

**Scoring Rubric for Program Outcome**  
***1a) An ability to apply math & science in engineering***

**Level 5 performance characterized by:**

- ❑ Combines mathematical &/or scientific principles to formulate models of chemical, physical and/or biological processes and systems relevant to chemical engineering
- ❑ Applies concepts of integral and differential calculus and/or linear algebra to solve chemical engineering problems
- ❑ Shows appropriate engineering interpretation of mathematical and scientific terms
- ❑ Translates academic theory into engineering applications and accepts limitations of mathematical models of physical reality
- ❑ Executes calculations correctly
  - ❑ By hand
  - ❑ Using mathematical software
- ❑ Correctly analyzes data sets using statistical concepts

**Level 3 performance characterized by:**

- ❑ Chooses a mathematical model or scientific principle that applies to an engineering problem, but has trouble in model development
- ❑ Shows nearly complete understanding of applications of calculus and/or linear algebra in problem-solving
- ❑ Most mathematical terms are interpreted correctly
- ❑ Some gaps in understanding the application of theory to the problem and expects theory to predict reality
- ❑ Minor errors in calculations
  - ❑ By hand
  - ❑ Applying math software
- ❑ Minor errors in statistical analysis of data

**Level 1 performance characterized by:**

- ❑ Does not understand the connection between mathematical models and chemical, physical, and/or biological processes and systems in chemical engineering
- ❑ Does not understand the application of calculus and linear algebra in solving chemical engineering problems
- ❑ Mathematical terms are interpreted incorrectly or not at all
- ❑ Does not appear to grasp the connection between theory and the problem
- ❑ Calculations not performed or performed incorrectly
  - ❑ By hand
  - ❑ Does not know how to use math software
- ❑ No application of statistics to analysis of data