

Background

The Canadian Engineering Accreditation Board (CEAB) is changing how it assesses engineering programmes, and as a result there will be some changes with how courses are being assessed. Essentially, the CEAB is evaluating programmes on whether they assess students in certain “outcome” categories, and whether they use this student assessment for improving the programme. There are 12 outcomes, 8 of which are required to be assessed in the coming 4th year. Within each of the outcomes are a number of categories relating to this outcome. Just how this all breaks down is something that has been decided “from above.”

What is in this document

In this document is the outcome assessment for MTHE 493. This means that all outcomes, as well as the outcome categories for each outcome, that are being assessed for MTHE 493 are listed, as well as descriptions of how students will be assessed in each category. In each category students will be assessed according to the criterion “Not demonstrated,” “Minimal pass,” “Meets expectation,” and “Above expectation,” according to the extent to which the marker feels that the outcome is being met.

How grades are calculated

Students in MTHE 493 are assessed in the following ways with the following weights.

Proposal	10%
Midterm oral presentation	15%
Final oral presentation	15%
Thesis	40%
Group evaluation	10%
Individual evaluation	10%

In the pages following you will see, for each assessed item listed above, the outcomes that are matched to it, as well as the categories for each outcome. Also listed is the weight assigned to each outcome category for that assessed item. The weight for an outcome is the sum of the weights for the categories under that outcome. Who the markers are is designated for each assessed item. In cases where there is more than one marker, marks are averaged.

Let us describe how the mark is calculated for each of these assessed items. Each marker will assign a number from 0–4 for each of the *outcomes* (not outcome *categories*!) according to how the student’s performance matches the expectations. This is the “raw score” for that outcome. The raw score of 0 is reserved for cases where the student did not do the work which is being used to do the outcome assessment. The raw score will be multiplied by the weight assigned to that outcome to get the “weighted score” for that outcome. Since the weights add to 100, the sum of the weighted scores will be bounded above by 400. Thus the mark for the assessed item is the weighted score multiplied by $\frac{\alpha}{400}$ where α is the percentage for that assessed item from the list above.

It’s that easy!

Proposal (marked by supervisor)

Outcome/Category /Weight	Not demonstrated	Minimal pass	Meets expectations	Above expectation
Problem analysis / Identify problem / 25	Identifies few aspects of the problem and related information and uncertainties	Identifies most aspects of the problem and related information and uncertainties	Identifies problem, known and unknown information and uncertainties	Demonstrates a superior understanding of all facets of the problem
Design / Identify design problem / 25	Does not properly identify the design problem and/or misses key constraints for the problem	Identifies most relevant parts of the design problem and constraints, including health and safety risks, applicable standards, economic, environmental, cultural and societal considerations	Identifies design problem and constraints including health and safety risks, applicable standards, economic, environmental, cultural and societal considerations	Shows a superior understanding of the design problem and all constraints involved, including health and safety risks, applicable standards, economic, environmental, cultural and societal considerations
Communications / Discipline-specific conventions / 5 / Communications	Seldom writes and revises documents using appropriate discipline-specific conventions	Often, but not always, writes and revises documents using appropriate discipline-specific conventions	Writes and revises documents using appropriate discipline-specific conventions	Shows superior abilities when writing and revising document, always using appropriate discipline-specific conventions
Communications / Technical vocabulary / 5	Seldom demonstrates accurate use of technical vocabulary	Often, but not always, demonstrates accurate use of technical vocabulary	Demonstrates accurate use of technical vocabulary	Demonstrates superior understanding and use of technical vocabulary
Communications / Referencing / 5	Seldom uses appropriate referencing to cite previous work	Often, but not always, uses appropriate referencing to cite previous work	Uses appropriate referencing to cite previous work	Shows exceptional knowledge of previous work and cites it appropriately
Communications / Graphics / 5	Seldom uses graphics appropriately to explain, interpret, and assess information	Often, but not always, uses graphics appropriately to explain, interpret, and assess information	Uses graphics appropriately to explain, interpret, and assess information	Uses graphics with unusual effectiveness to explain, interpret, and assess information
Impact of engineering / Consider social and environmental factors / 10	Seldom considers economic, social, and environmental factors and/or impacts in decisions, or does so inappropriately	Often, but not always, considers economic, social, and environmental factors and/or impacts in decisions	Considers economic, social, and environmental factors and/or impacts in decisions	Shows superior understanding of the role of economic, social, and environmental factors and/or impacts in decisions
Impact of engineering / Explains context of system / 10	Seldom explains the societal, enterprise, and/or technical context of the system	Often, but not always, explains the societal, enterprise, and/or technical context of the system	Explains the societal, enterprise, and/or technical context of the system	Shows a superior understanding of the societal, enterprise, and/or technical context of the system
Lifelong learning / Evaluates information / 10	Seldom critically evaluates procured information for authority, currency, and objectivity, or does so improperly	Often, but not always, critically evaluates procured information for authority, currency, and objectivity	Critically evaluates procured information for authority, currency, and objectivity	Shows superior understanding of the authority, currency, and objectivity of procured information

Midterm oral presentation (marked by faculty)

Category/Outcome /Weight	Not demonstrated	Minimal pass	Meets expectations	Above expectation
Problem analysis / Identify problem / 10	Identifies few aspects of the problem and related information and uncertainties	Identifies most aspects of the problem and related information and uncertainties	Identifies problem, known and unknown information and uncertainties	Demonstrates a superior understanding of all facets of the problem
Problem analysis / Select model / 10	Seldom selects and applies appropriate model and analysis to solve problems, or does so incorrectly	Often, but not always, selects and applies appropriate model and analysis to solve problems	Selects and applies appropriate model and analysis to solve problems	Devises superior and/or novel models and methods of analysis
Design / Identify design problem / 20	Does not properly identify the design problem and/or misses key constraints for the problem	Identifies most relevant parts of the design problem and constraints, including health and safety risks, applicable standards, economic, environmental, cultural and societal considerations	Identifies design problem and constraints including health and safety risks, applicable standards, economic, environmental, cultural and societal considerations	Shows a superior understanding of the design problem and all constraints involved, including health and safety risks, applicable standards, economic, environmental, cultural and societal considerations
Engineering tools / Appropriate tools / 20	Seldom evaluates appropriateness of results from engineering techniques and tools, or does so incorrectly	Often, but not always, evaluates appropriateness of results from several engineering techniques and tools, or does so in a limited way	Evaluates appropriateness of results for several engineering techniques and tools	Demonstrates superior awareness of engineering techniques and tools
Communications / Technical vocabulary / 5	Seldom demonstrates accurate use of technical vocabulary	Often, but not always, demonstrates accurate use of technical vocabulary	Demonstrates accurate use of technical vocabulary	Demonstrates superior understanding and use of technical vocabulary
Communications / Confident presentations / 5	Oral communication is often poorly thought out, ill-prepared, and not delivered in a convincing manner	Is sometimes shaky or ill-prepared for formal and informal oral communications	Demonstrates confidence preparation in formal and informal oral communications	Is extremely capable and well-prepared for all oral communication
Communications / Referencing / 5	Seldom uses appropriate referencing to cite previous work	Often, but not always, uses appropriate referencing to cite previous work	Uses appropriate referencing to cite previous work	Shows exceptional knowledge of previous work and cites it appropriately
Communications / Graphics / 5	Seldom uses graphics appropriately to explain, interpret, and assess information	Often, but not always, uses graphics appropriately to explain, interpret, and assess information	Uses graphics appropriately to explain, interpret, and assess information	Uses graphics with unusual effectiveness to explain, interpret, and assess information

Midterm oral presentation (cont'd)

Category/Outcome /Weight	Not demonstrated	Minimal pass	Meets expectations	Above expectation
Impact of engineering / Consider social and environmental factors / 6 ² / ₃	Seldom considers economic, social, and environmental factors and/or impacts in decisions, or does so inappropriately	Often, but not always, considers economic, social, and environmental factors and/or impacts in decisions	Considers economic, social, and environmental factors and/or impacts in decisions	Shows superior understanding of the role of economic, social, and environmental factors and/or impacts in decisions
Impact of engineering / Evaluates trade-offs / 6 ² / ₃	Seldom evaluates trade-offs among goals and concepts	Often, but not always, evaluates trade-offs among goals and concepts	Evaluates trade-offs among goals and concepts	Shows superior and/or novel means of evaluating trade-offs among goals and concepts
Impact of engineering / Explains context of system / 6 ² / ₃	Seldom explains the societal, enterprise, and/or technical context of the system	Often, but not always, explains the societal, enterprise, and/or technical context of the system	Explains the societal, enterprise, and/or technical context of the system	Shows a superior understanding of the societal, enterprise, and/or technical context of the system

Final oral presentation (marked by faculty)

Category/Outcome /Weight	Not demonstrated	Minimal pass	Meets expectations	Above expectation
Problem analysis / Identify problem / 5	Identifies few aspects of the problem and related information and uncertainties	Identifies most aspects of the problem and related information and uncertainties	Identifies problem, known and unknown information and uncertainties	Demonstrates a superior understanding of all facets of the problem
Problem analysis / Create process / 5	Seldom, or improperly, creates process for solving problem including justified approximations and assumptions	Often, but not always, correctly creates process for solving problem including justified approximations and assumptions	Correctly creates process for solving problem including justified approximations and assumptions	Is rigorous in creating correct processes for solving problems, understanding all approximations and assumptions
Problem analysis / Select model / 5	Seldom selects and applies appropriate model and analysis to solve problems, or does so incorrectly	Often, but not always, selects and applies appropriate model and analysis to solve problems	Selects and applies appropriate model and analysis to solve problems	Devises superior and/or novel models and methods of analysis
Problem analysis / Evaluate solution / 5	Does not evaluate results and models for error and uncertainty, or does so incorrectly	Performs somewhat substandard evaluation of results and models for error and uncertainty	Evaluates validity of results and model for error and uncertainty	Demonstrates superior and/or novel means of evaluating validity of results and model for error and uncertainty
Design / Identify design problem / 4	Does not properly identify the design problem and/or misses key constraints for the problem	Identifies most relevant parts of the design problem and constraints, including health and safety risks, applicable standards, economic, environmental, cultural and societal considerations	Identifies design problem and constraints including health and safety risks, applicable standards, economic, environmental, cultural and societal considerations	Shows a superior understanding of the design problem and all constraints involved, including health and safety risks, applicable standards, economic, environmental, cultural and societal considerations
Design / Applies knowledge / 4	Seldom applies appropriate knowledge, judgement, and design tools, in creating and analyzing conceptual design solutions	Often, but not always, applies appropriate knowledge, judgement, and design tools, in creating and analyzing conceptual design solutions	Applies appropriate knowledge, judgement, and design tools, in creating and analyzing conceptual design solutions	Demonstrates superior and/or novel abilities in creating and analyzing design solutions
Design / Creates simulations / 4	Seldom, or improperly, creates and tests simulations, models, and/or prototypes at various points in design with complexity appropriate to design stage	Often, but not always, creates and tests appropriate simulations, models, and/or prototypes at various points in design with complexity appropriate to design stage	Creates and tests appropriate simulations, models, and/or prototypes at various points in design with complexity appropriate to design stage	Creates and tests superior and/or novel simulations, models, and/or prototypes at various points in design with complexity appropriate to design stage
Design / Assess solution / 4	Seldom evaluates design solutions based on requirements, yield, reliability, and/or safety, or does so in a deficient manner	Often properly evaluates design solutions based on requirements, yield, reliability, and/or safety	Evaluates design solutions based on requirements, yield, reliability, and/or safety	Develops superior and/or novel means of evaluating design solutions based on requirements, yield, reliability, and/or safety
Design / Identifies improvements / 4	Seldom identifies possibilities for further improvement and conducts design reviews to evaluate performance of the overall process, or does so improperly	Often, but not always, identifies possibilities for further improvement and conducts design reviews to evaluate performance of the overall process	Identifies possibilities for further improvement and conducts design reviews to evaluate performance of the overall process	Is unusually assiduous in improving and reviewing designs to evaluate performance of the overall process

Final oral presentation (cont'd)

Category/Outcome /Weight	Not demonstrated	Minimal pass	Meets expectations	Above expectation
Engineering tools / Evaluates tool limitations / 6 ² / ₃	Seldom evaluates techniques, resources, and tools to identify their limitations with respect to needs, or does so improperly	Often, but not always, evaluates techniques, resources, and tools to identify their limitations with respect to needs	Evaluates techniques, resources, and tools to identify their limitations with respect to needs	Shows superior and/or novel means of evaluating techniques, resources, and tools to identify their limitations with respect to needs
Engineering tools / Applies tools / 6 ² / ₃	Seldom applies appropriate techniques, tools, and processes to accomplish a task	Often applies appropriate techniques, tools, and processes to accomplish a task	Applies appropriate techniques, tools, and processes to accomplish a task	Demonstrates superior and/or novel application of techniques, tools, and processes to accomplish a task
Engineering tools / Appropriate tools / 6 ² / ₃	Seldom evaluates appropriateness of results from engineering techniques and tools, or does so incorrectly	Often, but not always, evaluates appropriateness of results from several engineering techniques and tools, or does so in a limited way	Evaluates appropriateness of results for several engineering techniques and tools	Demonstrates superior awareness of engineering techniques and tools
Communications / Technical vocabulary / 5	Seldom demonstrates accurate use of technical vocabulary	Often, but not always, demonstrates accurate use of technical vocabulary	Demonstrates accurate use of technical vocabulary	Demonstrates superior understanding and use of technical vocabulary
Communications / Confident presentations / 5	Oral communication is often poorly thought out, ill-prepared, and not delivered in a convincing manner	Is sometimes shaky or ill-prepared for formal and informal oral communications	Demonstrates confidence preparation in formal and informal oral communications	Is extremely capable and well-prepared for all oral communication
Communications / Referencing / 5	Seldom uses appropriate referencing to cite previous work	Often, but not always, uses appropriate referencing to cite previous work	Uses appropriate referencing to cite previous work	Shows exceptional knowledge of previous work and cites it appropriately
Communications / Graphics / 5	Seldom uses graphics appropriately to explain, interpret, and assess information	Often, but not always, uses graphics appropriately to explain, interpret, and assess information	Uses graphics appropriately to explain, interpret, and assess information	Uses graphics with unusual effectiveness to explain, interpret, and assess information
Impact of engineering / Consider social and environmental factors / 6 ² / ₃	Seldom considers economic, social, and environmental factors and/or impacts in decisions, or does so inappropriately	Often, but not always, considers economic, social, and environmental factors and/or impacts in decisions	Considers economic, social, and environmental factors and/or impacts in decisions	Shows superior understanding of the role of economic, social, and environmental factors and/or impacts in decisions
Impact of engineering / Evaluates trade-offs / 6 ² / ₃	Seldom evaluates trade-offs among goals and concepts	Often, but not always, evaluates trade-offs among goals and concepts	Evaluates trade-offs among goals and concepts	Shows superior and/or novel means of evaluating trade-offs among goals and concepts
Impact of engineering / Explains context of system / 6 ² / ₃	Seldom explains the societal, enterprise, and/or technical context of the system	Often, but not always, explains the societal, enterprise, and/or technical context of the system	Explains the societal, enterprise, and/or technical context of the system	Shows a superior understanding of the societal, enterprise, and/or technical context of the system

Thesis (marked by supervisor)

Category/Outcome /Weight	Not demonstrated	Minimal pass	Meets expectations	Above expectation
Problem analysis / Identify problem / 4	Identifies few aspects of the problem and related information and uncertainties	Identifies most aspects of the problem and related information and uncertainties	Identifies problem, known and unknown information and uncertainties	Demonstrates a superior understanding of all facets of the problem
Problem analysis / Create process / 4	Seldom, or improperly, creates process for solving problem including justified approximations and assumptions	Often, but not always, correctly creates process for solving problem including justified approximations and assumptions	Correctly creates process for solving problem including justified approximations and assumptions	Is rigorous in creating correct processes for solving problems, understanding all approximations and assumptions
Problem analysis / Select model / 4	Seldom selects and applies appropriate model and analysis to solve problems, or does so incorrectly	Often, but not always, selects and applies appropriate model and analysis to solve problems	Selects and applies appropriate model and analysis to solve problems	Devises superior and/or novel models and methods of analysis
Problem analysis / Evaluate solution / 4	Does not evaluate results and models for error and uncertainty, or does so incorrectly	Performs somewhat substandard evaluation of results and models for error and uncertainty	Evaluates validity of results and model for error and uncertainty	Demonstrates superior and/or novel means of evaluating validity of results and model for error and uncertainty
Design / Identify design problem / $3\frac{1}{5}$	Does not properly identify the design problem and/or misses key constraints for the problem	Identifies most relevant parts of the design problem and constraints, including health and safety risks, applicable standards, economic, environmental, cultural and societal considerations	Identifies design problem and constraints including health and safety risks, applicable standards, economic, environmental, cultural and societal considerations	Shows a superior understanding of the design problem and all constraints involved, including health and safety risks, applicable standards, economic, environmental, cultural and societal considerations
Design / Applies knowledge / $3\frac{1}{5}$	Seldom applies appropriate knowledge, judgement, and design tools, in creating and analyzing conceptual design solutions	Often, but not always, applies appropriate knowledge, judgement, and design tools, in creating and analyzing conceptual design solutions	Applies appropriate knowledge, judgement, and design tools, in creating and analyzing conceptual design solutions	Demonstrates superior and/or novel abilities in creating and analyzing design solutions
Design / Creates simulations / $3\frac{1}{5}$	Seldom, or improperly, creates and tests simulations, models, and/or prototypes at various points in design with complexity appropriate to design stage	Often, but not always, creates and tests appropriate simulations, models, and/or prototypes at various points in design with complexity appropriate to design stage	Creates and tests appropriate simulations, models, and/or prototypes at various points in design with complexity appropriate to design stage	Creates and tests superior and/or novel simulations, models, and/or prototypes at various points in design with complexity appropriate to design stage
Design / Assess solution / $3\frac{1}{5}$	Seldom evaluates design solutions based on requirements, yield, reliability, and/or safety, or does so in a deficient manner	Often properly evaluates design solutions based on requirements, yield, reliability, and/or safety	Evaluates design solutions based on requirements, yield, reliability, and/or safety	Develops superior and/or novel means of evaluating design solutions based on requirements, yield, reliability, and/or safety
Design / Identifies improvements / $3\frac{1}{5}$	Seldom identifies possibilities for further improvement and conducts design reviews to evaluate performance of the overall process, or does so improperly	Often, but not always, identifies possibilities for further improvement and conducts design reviews to evaluate performance of the overall process	Identifies possibilities for further improvement and conducts design reviews to evaluate performance of the overall process	Is unusually assiduous in improving and reviewing designs to evaluate performance of the overall process

Thesis (cont'd)

Category/Outcome /Weight	Not demonstrated	Minimal pass	Meets expectations	Above expectation
Engineering tools / Evaluates tool limitations / 5 $\frac{1}{3}$	Seldom evaluates techniques, resources, and tools to identify their limitations with respect to needs, or does so improperly	Often, but not always, evaluates techniques, resources, and tools to identify their limitations with respect to needs	Evaluates techniques, resources, and tools to identify their limitations with respect to needs	Shows superior and/or novel means of evaluating techniques, resources, and tools to identify their limitations with respect to needs
Engineering tools / Applies tools / 5 $\frac{1}{3}$	Seldom applies appropriate techniques, tools, and processes to accomplish a task	Often applies appropriate techniques, tools, and processes to accomplish a task	Applies appropriate techniques, tools, and processes to accomplish a task	Demonstrates superior and/or novel application of techniques, tools, and processes to accomplish a task
Engineering tools / Appropriate tools / 5 $\frac{1}{3}$	Seldom evaluates appropriateness of results from engineering techniques and tools, or does so incorrectly	Often, but not always, evaluates appropriateness of results from several engineering techniques and tools, or does so in a limited way	Evaluates appropriateness of results for several engineering techniques and tools	Demonstrates superior awareness of engineering techniques and tools
Communications / Discipline-specific conventions / 4	Seldom writes and revises documents using appropriate discipline-specific conventions	Often, but not always, writes and revises documents using appropriate discipline-specific conventions	Writes and revises documents using appropriate discipline-specific conventions	Shows superior abilities when writing and revising document, always using appropriate discipline-specific conventions
Communications / Technical vocabulary / 4	Seldom demonstrates accurate use of technical vocabulary	Often, but not always, demonstrates accurate use of technical vocabulary	Demonstrates accurate use of technical vocabulary	Demonstrates superior understanding and use of technical vocabulary
Communications / Referencing / 4	Seldom uses appropriate referencing to cite previous work	Often, but not always, uses appropriate referencing to cite previous work	Uses appropriate referencing to cite previous work	Shows exceptional knowledge of previous work and cites it appropriately
Communications / Graphics / 4	Seldom uses graphics appropriately to explain, interpret, and assess information	Often, but not always, uses graphics appropriately to explain, interpret, and assess information	Uses graphics appropriately to explain, interpret, and assess information	Uses graphics with unusual effectiveness to explain, interpret, and assess information
Professionalism / Integrates standards / 10	Seldom integrates standards, codes of practice, and legal and regulatory factors into decision-making processes (as appropriate), or does so improperly	Often, but not always, integrates standards, codes of practice, and legal and regulatory factors into decision-making processes (as appropriate)	Integrates standards, codes of practice, and legal and regulatory factors into decision-making processes (as appropriate)	Shows a superior knowledge and application of standards, codes of practice, and legal and regulatory factors in the decision-making processes (as appropriate)

Thesis (cont'd)

Category/Outcome /Weight	Not demonstrated	Minimal pass	Meets expectations	Above expectation
Impact of engineering / Consider social and environmental factors / 5 $\frac{1}{3}$	Seldom considers economic, social, and environmental factors and/or impacts in decisions, or does so inappropriately	Often, but not always, considers economic, social, and environmental factors and/or impacts in decisions	Considers economic, social, and environmental factors and/or impacts in decisions	Shows superior understanding of the role of economic, social, and environmental factors and/or impacts in decisions
Impact of engineering / Evaluates trade-offs / 5 $\frac{1}{3}$	Seldom evaluates trade-offs among goals and concepts	Often, but not always, evaluates trade-offs among goals and concepts	Evaluates trade-offs among goals and concepts	Shows superior and/or novel means of evaluating trade-offs among goals and concepts
Impact of engineering / Explains context of system / 5 $\frac{1}{3}$	Seldom explains the societal, enterprise, and/or technical context of the system	Often, but not always, explains the societal, enterprise, and/or technical context of the system	Explains the societal, enterprise, and/or technical context of the system	Shows a superior understanding of the societal, enterprise, and/or technical context of the system
Lifelong learning / Evaluates information / 10	Seldom critically evaluates procured information for authority, currency, and objectivity, or does so improperly	Often, but not always, critically evaluates procured information for authority, currency, and objectivity	Critically evaluates procured information for authority, currency, and objectivity	Shows superior understanding of the authority, currency, and objectivity of procured information

Group evaluation (marked by supervisor)

Category/Outcome /Weight	Not demonstrated	Minimal pass	Meets expectations	Above expectation
Problem analysis / Identify problem / $6\frac{2}{3}$	Identifies few aspects of the problem and related information and uncertainties	Identifies most aspects of the problem and related information and uncertainties	Identifies problem, known and unknown information and uncertainties	Demonstrates a superior understanding of all facets of the problem
Problem analysis / Create process / $6\frac{2}{3}$	Seldom, or improperly, creates process for solving problem including justified approximations and assumptions	Often, but not always, correctly creates process for solving problem including justified approximations and assumptions	Correctly creates process for solving problem including justified approximations and assumptions	Is rigorous in creating correct processes for solving problems, understanding all approximations and assumptions
Problem analysis / Select model / $6\frac{2}{3}$	Seldom selects and applies appropriate model and analysis to solve problems, or does so incorrectly	Often, but not always, selects and applies appropriate model and analysis to solve problems	Selects and applies appropriate model and analysis to solve problems	Devises superior and/or novel models and methods of analysis
Problem analysis / Evaluate solution / $6\frac{2}{3}$	Does not evaluate results and models for error and uncertainty, or does so incorrectly	Performs somewhat substandard evaluation of results and models for error and uncertainty	Evaluates validity of results and model for error and uncertainty	Demonstrates superior and/or novel means of evaluating validity of results and model for error and uncertainty
Design / Identify design problem / $5\frac{1}{3}$	Does not properly identify the design problem and/or misses key constraints for the problem	Identifies most relevant parts of the design problem and constraints, including health and safety risks, applicable standards, economic, environmental, cultural and societal considerations	Identifies design problem and constraints including health and safety risks, applicable standards, economic, environmental, cultural and societal considerations	Shows a superior understanding of the design problem and all constraints involved, including health and safety risks, applicable standards, economic, environmental, cultural and societal considerations
Design / Applies knowledge / $5\frac{1}{3}$	Seldom applies appropriate knowledge, judgement, and design tools, in creating and analyzing conceptual design solutions	Often, but not always, applies appropriate knowledge, judgement, and design tools, in creating and analyzing conceptual design solutions	Applies appropriate knowledge, judgement, and design tools, in creating and analyzing conceptual design solutions	Demonstrates superior and/or novel abilities in creating and analyzing design solutions
Design / Creates simulations / $5\frac{1}{3}$	Seldom, or improperly, creates and tests simulations, models, and/or prototypes at various points in design with complexity appropriate to design stage	Often, but not always, creates and tests appropriate simulations, models, and/or prototypes at various points in design with complexity appropriate to design stage	Creates and tests appropriate simulations, models, and/or prototypes at various points in design with complexity appropriate to design stage	Creates and tests superior and/or novel simulations, models, and/or prototypes at various points in design with complexity appropriate to design stage
Design / Assess solution / $5\frac{1}{3}$	Seldom evaluates design solutions based on requirements, yield, reliability, and/or safety, or does so in a deficient manner	Often properly evaluates design solutions based on requirements, yield, reliability, and/or safety	Evaluates design solutions based on requirements, yield, reliability, and/or safety	Develops superior and/or novel means of evaluating design solutions based on requirements, yield, reliability, and/or safety
Design / Identifies improvements / $5\frac{1}{3}$	Seldom identifies possibilities for further improvement and conducts design reviews to evaluate performance of the overall process, or does so improperly	Often, but not always, identifies possibilities for further improvement and conducts design reviews to evaluate performance of the overall process	Identifies possibilities for further improvement and conducts design reviews to evaluate performance of the overall process	Is unusually assiduous in improving and reviewing designs to evaluate performance of the overall process

Group evaluation (cont'd)

Category/Outcome /Weight	Not demonstrated	Minimal pass	Meets expectations	Above expectation
Engineering tools / Evaluates tool limitations / 8 ⁸ / ₉	Seldom evaluates techniques, resources, and tools to identify their limitations with respect to needs, or does so improperly	Often, but not always, evaluates techniques, resources, and tools to identify their limitations with respect to needs	Evaluates techniques, resources, and tools to identify their limitations with respect to needs	Shows superior and/or novel means of evaluating techniques, resources, and tools to identify their limitations with respect to needs
Engineering tools / Applies tools / 8 ⁸ / ₉	Seldom applies appropriate techniques, tools, and processes to accomplish a task	Often applies appropriate techniques, tools, and processes to accomplish a task	Applies appropriate techniques, tools, and processes to accomplish a task	Demonstrates superior and/or novel application of techniques, tools, and processes to accomplish a task
Engineering tools / Appropriate tools / 8 ⁸ / ₉	Seldom evaluates appropriateness of results from engineering techniques and tools, or does so incorrectly	Often, but not always, evaluates appropriateness of results from several engineering techniques and tools, or does so in a limited way	Evaluates appropriateness of results for several engineering techniques and tools	Demonstrates superior awareness of engineering techniques and tools
Professionalism / Professional bearing / 10	Seldom demonstrates professional bearing	Often, but not always, demonstrates professional bearing	Demonstrates professional bearing	Goes beyond the normal and expected standards of professional bearing
Lifelong learning / Self-education / 10	Demonstrates few, if any, of the skills needed for self-education	Demonstrates some of the skills needed for self-education	Demonstrate skills needed for self-education	Shows superior traits for self-education

Individual evaluation (marked by supervisor)

Category/Outcome /Weight	Not demonstrated	Minimal pass	Meets expectations	Above expectation
Teamwork / Leadership / 15	Seldom demonstrates capacity for initiative and technical or team leadership while respecting others’ roles	Often, but not always, demonstrates capacity for initiative and technical or team leadership while respecting others’ roles	Demonstrates capacity for initiative and technical or team leadership while respecting others’ roles	Shows superior leadership and understanding of the roles and abilities of other team members
Teamwork / Evaluates team effectiveness / 15	Seldom evaluates team effectiveness and plans for improvements	Often, but not always, evaluates team effectiveness and plans for improvements	Evaluates team effectiveness and plans for improvements	Plays a key role in evaluating team effectiveness and plans for improvements
Communications / Confident presentations / 30	Oral communication is often poorly thought out, ill-prepared, and not delivered in a convincing manner	Is sometimes shaky or ill-prepared for formal and informal oral communications	Demonstrates confidence preparation in formal and informal oral communications	Is extremely capable and well-prepared for all oral communication
Professionalism / Professional bearing / 20	Seldom demonstrates professional bearing	Often, but not always, demonstrates professional bearing	Demonstrates professional bearing	Goes beyond the normal and expected standards of professional bearing
Lifelong learning / Self-education / 20	Demonstrates few, if any, of the skills needed for self-education	Demonstrates some of the skills needed for self-education	Demonstrate skills needed for self-education	Shows superior traits for self-education