

Rubrics

Outcome A: An ability to apply knowledge of mathematics, science, and engineering.

Performance Indicator	5=Exemplary	4=Good	3=Adequate	2=Marginal	1=Unacceptable
Appropriate Model	Best model is selected for the problem.	A correct model is selected.	A correct model is chosen, but there are some conceptual errors.	Incorrect model is selected for the problem.	No model is selected for the problem.
Logically Consistent Solution	There is a complete and detailed sequence of steps to the solution.	There is a complete sequence of steps to the solution.	There is a correct sequence of steps to the solution.	There is a partially correct sequence of steps to the solution.	There is no logical sequence of steps to the solution.
Correct Solution	The solution is conceptually correct, with no procedural errors.	The solution is conceptually correct, with only minor procedural errors.	The solution is conceptually correct, but contains procedural errors.	The solution contains several conceptual or procedural errors.	The solution contains major conceptual or procedural errors.
Present Result	Presentation of results is detailed, well organized, and clear. All intermediate steps are shown.	Presentation of results is detailed and clear. All intermediate steps are shown.	Presentation is clear. All intermediate steps are shown.	Presentation is neat, but not all intermediate steps are shown.	Presentation is sloppy. Intermediate steps are not shown. Illegible.

Outcome B: An ability to design and conduct experiments, as well as to analyze and interpret data.

Performance Indicator	5=Exemplary	4=Good	3=Adequate	2=Marginal	1=Unacceptable
Design Experiment	Able to select all tests appropriate for the given experiment. Anticipate difficulties with contingencies.	Able to select all tests appropriate for the given experiment.	Able to select most tests appropriate for the given experiment.	Able to select some tests appropriate for the given experiment.	Unable to select tests appropriate for the given experiment.
Choose Tools	Completely able to justify selection of tool and explain how the tool works, its limitations, its assumptions, ...	Able to justify selection of tool and explain how the tool works, its limitations, its assumptions, ...	Mostly able to justify selection of tool and explain how the tool works, its limitations, its assumptions, ...	Limited ability to justify selection of tool and explain how the tool works, its limitations, its assumptions, ...	Unable to justify selection of tool or explain how the tool works, its limitations, its assumptions, ...
Conduct Experiment	Highly efficient use of tool. Able to produce accurate results.	Efficient use of tool. Able to produce accurate results.	Able to use tool to produce appropriate results.	Minimal knowledge of how to use tool and/or inaccurate results.	Unable to use tool; results are inaccurate.
Analyze Results	Experimental results are explained in terms of appropriate models. Analysis detailed and correct.	Experimental results are explained in terms of appropriate models. Analysis is correct.	Experimental results are explained in terms of appropriate models with only minor errors.	Experimental results are explained in terms of appropriate models but with major errors.	Experimental results are not explained in terms of appropriate models and major errors exist.

Evaluate Significance	There is complete and detailed treatment of variability, error, significance, and agreement with hypothesis.	There is substantial treatment of variability, error, significance, and agreement with hypothesis.	There is treatment of variability, error, significance, and agreement with hypothesis.	There is partial treatment of variability, error, significance, and agreement with hypothesis.	There is no treatment of variability, error, significance, or agreement with hypothesis.
Present Result	Presentation of results is detailed, well organized, and clear, and reflects significant thought and/or interpretation of results.	Presentation of results is detailed and clear, and reflects appropriate thought and/or interpretation of results.	Presentation is clear and reflects some thought and/or interpretation of results.	Presentation has errors, is not detailed, well organized, or clear, and has little reflection or interpretation of results.	Presentation has significant errors, is not detailed, well organized, or clear, and has no reflection or interpretation of results.

Outcome C: An ability to design a system, component, or process to meet desired needs within realistic constraints, such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.

Performance Indicator	5=Exemplary	4=Good	3=Adequate	2=Marginal	1=Unacceptable
Identify Need	Need is identified and justified in detail.	Need is identified and justified.	Need is identified and somewhat justified.	Need for the design is discussed, but not clearly identified or justified.	Need for the design is not addressed.
Identify Constraints	Constraints are identified and justified in detail.	Constraints are identified and justified.	Constraints are identified and somewhat	A single constraint is identified. Inadequate	Constraints are not addressed.

			justified.	discussion or justification.	
Identify Standards	Standards are identified and justified in detail.	Standards are identified and justified.	Standards are identified and somewhat justified.	A standard is identified. Inadequate discussion or justification.	Standards are not addressed.
Create Design	Design exceeds technical specification. All needs, constraints, and standards considered in detail.	Design is technically correct. Needs, constraints, and standards adequately considered.	Design is technically correct. Needs, constraints, and standards considered at minimally adequate level.	Some technical flaws in design. A subset of needs, constraints, and standards are considered.	Major technical flaws in design. Design does not consider needs, constraints, or standards.
Compare	All alternative considered and best solution chosen and justified.	Most alternatives are considered, including the most feasible.	Alternatives are considered, though some better ones are omitted.	Only 1 alternative is considered.	The best alternative is not considered.
Evaluate	The success of the design is discussed in depth. Future improvements are suggested.	The success of the design is discussed. Future improvements are suggested.	The success of the design is discussed.	There is minimal analysis of the success of the design.	There is no critical analysis of extent to which design is fulfilled.
Demonstrate	All design elements are implemented and working	All design elements are implemented and working	Most design elements are implemented in prototype, which	Minimal elements of design are implemented in prototype or there	Prototype is incomplete or does not work.

	successfully. Scope of prototype is appropriate for team size.	successfully.	works adequately.	are technical flaws in prototype.	
Present	Good organization to report. Clear and concise writing. Presentation is clear, organized, and easy to follow.	Overall good report and presentation with some minor flaws.	Good report and presentation with some flaws.	Either report or presentation or inadequate.	Both report and presentation are inadequate.

Outcome D: An ability to function on multidisciplinary teams.

Performance Indicator	5=Exemplary	4=Good	3=Adequate	2=Marginal	1=Unacceptable
Individual Accountability	Individual contributes a significant amount to the team, and assumes team leadership.	Individual contributes a significant amount to the team.	Individual contributes an appropriate amount to the team.	Individual contributes minimally to the team.	Individual does not contribute to the team.
Teamwork	All individuals contribute equally to the team's	The team exhibits good teamwork. Goals are met.	The team functions as a unit and goals are	The team minimally functions as a	The team does not function as a unit. Goals are not

	success. Goals are exceeded.		met.	unit. Partial goals are met.	attained.
Multidisciplinary	The team recognizes multidisciplinary contributions, seeks significant input from those disciplines, and incorporates that input into their project.	The team recognizes multidisciplinary contributions, and seeks significant input from those disciplines.	The team recognizes multidisciplinary contributions, and seeks input from those disciplines.	The team recognizes multidisciplinary contributions, but does not seek input from those other disciplines.	The team does not recognize multidisciplinary contributions.

Outcome E: An ability to identify, formulate, and solve engineering problems.

Performance Indicator	5=Exemplary	4=Good	3=Adequate	2=Marginal	1=Unacceptable
Appropriate Model	Best model is selected for the problem.	A correct model is selected.	A correct model is chosen, but there are some conceptual errors.	Incorrect model is selected for the problem.	No model is selected for the problem.
Logically Consistent Solution	There is a complete and detailed sequence of steps to the solution.	There is a complete sequence of steps to the solution.	There is a correct sequence of steps to the solution.	There is a partially correct sequence of steps to the solution.	There is no logical sequence of steps to the solution.
Correct Solution	The solution is	The solution is	The solution is	The solution	The solution

	conceptually correct, with no procedural errors.	conceptually correct, with only minor procedural errors.	conceptually correct, but contains procedural errors.	contains several conceptual or procedural errors.	contains major conceptual or procedural errors.
Present Result	Presentation of results is detailed, well organized, and clear. All intermediate steps are shown.	Presentation of results is detailed and clear. All intermediate steps are shown.	Presentation is clear. All intermediate steps are shown.	Presentation is neat, but not all intermediate steps are shown.	Presentation is sloppy. Intermediate steps are not shown. Illegible.

Outcome F: An understanding of professional and ethical responsibility.

Performance Indicator	5=Exemplary	4=Good	3=Adequate	2=Marginal	1=Unacceptable
Recognition	Identifies the appropriate and frames key ethical dilemmas. Cites precedent and other examples.	Identifies the appropriate and frames key ethical dilemmas.	Identifies the appropriate ethical dilemma.	Identifies some of the problem, but does not correctly explain the ethical dilemma.	Does not recognize the problem.
Definition	Able to define elements of multiple codes, and IP in detail.	Able to define elements of IEEE code, and IP.	Able to define some elements of ethical codes. Able to define IP.	Only partially able to define elements of ethical codes and IP.	Unable to define code or IP.
Application	Able to apply code of ethics in great depth.	Able to apply code of ethics in some depth.	Able to apply code of ethics.	Partially able to apply code of ethics.	Unable to apply code of ethics.
Judgement	Able to judge in great detail.	Able to judge in some detail.	Able to judge.	Partially able to judge.	Unable to judge..

Outcome G: An ability to communicate effectively (Writing).

Performance Indicator	5=Exemplary	4=Good	3=Adequate	2=Marginal	1=Unacceptable
Organization	Paper is logically organized and reasoning is easy to follow.	Paper and meaning are clear.	Paper's meaning is generally clear. Organization is adequate. Minor points might be confusing.	Paper is difficult to follow. Organization is haphazard.	Paper lacks direction, focus, and organization. Reader is lost.
Content	Presentation is given at the right technical level for the audience. Jargon is avoided. Conclusions are novel and interesting.	Conclusions demonstrate insight into the material. Concepts are clear.	Conclusions demonstrate some insight into the material. Concepts are generally clear with minor errors.	Little synthesis of material on part of writer is present. Conclusions are not new or insightful. Concepts are unclear.	Conclusions are not present or don't exhibit writer's synthesis of the material. No insight or new knowledge is gained.
Writing Style/Grammar	Grammar is correct. Paper is concise. Paragraphs are coherent with a topic sentence. Excellent English style is used.	Grammar is correct. Paragraphs are coherent with a topic sentence. Good English style is used.	Grammar is mostly correct. English is mostly coherent.	Some of these mistakes are present. Errors and bad style obscure meaning of paper. Paragraphs lack structure. Incorrect grammar.	Errors and bad style obscure meaning of paper. Paragraphs lack structure. Incorrect grammar.
Appearance	Document is neat and well laid out. Appearance aids	Document is neat and well laid out.	Document is mostly neat and well laid out.	Parts of the document are sloppy and not	Document is sloppy and not properly

	understanding.			properly formatted.	formatted.
Tables, Graphs, Pictures	Tables, Graphs, Pictures are easy to understand, have informative captions, referenced in text, and enhance understanding.	Mostly, Tables, Graphs, Pictures are easy to understand, have informative captions, referenced in text, and enhance understanding.	Tables, Graphs, Pictures are easy to understand, and referenced in text.	Some of these elements are present. Tables... are hard to read and understand, not referenced in text, have inadequate captions, and don't add to understanding.	Tables... are hard to read and understand, not referenced in text, have inadequate captions, and don't add to understanding.

Outcome G: An ability to communicate effectively (Oral Presentation).

Performance Indicator	5=Exemplary	4=Good	3=Adequate	2=Marginal	1=Unacceptable
Organization	Presentation is clear, logical, and organized. Easy to follow. Organization enhances understanding and follows standard guidelines.	Presentation is clear, logical, and organized. Easy to follow. Organization follows standard guidelines.	Presentation is mostly clear, logical, and organized.	Organization is haphazard. Presentation difficult to follow.	Audience is confused.
Content	Technical/Professional information is appropriate for the audience. All key	Technical/Professional information is appropriate for the audience. Most key	Technical/Professional information is somewhat appropriate for the	Material is marginal and sometimes confusing. Little	Information is unacceptable, confusing, and unclear.

	concepts and terms explained. Research and/or analysis of topic is detailed. Audience gains significant new knowledge and insight.	concepts and terms explained. Research and/or analysis of topic is evident. Audience gains some new knowledge and insight.	audience. Some key concepts and terms explained. Research and/or analysis of topic is partially evident. Audience understands material.	synthesis of material is present. No know insight or knowledge is gained.	
Multi-Media	Multi-media is used creatively to enhance understanding significantly.	Multi-media is used to enhance understanding.	Some multi-media is used to enhance understanding.	Multi-media is poorly prepared and mostly does not enhance presentation.	Multi-media is a distraction to the presentation.
Appearance	Very Appropriate	Appropriate	Generally Appropriate	Somewhat inappropriate	Inappropriate
Delivery	Speaks to the audience, has memorized content, answers questions, easily heard, well-rehearsed. Presentation is smooth. Explains main points and answers questions with ease.	Predominantly speaks to the audience, has memorized content, answers questions, easily heard, well-rehearsed.	Mostly speaks to the audience, has memorized content, answers questions, easily heard, well-rehearsed.	Most of the following faults are present. Does talk to audience. Reads presentation slides. Does not answer questions. Hard to hear. Not practiced.	Does talk to audience. Reads presentation slides. Does not answer questions. Hard to hear. Not practiced.

Outcome H: The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.

Performance Indicator	5=Exemplary	4=Good	3=Adequate	2=Marginal	1=Unacceptable
Impact	Lists good examples with some breath of impact.	Lists good examples.	Lists sufficient examples.	Lists minimal examples.	Unable to list examples.
Responsibilities of Engineer	Has full and detailed understanding.	Has good understanding.	Has basic understanding.	Has some understanding.	Has no understanding.
Diversity	Respects diversity and acknowledges its value.	Respects diversity.	Respects diversity with minor reservations.	Understands diversity but shows some disrespect.	Has disrespect for diversity.

Outcome I: A recognition of the need for, and an ability to engage in life-long learning.

Performance Indicator	5=Exemplary	4=Good	3=Adequate	2=Marginal	1=Unacceptable
Participation	Greater than 50% participation in IEEE, Honor Societies, or departmental seminars.	Greater than 1/3 participation in IEEE, Honor Societies, or departmental seminars.	Greater than 25% participation in IEEE, Honor Societies, or departmental seminars.	Less than 25% participation in IEEE, Honor Societies, or departmental seminars.	Less than 10% participation in IEEE, Honor Societies, or departmental seminars.
Progress	Greater than 50% taking FE exam.	Greater than 1/3 taking FE exam.	Greater than 10% taking FE exam.	Less than 25% taking FE exam.	Less than 10% taking FE exam.
Analysis	Able to get started	Able to get started	Able to get started	Unable to get	Unable to get

	on their own. Self-directed. Needed no help. Outstanding job on the task with some creativity and innovation.	on their own. Only needs minor help. Did well on the task.	on their own. Need some help. Accomplished the task.	started on their own. Needs help on major aspects. Accomplished the minimum.	started on their own. Needs significant help on all aspects.
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Outcome J: A knowledge of contemporary issues.

Performance Indicator	5=Exemplary	4=Good	3=Adequate	2=Marginal	1=Unacceptable
Discuss	Has an outstanding grasp of the issue, its relation to engineering.	Has knowledge and can relate the issue to engineering.	Has some knowledge and can somewhat relate the issue to engineering.	Has a superficial knowledge. Cannot relate to engineering.	Has no knowledge or its relation to engineering.
Demonstrate	Knows the issue and can discuss impact and defend a position in depth.	Knows the issue and can discuss most impacts and defend a position.	Knows the issue and can discuss major impact and moderately defend a position.	Has superficial knowledge but cannot discuss impact, or defend a position.	Has no knowledge.

Outcome K: An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Performance Indicator	5=Exemplary	4=Good	3=Adequate	2=Marginal	1=Unacceptable
Appropriate Tools	Expert use of the	Uses the	Has some	Has superficial	Is unable to use

	tool.	appropriate tool proficiently.	knowledge of the tool.	knowledge of the tool.	tool.
Outside Resources	Finds a good solution with several alternatives and explores outside resources exhaustively.	Finds a good solution with good coverage of outside resources.	Uses outside resources until adequate solution is found. Some resources are left unexplored.	Superficially uses outside resources until less than optimum solution is found.	Does not use resources outside of class.
Use of Labs	Safe. Can do all tests. Explores different options. Data is reliable.	Safe. Can do most tests. Data is reliable, and used appropriately.	Safe. Can do basic tests. Data is mostly reliable, and used appropriately.	Some elements of Unsafe, cannot do basic tests, data is questionable.	Unsafe, cannot do basic tests, data is questionable.