CHEMICAL (AND BIOCHEMICAL) ENGINEERING

BASIC TOOLS AND SKILLS YOU WILL HAVE AS A FRESHMAN

- Software packages: SolidWorks, Excel, Outlook, Access, Word, PowerPoint, Mathematica
- Laboratory: Safety, experimental design, chemicals handling, PCR, documentation
- Communication: Oral presentations, poster presentations, technical writing
- Other: Organization, problem-solving skills, teamwork and leadership skills
- International: (Note Current U.S. Passport or indicate Visa; cite language skills)

TOOLS AND SKILLS YOU CAN ADD AS A SOPHOMORE

- Software packages: Visual Basic, Polymath, Visio
- Laboratory: sample preparation, spectroscopy,
- Independent research (library)
- Drawing and mapping
- Filing maps, data entry, plotting data, etc.

ADDITIONAL TOOLS AND SKILLS YOU WILL ADD BY THE TIME YOU GRADUATE

- Software packages: ASPEN Plus Process Simulator, COMSOL, LoopPro, MathCad, Spartan, Matlab, Latex
- Perform Chemical Engineering calculations including:
  - Material and energy balances with and without reactions, steady state and transient
  - Phase equilibrium
  - Process design, modeling, and optimization
  - Heat exchanger design
- Hands-on experience with typical unit operations including:
  - Lab-scale distillation column
  - Heat exchangers (plate and frame, single and multi-pass shell and tube, condensing steam)
  - Membrane separators (gas and liquid phase)
  - Dialysis system
  - Gas absorber and stripper columns
  - Adsorption column
  - Piping and minor fittings, pumps, compressors, blowers, orifices, etc.
- Characterization techniques including
  - Mass spectrometry
  - Infrared spectrometry
  - Gas chromatography
  - NMR spectrophotometry
- Chemical reactor design
- Chemical plant design
- Familiarity with EPA regulations, environmental law