Scoring Rubric for Program Outcome

2) An ability to design a system, component or process

Level 5 performance characterized by:
- Develops a design strategy, including a plan of attack, decomposition of work into subtasks, development of a timetable
- Suggests new approaches and improves on what has been done before
- Develops several potential solutions and finds optimum
- Understands how areas interrelate and demonstrates ability to integrate prior knowledge into a new problem
- Thinks holistically: sees the whole as well as the parts
- Uses computer tools and engineering resources effectively
- Supports design procedure with documentation and references
- Develops a solution that includes economic, safety, environmental and other realistic constraints
- Applies engineering and/or scientific principles correctly to design practical processes
- Recognizes practical significance of design outcome/answer (i.e. no outrageously sized reactors, 600 m towers, or pipes 1 mile in diameter!)

Level 3 performance characterized by:
- Uses a design strategy with guidance
- Can follow a previous example competently
- Can develop and compare multiple solutions to a problem, but does not usually arrive at the best result; conducts optimization but neglects one or two key aspects
- Can use prior knowledge to design individual pieces of equipment competently when guided to do so
- Does not think holistically: does not see the integration of the pieces clearly
- Minimal or incorrect use of computer tools and engineering resources
- Design is done, but procedures and equations are not documented or referenced
- Includes only minor or cursory consideration of economic, safety, and environmental constraints
- Applies engineering and/or scientific principles incompletely or incorrectly to design a practical processes
- Gives an answer, but does not check its practicality

Level 1 performance characterized by:
- No design strategy; haphazard approach
- Cannot design processes or individual pieces of equipment without significant amounts of help
- Only focuses on one solution to a problem; no optimization attempted
- Unable to relate prior knowledge to the design problem
- Has no concept of the process as a sum of its parts
- No use of computer tools and engineering resources
- Design is done incompletely without the proper equations and without references
- No consideration of economics, safety, and environment
- No application of engineering and/or scientific principles
- Design is incomplete, no answer is given