

Prerequisite Technical Content List for ChE 200
(compiled by Dr. Michael Prudich and Dr. Valerie Young)

Prerequisites - Mastery

All students entering ChE 200 must be able to:

Mathematics

- Find the equation of a line given two points.
- Integrate a polynomial expression.
- Rearrange an algebraic equation so it is explicit in one variable and solve.
- Solve equations by trial-and-error or successive approximation when appropriate.
- Calculate the perimeter and area of triangles, circles, and rectangles.
- Calculate the surface area and volume of spheres, cylinders, and rectangular boxes.
- Perform linear interpolation between values in a table.
- Represent a function, its integral, and its derivative on a graph.
- Correctly manipulate expressions containing logarithms, exponentials, and powers.

English

- Read, write, and speak in Standard English.
- Proofread written work.

Physics

- Define variables to represent real quantities.
- Define equations to represent real processes and relationships between quantities.
- Present problem solutions logically, with a diagram and with appropriate equations.
- Check that answers are of reasonable magnitude and that significant figures are reasonable.
- Associate appropriate units with all quantities.
- Convert between different unit systems, given conversion factors.

Chemistry

- Define variables to represent real quantities.
- Define equations to represent real processes and relationships between quantities.
- Present problem solutions logically, with a diagram (if appropriate) and with appropriate equations.
- Check that answers are of reasonable magnitude and that significant figures are reasonable.
- Associate appropriate units with all quantities.

- Convert between different unit systems, given conversion factors.
- Convert between mass and moles (and reverse), given the molecular weight of a substance.
- Calculate compositions of mixtures in weight percent, weight fraction, mole percent, mole fraction, and molarity.
- State the ideal gas law.
- Explain that intermolecular forces are neglected in an "ideal gas".
- Identify conditions under which real gases typically behave ideally.
- Define boiling point, normal boiling point, and melting point.
- State the chemical compositions/structures of common substances (water, air, table salt, methane, methanol, ethanol, acetylene, ethylene, benzene, toluene, linear alkanes, hydrochloric acid, sodium hydroxide).
- State the nitrogen and oxygen content of air.
- Explain the relationship between pH, H⁺, and OH⁻.

Computers (general)

- Use a word processor.
- Send text messages via e-mail.
- Search for information on the World Wide Web.
- Search for information in the Ohio University Libraries electronic catalog system.
- Start Matlab and open, save, and run an m-file.

Computers (Matlab)

Students should be able to accomplish the following Matlab tasks with occasional reference to the tutorials or manual:

- Write m-files and function m-files in which a series of commands in a logical order correctly complete a calculation.
- Comment m-files and format output appropriately (labels, units, etc.).
- Use "for" and "if-then" structures and counters.
- Perform calculations with scalars, vectors, and arrays.
- Properly distinguish between element-by-element and array operations.
- Make plots with labeled axes.
- Use Matlab to solve systems of linear equations.
- Use fsolve to complete a "trial-and-error"-type solution of a single equation.
- Use Matlab to solve systems of nonlinear equations.
- Use Matlab to make least squares linear regressions.

Engineering

- Define variables to represent real quantities.
- Define equations to represent real processes and relationships between quantities.
- Present problem solutions logically, with a diagram and with appropriate equations.

- Identify all assumptions in a problem solution.
- Identify the source of information used in a problem solution.
- Check that answers are of reasonable magnitude and that significant figures are reasonable.
- Associate appropriate units with all quantities.
- Recognize and work with common units in both the English and metric system.

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