALS ENGR (CHME)

CHME 101. Introduction to Chemical Engineering Calculations
2 Credits (2)
Introduction to the discipline of chemical engineering, including: an overview of the curriculum; career opportunities; units and conversions; process variables; basic data treatments; and computing techniques including use of spreadsheets.
Prerequisite/Corequisite: MATH 1220G, or MATH 1250G, or MATH 1511G, or MATH1511H.
Learning Outcomes

1. Describe career opportunities available to holders of a BSCHE degree.
2. Find and use learning and advising resources within CHME and Engineering.
3. Create a course registration plan for future semesters that meets the degree and prerequisite requirements for the BSCHE in the timeliest manner.
4. Diagram a process with unit operations and material and energy flows.
5. Perform unit analysis and unit conversions accurately and efficiently.
6. Validate calculated results using estimation techniques.
7. Apply the concept of significant figures to numerical answers.
8. Identify and describe process variable measurements using engineering vocabulary.
9. Express and convert concentrations using mass, mole, and volume bases. 1
10. Convert between absolute and relative pressure and temperature scales. 1
11. Perform calculations in Excel using built-in and custom functions. 1
12. Generate 2-D plots of data and functions in Excel. 1
13. Perform a regression of data to a mathematical model.

CHME 102. Material Balances
2 Credits (2)
Perform material balances in single- and multi-phase, reacting and non-reacting systems under isothermal conditions.
Prerequisite: MATH 1220G, or MATH 1250G, or MATH 1511G, or MATH 1511H.
Learning Outcomes

1. Analyze data using trendlines, linearize when necessary.
2. Use unit conversions when solving problems.
3. Turn a verbal or written problem statement into a diagram and a mathematical form.
4. Write and solve material balances on single and multi-unit processes, for both nonreactive and reactive processes.
5. Identify what phase a substance is in and then be able to use the correct equations to relate volume to mass and moles.
6. Use Raoult's and Henry's law when solving mass balances.

CHME 201. Energy Balances & Basic Thermodynamics
3 Credits (3)
Chemical Engineering energy balances; combined energy and material balances including those with chemical reaction, purge and recycle; thermochemistry; application to unit operations. Introduction to the first and second laws of thermodynamics and their applications. May be repeated up to 3 credits.
Prerequisite: CHME 102 and MATH 1250G or MATH 1511G or MATH 1511H.
Prerequisite/Corequisite: CHEM 1216 or CHEM 1215G.
Learning Outcomes

1. Correctly implement unit conversions (outcome (a) an ability to apply knowledge of mathematics, science, and engineering).
2. Analyze and solve elementary material balances on single and multi-unit process, for both nonreactive and reactive processes.
3. Apply the first law of thermodynamics to batch and flow processes.
4. Locate thermophysical property data in the literature and estimate properties when data are not available.
5. Conduct combined material and energy balances around continuous multi-unit processes with and without chemical reaction.
6. Perform process calculations using psychrometric charts, enthalpy concentration diagrams and steam tables.
7. Derive and solve differential equations for transient heat and material balances on dynamic systems.
8. Determine individual learning style and describe how learners of that style can help themselves.
9. Use modern engineering tools (example, Excel) to solve material and energy balance problems.