

Material and Energy Balances, SCI 302

Lecturer: Ms. Marina Mukabi

Office: Basement (next to Prof. Midiwo's lab)

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Course content:

- Units and dimensions.
- Conversion of quantities and estimating properties of process materials: fluid density, flow rate, composition, concentration, mass and mole fractions, fluid pressure and temperature.
- Presentation of data in tables and graphs.
- Material balance calculations involving reactions, recycle, purge, by-pass.
- Internal energy and enthalpy
- Application of thermodynamic laws, processes, functions in energy balances
- Material and energy balance equations for single-unit and multiple-unit processes
- Pressure-volume-temperature calculations for ideal gases

Lecture hours and venue: Wednesday, 10.00 am – 13.00 pm, Chem Lab.

Examination/cat assessment: CAT out 30%, exam out 70% .

References:

1. Fedler, R.M., and Rousseau. "Elementary Principles of Chemical Processes"
2. Veverka, V.V., and F. Madron. "Material and Energy Balances in the Process Industries"
3. Hines and Maddox "Mass Transfer"
4. Luyben, W.L., and L.A. Wentzel." Chemical Process Analysis: Mass and Energy Balances"
5. Reynolds, J. "Material and Energy Balances"
6. Schlesinger, "Mass and Energy Balances in Materials Engineering"

Module objectives:

1. To introduce you to the principles and calculation techniques used in industrial chemistry courses.

2. To acquaint you with what material and energy balances are, and how to formulate and solve them.
3. To assist you in learning efficient and consistent methods of problem solving so that you can effectively solve problems you will encounter after leaving university of Nairobi.
4. To offer practice in defining problems, collecting data, analyzing the data and breaking it down into basic patterns, and selecting pertinent information for application.
5. To review certain principles of applied physical chemistry.