

| <b>ABET Student Outcome 1: Solve Engineering Problems</b><br>an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics |   |  |  |
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|  | <b>Level of Achievement: 1<br/>Below Expectations</b>   | <b>Level of Achievement: 2<br/>Meets Expectations</b>  | <b>Level of Achievement: 3<br/>Exceeds Expectations</b>  |
| Identify   | Does not realize when major components of the problem are missing and has no coherent strategies for problem solving            | Has a vision of the whole problem and has some strategies for problem solving.   | Demonstrates understanding of how various pieces of the problem relate to each other and the whole                                   |
| Formulate  | Does not see the connection between theory and practical problem solving  | Connects theoretical concepts to practical problem-solving when prompted and is beginning to integrate previous knowledge and new information.       | Formulates strategies for solving problem and can relate theoretical concepts to practical problem solving                           |
| Solve  | Demonstrates solution implementing simple application of one formula or equation with close analogies to class/lecture problems | Demonstrates solution with integration of diverse concepts with useful relationships and connects theoretical concepts to practical problem solving. | Demonstrates creative synthesis of solution, creates new alternatives, and relates theoretical concepts to practical problem solving |
| Theory   | Does not appear to grasp the connection between theory and the problem  | Some gaps in understanding the application of theory to the problem  | Translates academic theory into engineering applications   |
| Mathematics Modeling   | Does not understand the connection between mathematical models and systems in engineering                                       | Chooses a mathematical model or scientific principle that applies to an engineering problem, but has trouble in model development                    | Combines mathematical and/or scientific principles to formulate system models relevant to engineering                                |
| Application  | Does not understand the application of calculus and higher mathematics in solving engineering problems                          | Shows nearly complete understanding of applications of calculus and higher mathematics in solving engineering problems                               | Applies concepts of calculus and higher mathematics to solve engineering problems  |