ENGINEER'S NOTEBOOK RUBRIC

Performance Criteria	Attribute	Performance Level			
Design Process Stage		Low = 1 (6 or below pts)	Medium= 2 (7 or 8 pts.)	High= 3 (9 or 10 pts.)	Score
Problem Definition: The student will provide the identification of the need and rationale for the solution to a design problem.	Intensity (clarity and relevancy)	The notebook contains a design problem statement **requires further** explanation of the problem and **lacks** strong rationale of the need and **no** creditable sources are cited.	The notebook contains a design problem statement provides a **limited** explanation of the problem but provides **rationale** of the need using **limited** creditable sources.	The notebook contains a design problem statement provides a **clear** explanation of the problem and provides **in-depth rationale** of the need with **multiple** creditable sources cited.	
Brainstorming/ idea generation: The student will provide preliminary ideas to help solve the design problem	Amount (breadth)	The notebook contains **15** or more preliminary design ideas to solve the problem. **2** ideas will be further explored through design sketches and detailed descriptions.	The notebook contains **35** or more preliminary design ideas to solve the problem. **5** ideas will be further explored through design sketches and detailed descriptions.	The notebook contains **50** or more preliminary design ideas to solve the problem. **10** ideas will be further explored through design sketches and detailed descriptions.	
Research: The student will conduct extensive research on the design problem and possible design solutions	Amount (breadth)	The notebook contains **little or no** evidence of U.S. patent searches of existing solutions and **little or no** verifiable facts of the design problem and some industry standards presented for possible solutions. **No evidence** of focus group, survey, or interviews conducted. No details how and why the constraints and criteria were identified.	The notebook contains **some** evidence of U.S. patent searches of existing solutions and **some** verifiable facts of the design problem and some industry standards presented for possible solutions. **Limited** focus group, survey, or interviews conducted (empathy techniques). The notebook contains some important details of how and why the constraints and criteria were identified.	The notebook contains **extensive** evidence of U.S. patent searches of existing solutions and **multiple** sources of verifiable facts of the design problem and **multiple** industry standards presented for possible solutions. **Multiple** sources of focus groups, interview, and/or surveys conducted with stakeholders (empathy techniques). The notebook contains all important details of how and why the constraints and criteria were identified.	

Constraints and Criteria: The student will identify all constraints and design criteria for the designed solution	Accuracy (frequency)	The notebook contains a **few** constraints and criteria for the designed solution but limited or **no rationale** for the constraints and criteria.	The notebook contains **some** constraints and criteria necessary for the designed solution and provided **some rationale** for the constraints and criteria.	The notebook contains **all** necessary constraints and criteria for designed solutions and provided **clear rationale** for the constraints and criteria later to be used to assess the final design decision.	
Generate possible solutions: The student will develop multiple solutions to the identified design problem.	Amount (breadth)	The notebook contains a **few** possible solutions are generated considering size of design team and time allotted solutions are not all **feasible** for the course or skill level of design team.	The notebook contains **some** possible solutions presented with consideration of size of design team, feasibility for the course, and design team skill level.	The notebook contains **multiple** possible solutions that are appropriate for the skill level; time allotted; and use of available resource. Proper analyses of the solution are considered in the final design selection.	
Analysis (including optimization, decision) The student provides a rationale for selecting a solution evaluated against identified constraints and criteria and using data to make design decisions such as numerical or computer-generated simulations (ie: FEA, free body diagrams, product life cycle, decision matrix, etc)	Accuracy (frequency)	The notebook contains a rationale for final design solution evaluated against **some** but not all identified constraints and criteria. **Limited** use of data to make informed decisions about the selection of a design solution.	The notebook contains rationale for final design solution evaluated against **most** identified constraints and criteria. **Some** use of data to make informed decisions about the selection of a design solution.	The notebook contains rationale for final design solution evaluated against **all** identified constraints and criteria. Solution is selected by using **Multiple** data driven decisions such as- Instructor List specific analysis:	

Prototype : The students create a working model that demonstrates the functionality of the designed solution.	Intensity (clarity and relevancy)	The notebook contains evidence that the prototype meets **some** specifications. Prototype has **limited** functionality. Random or inappropriate use of building materials. Limited or no manufacturing standards	The notebook contains evidence that the prototype meets **most** specifications with **moderate** functionality. **Most** materials and construction are appropriate for prototype. Some manufacturing and safety building standards are addressed.	The notebook contains evidence that the prototype meets **all** specifications identified with **complete** functionality. **All** materials used and construction techniques are appropriate for a quality prototype and **all** manufacturing and safety standards are addressed.	
Testing: The student will conduct appropriate testing of the prototype to assess the quality, safety, and functionality of the design solution	Accuracy (frequency)	The notebook contains evidence that the **no** testing was done or prototype tests yielding **limited or no** evidence of the performance of the design solution based upon identified constraints and criteria. Manufacturing and safety standards were not considered in prototype testing.	The notebook contains evidence that prototype tests were conducted yielding evidence of the performance of the design solution based upon **some** identified constraints and criteria and included evidence of meeting **some** manufacturing and safety standards.	The notebook contains evidence that prototype tests were conducted yielding strong evidence of the performance of the design solution based upon **all** identified constraints and criteria and included evidence of meeting **all** manufacturing and safety standards. When appropriate tests yielded numerical data, field notes, stakeholder surveys.	

Specification: The students will provide detailed specifications of the final design by providing design drawings, parts list, and documentation of construction process.	Intensity (clarity and relevancy)	2D or isometric drawing of solution. **Incomplete** parts list and materials list. The process flow chart documenting the construction is incomplete. Limited documentation of Equipment used.	Parametric modeling drawing of solution and 2 D drawings of prototype. **Complete** parts list and materials list, but **limited details**. A complete process flow chart documenting step by step construction. Documentation of Equipment used.	Parametric modeling drawing of solution and 2 D drawings of prototype. **Complete** parts list and materials list, including data safety sheets, product life cycle **details**, manufacturing codes. A complete process flow chart documenting step by step construction with photos of the manufacturing process in action. Documentation of equipment used and details of custom jigs if required.	

Notebook Rules: The student will provide an engineer's notebook that follows standard rules and procedures of engineering design record keeping. Complete description of note booking rules are provided by the instructor. (See Kelley, 2011)	Accuracy (frequency)	The student's notebook contains **more than three** engineer's notebook rule violations. The notebook is missing essential notebook entries and the notebook is poorly organized. Additional rules violated include:	The student's notebook contains **up to three** engineer's notebook rule violations. Entries are neat and legible and contain **all** the essential notebook entries. Additional rules violated include:	The student's notebook is organized and formatted properly according to the engineer's notebook rules, **No** rules are violated. Entries are neat and legible and contain **all** the essential notebook entries.	
				Total	
Instructor Notes:					