**Kuwait University**

**College of Engineering and Petroleum**

**Scoring Rubric for Student Outcome 2 (SO2)**

SO2: An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.

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| **Performance Indicator** | **4 (Exemplary)** | **3 (Meets Expectations)** | **2 (Developing)** | **1 (Beginning)** | **Weight** | **Score** |
| Breakdown engineering design to components for solutions. | * Finalizes most of the proposed design solutions of the components.
* Shows strength in the proposed design solutions.
 | * Presents proposed design solutions of the most components in detail.
* Shows weakness in some proposed design solutions.
 | * Breakdowns engineering design to components for possible solutions without details.
* Unable to show possible solutions to some components.
 | * Unable to breakdown design components for acceptable solutions.
* Unable to understand the engineering design components.
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| Generate alternative engineering design solutions to components | * Builds a final design from alternative solutions with proper analysis and constraints.
* Presents acceptable alternative solutions.
 | * Generates acceptable alternative solutions with minor weakness.
* Analyzes alternative solutions and compares with constraints with some weakness.
 | * Generates some alternative solutions with major weakness.
* Generates alternative solutions and relates to constraints.
 | * Unable to generate acceptable alternative solutions.
* Unable to relate constraints to the alternative solutions.
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| Identify social, cultural, and welfare needs as constraints for an engineering design from the stakeholders. | * Identifies and analyzes all relevant constraints related to the design needs.
* Finalizes constraints to the design needs appropriately.
 | * Identifies the constraints related to engineering design needs.
* Unable to use most of the constraints efficiently to the design needs.
 | * Makes a partial list of constraints but missing some key constraints.
* Understands the concept of constraints but is unable to list and detail them to the design.
 | * Unable to detail out the lists of constraints.
* Unable to understand the concept of constraints.
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| Identify constraints related to engineering design based on public health, safety, environmental, economic and benefit factors | * Analyzes constraints to the design needs in an acceptable way.
* Finalizes constraints to the design needs appropriately.
 | * Connects constraints to the design requirements well enough with minor weakness.
* Unable to use efficiently critical constraints to the design.
 | * Makes a partial list of constraints with major weaknesses.
* Unable to understand several critical constraints.
 | * Unable to identify constraints criteria.
* Unable to understand the concept of constraints.
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