Graduate Attribute Indicator Rubrics

The Faculty level CPEI committee is continuing to develop these graduate attribute indicator rubrics and will confirm, before the start of each academic year.

McGill
Faculty of
Engineering

Knowledge Base for Engineering (KB)

	Indicators	Below expectations <55% (D and F)	Marginal 55-64% (C^+ and C)	Meets expectations 65-79% (B^+, B and B^-)	Exceed expectations 80-100% (A and A^-)
Mathematics	**KB.1 - Recalls and defines information and concepts in mathematics**	• Unable to recall previously learned information and concepts in mathematics	• Recalls some of the previously learned information and concepts in mathematics	• States most principles and theories and identifies most rules and methodologies in mathematics	• Explains specifics, principles, theories, rules, and methodologies in mathematics
		• Cannot reproduce solutions to problems in mathematics	• Reproduces in part solutions to problems in mathematics	• Reproduces solutions to previously encountered problems in mathematics	• Reproduces solutions to new problems in mathematics
	KB.2 - Comprehends information and applies concepts in mathematics	• Shows minimal understanding of applications of mathematical theory to the problem	• Shows limited understanding of applications of mathematical theory to the problem	• Shows nearly complete understanding of applications of mathematical theory to the problem and expects theory to predict reality	• Shows complete understanding of applications of mathematical theory to the problem
Natural Sciences	**KB.3 - Recalls and defines information, first principles and concepts in the natural sciences**	• Unable to recall previously learned information and concepts in the natural sciences	• Recalls some of the previously learned information and concepts in the natural sciences	• States most principles and theories and identifies most rules and methodologies in the natural sciences	• Explains specifics, principles, theories, rules, and methodologies in the natural sciences
		• Cannot reproduce solutions to problems in the natural sciences	• Reproduces in part solutions to problems in the natural sciences	• Reproduces solutions to previously encountered problems in the natural sciences	• Reproduces solutions to new problems in the natural sciences
	KB.4 - Comprehends information and applies concepts in the natural sciences	• Shows minimal understanding of applications of natural sciences to the problem	• Shows limited understanding of applications of natural sciences to the problem	• Shows complete understanding of applications of natural sciences to the problem and expects theory to predict reality	• Translates theory into engineering applications and accepts limitations of mathematical models of physical reality

Knowledge Base for Engineering (KB)

	Indicators	Below expectations <55% (D and F)	Marginal 55-64% (C^+ and C)	Meets expectations 65-79% (B^+, B and B^-)	Exceed expectations 80-100% (A and A^-)
Fundamental Engineering Science	**KB.5 - Recalls and defines information, first principles and concepts in fundamental engineering science**	• Unable to recall previously learned information and concepts in fundamental engineering science	• Recalls some of the previously learned information and concepts in fundamental engineering science	• States most principles and theories andidentifies most rules and methodologies in fundamental engineering science	• Explains specifics, principles, theories, rules, and methodologies in fundamental engineering science
		• Cannot reproduce solutions to problems in fundamental engineering science	• Reproduces in part solutions to problems in fundamental engineering science	• Reproduces solutions to previously encountered problems in fundamental engineering science	• Reproduces solutions to new problems in fundamental engineering science
	KB.6 - Comprehends information and applies concepts in fundamental engineering science	• Shows minimal understanding of applications of fundamental engineering science to the problem	• Shows limited understanding of applications of fundamental engineering science to the problem	• Shows complete understanding of applications of fundamental engineering science to the problem and expects theory to predict reality	• Makes generalizations, inferences, and connections between mathematics/natural sciences and fundamental engineering science
Specialized Engineering Science	**KB.7 - Recalls and defines information, first principles and concepts in specialized engineering science**	• Unable to recall previously learned information and concepts in specialized engineering science	• Recalls some of the previously learned information and concepts in specialized engineering science	• States most principles and theories and identifies most rules and methodologies in specialized engineering science	• Explains specifics, principles, theories, rules, and methodologies in specialized engineering science
		• Cannot reproduce solutions to problems in specialized engineering science	• Reproduces in part solutions to problems in specialized engineering science	• Reproduces solutions to previously encountered problems in specialized engineering science	• Reproduces solutions to new problems in specialized engineering science
	KB.8 - Comprehends information and applies concepts in specialized engineering science	• Shows minimal understanding of applications of specialized engineering science to real industry problem	• Summarizes or explains some ideas and content; • Shows limited understanding of applications of specialized engineering science to the real industry problem	• Summarizes and explains key ideas and content • Shows complete understanding of applications of specialized engineering science theory to the real industry problem and expects theory to predict reality	• Extrapolates ideas and content for use in different specialized engineering situations

Problem Analysis (PA)

	Indicators	Below expectations <55% (D and F)	Marginal 55-64% (C^+ and C)	Meets expectations 65-79% (B^+, B and B^-)	Exceed expectations 80-100% (A and A^-)
Identify	**PA.1 - Identifies and formulates complex engineering problems**	• Unable to extract key information	• Extracts some key information	• Extracts key information and interprets most auxiliary information	• Skilfully extracts key information and interprets all auxiliary information
Formulate		• Unable to solve problems that were presented in class, assignments, or homework	• Shows difficulty in coping with a slight variation of a standard problem	• Adjusts from known problems to slightly different situations	• Adapts or creates a solution procedure when presented with a significantly different problem than that taught
method		• Unable to do groundwork or basic calculations required to setup problem	• Demonstrates solutions implementing simple applications of one formula or equation with close analogies to class/lecture problems	• Simplifies problems, reduces number of variables, and applies assumptions	• Makes creative simplifying assumptions beyond those taught
Identify	**PA.2 - Develops models from first principles to analyze complex engineering problems**	• Demonstrates minimal or no understanding of the models from first principles	• Outlines a general procedure but does not clearly identify methods.	• Develops solution/model from first principles	• Creates an optimal model considering all constraints within an of engineering problem
Formulate		• Unable to formulate a model	• Formulates a general models but unable to identify their limitations	• Formulates models and identifies some of their limitations	• Combines mathematical and/or scientific principles to formulate models of chemical and/or physical processes and systems relevant to the specialized field of studies
method		• Unable to select appropriate computational procedures	• Selects appropriate computational procedures but unable to apply them	• Selects and applies appropriate computational procedures	• Develops appropriate computational procedures and identifies all the limitations of the model, making suggestions for improvement
Validation		• Unable to validate a model	• Identifies some of the limitations of a model	• Validates credibility of a model with first principle analysis	• Validates credibility of different models for an engineering problem with first principle analysis and suggests the most appropriate one

Problem Analysis (PA)

	Indicators	Below expectations <55% (D and F)	Marginal 55-64% (C^+ and C)	Meets expectations 65-79% (B^+, B and B^-)	Exceed expectations 80-100% (A and A^-)
Solution	**PA.3 – Analyzes and Solves complex engineering problems**	• Unable to create solutions to a problem	• Creates a solution to a problem considering a few factors	• Creates a solution to a problem considering various factors	• Creates multiple solutions to a problem considering various factors
Conclusions		• Unable to extract conclusions from calculations	• Extracts some conclusions from calculations	• Extracts conclusions from calculations	• Demonstrates creative synthesis of the results to extract conclusions
Validation		• Unable to determine range or regime of equation validity	• Evaluates validity of some of the answers and results	• Evaluates validity of most of the answers and results	• Evaluates validity of the answers and results
Analysis		• Leaves questionable answers unexplained or unanswered • Accepts wrong answers and offers them as correct	• Provides comments to some of the questions posed • Predicts and justifies problem outcomes incompletely	• Provides comments to questions posed and predicts and justifies problem outcomes	• Analyzes the solution from various perceptivity, e.g. practicality, cost,...
Evaluation	**PA.4 – Critically evaluates the validity and accuracy of solution**	• Unaware of alternative existing solutions • Unable to evaluate the validity and accuracy of proposed solutions	• Shows limited awareness of alternative existing solutions • Evaluates the validity and accuracy of proposed solutions to a limited extent	• Identifies most of the alternative existing solutions • Evaluates the validity of a proposed solution	• Researches alternative solutions • Evaluates validity of the answers and results for each proposed solution • Evaluates the extent of validity of an existing solution method
Limitation		• Unable to identify solution method limitation(s)	• Identifies some solution method limitation(s)	• Identifies most solution method limitation(s)	• Identifies solution method limitation(s) and suggests improvements to the proposed solution
Error		• Unable to identify sources of error in the solution process	• Identifies some sources of error in the solution process	• Identifies sources of error in the solution process	• Identifies the extent of errors introduced by simplifying assumptions in a proposed solution

Investigation (IN)

	Indicators	Below expectations <55% (D and F)	Marginal 55-64% (C^+ and C)	Meets expectations 65-79% (B^+, B and B^-)	Exceed expectations 80-100% (A and A^-)
Measurement	**IN.1 – Conducts planned activities (experiments, measurement, laboratories, literature review, ...) and analyzes data**	• Unable to determine which variables to measure or control	• Measures some but not all of the correct and relevant variables, investigates the correct variables but over the wrong range	• Measures and controls all correct variables necessary to solve problem or understand system	• Includes additional tests to study related and relevant processes or to gain a deeper understanding of system under study
Method		• Unable to carry out planned activity • Unaware of basic tools necessary for the job, • Cannot conceive of practical implementation.	• Uses methods that are ineffective, or inefficient	• Utilizes valid methods Conducts methods well and with sufficient accuracy	• Develops novel methods • Improves existing methods, e.g., reduces error • Troubleshoots
Documentation		• Documentation of data and information is poor	• Documents some of the data and information	• Documents the relevant data and information	• Objectively documents all data and information.
calculations		• Unable to use data to calculate additional information	• Performs some basic calculations and plots data and results, but not able to see full picture	• Uses data to calculate additional information • Shows awareness of all main interrelations and trends in the data • Plots all data against correct variables	• Calculates non-obvious information (e.g., dimensionless groups) • Uses advanced methods (e.g., mathematical techniques) or tools (e.g., computer software such as MATLAB)
Analysis		• Unable to grasp relationships between data • Unfamiliar with basic data analysis tools • Fails to recognize errors in data	• Shows familiarity with basic data analysis tools • Recognizes some errors in data	• Demonstrates the ability to analyze the collected data adequately	• Demonstrates the ability to analyze the collected data skillfully • Develops creative data visualization-analysis scheme

Investigation (IN)

	Indicators	Below expectations <55% (D and F)	Marginal 55-64% (C^+ and C)	Meets expectations 65-79% (B^+, B and B^-)	Exceed expectations 80-100% (A and A^-)
Error / limitation	**IN.2 – Interprets results and reaches valid conclusions**	• Is unaware of measurement error	• Is aware of measurement error but does not account for them	• Acknowledges most of the limitations of data and takes some into account	• Acknowledges limitations of data and measurement error and accounts for them
Data presentation		• Plots without units and/or identification of variables	• Plots data for some of the correct variables	• Plots data as a function of correct variables	• Compares results and conclusions with previous works
Conclusion		• Misinterprets trends and correlations • Provides physically unrealistic explanations • Unable to relates physics of the system to results	• Makes little attempt to relate data to theory • Interprets some results	• Reaches valid conclusions justified by the data • Relates physics of the system • Uses caution in interpretations	• Presents far reaching conclusions • Extends results to other general systems; proposes improvements in the methods
Formulate Hypotheses	**IN.3 – Formulates hypotheses and designs suitable investigative approaches and/or research methodologies**	• Unable to construct hypotheses	• Hypotheses is defined somewhat clearly	• Hypotheses is defined clearly	• Hypotheses are well specified
Develop investigation plan		• unable to develop investigation plans	• Develops investigation plans that are incomplete	• Develops investigation plan and/or research methodologies adequately	• Develops investigation plans and/or research methodologies that show thought processes based on an advanced understanding of the system
Safety	**IN.4 – Understands and / or demonstrates appropriate safety protocols**	• Safety concerns may become apparent during an activity • Practices unsafe, risky behaviors in lab	• Unsafe lab procedures observed infrequently	• Follows safety protocols of the lab	• Observes and follows standard safety codes as well as lab's safety protocols

Design (DE)

	Indicators	Below expectations <55% (D and F)	Marginal 55-64% (C+ and C)	Meets expectations 65-79% (B+, B and B-)	Exceed expectations 80-100% (A and A-)
Define Problem	**DE.1 - Understands the problem (i.e., context and need for a design solution) and defines objectives and constraints**	• Does not understand the problem nor the objectives	• Has an incomplete understanding of the nature of the complex/open-ended engineering problems	• Understands the nature of the complex/open-ended engineering problems and some of the broader in context	• Understands nature of the complex/open-ended engineering problems and defines the problem and the objectives in the broader context
Define Objectives		• Does not define the objectives	• Defines some of the technical objectives	• Defines most of the technical objectives and some of health & safety, standard, economics and environments objectives	• Defines all the objectives including technical and safety and environmental, etc.
Constraint		• Does not identify the constraints	• Identifies some of the constraints imposed by factors such as health and safety, standards, economics, environment, etc.	• Identifies most of the constraints imposed by factors such as health and safety, standards, economics, environment, etc.	• Identifies all constraints imposed by factors such as health and safety, standards, economics, environment, etc.
Understanding Design process	**DE.2 - Develops a design process considering health and safety risks, applicable standards, economic, environmental, cultural and societal considerations.**	• Has no concept of the process as a sum of its parts	• Understands the need of breaking down the problem into sub-problems	• Decomposes the problem into sub-problems	• Sees the big picture as well as each part
Develop Design process		• No design plan • Cannot design systems, components and processes without help	• Creates a design process with extensive guidance	• Develops a design process with minimum guidance	• Develops a design plan that includes economic, safety, environmental and other realistic constraints
Design Constraints		• Does not consider design constraints: health and safety risks, engineering standards and codes, economic, environmental, cultural and societal issues in design	• Considers some design constraints: health and safety risks, engineering standards and codes, economic, environmental, cultural and societal issues in design	• Considers most of design constraints: health and safety risks, engineering standards and codes, economic, environmental, cultural and societal issues in design	• Considers all constraints: health and safety risks, engineering standards and codes, economic, environmental, cultural and societal issues in design

Design (DE)

	Indicators	Below expectations <55% (D and F)	Marginal 55-64% (C+ and C)	Meets expectations 65-79% (B+, B and B-)	Exceed expectations 80-100% (A and A-)
Develop Alternative solution	**DE.3 - Researches and develops possible solutions to a complex engineering problem and recommends a final design**	• Proposes only one (limited) design	• Specifies several incomplete designs, including those that fail to meet the desired objectives and/or constraints	• Conceives several alternative design solutions that meet most of the desired functions and objectives	• Generate several novel design alternatives that meet the desired and objectives, subject to the constraints
Justification		• Cannot recommend and/or justify an appropriate design	• Identifies and justifies the design with difficulty	• Designs account for some of the constraints • Systematically identifies and justifies an appropriate design that satisfies most of the requirements (objectives, and constraints) and considers implementation issues	• Understands and anticipates the implications of future changes in constraints and life cycle considerations on the proposed design • Supports design procedure with documentation and references
Implementation	**DE.4 – Implements and evaluates a final design**	• Design is incomplete No consideration of economics, safety, and environment	• Design is done, but does not validate the practicality of the design	• A detailed design is done and the final design is implemented • The design validates against the objectives and some of constraints	• Recognizes practical significance of design outcome • Designs show clearly the impact and limitations imposed by the constraints

Use of Engineering Tools (ET)

	Indicators	Below expectations <55% (D and F)	Marginal 55-64% (C+ and C)	Meets expectations 65-79% (B+, B and B-)	Exceed expectations 80-100% (A and A-)
Tool Selection	**ET.1 - Selects and uses tools**	• Cannot select the appropriate tool nor to understand the rationale for using a given tool	• Explains the reasoning behind the use of a particular tool, when there is only one	• Justifies the selection of one tool over another, given options	• Identifies and investigates different tools for the problem • Selects the most appropriate tool for the problem
Using tools		• Cannot use the modern engineering tool(s), even with guidance. • Safety concerns may become apparent when in possession of tool	• Uses the modern engineering tool(s) given to them to complete the task with significant guidance	• Uses modern engineering tools that may be appropriate for the problem at hand with some guidance	• Uses modern engineering tools that are most applicable to the problem at hand, without external guidance
Evaluate Limitation	**ET.2 - Evaluates tools and identifies their limitations**	• Is unaware of tool's error and limitations • Does not understand the role of a tool in the broader subject	• Is aware of limitation of tools but does not account for them	• Identifies the limitation of tools • Accounts for some of the limitation of the tools	• Critiques these tools and justify the use of a particular one • Critically evaluates and account for the limitations of tools
Tools creation	**ET.3 - Creates and adapts tools, Integrates tool range**	• Knows only what is told to them; no knowledge of the evolution/adaptation of the tools for increasingly complex problems	• Understands that other tools exist, but cannot integrate them into a cohesive protocol	• Understands that tools are often used together to expand the process, and shows adequate knowledge about integrating tools to perform a task	• Expands upon tool selection, to be able to use a number of tools, either in series or parallel, in order to perform a desired function

Individual and Team Work (IT)

	Indicators	Below expectations <55% (D and F)	Marginal 55-64% (C+ and C)	Meets expectations 65-79% (B+, B and B-)	Exceed expectations 80-100% (A and A-)
Participation	**IT.1 - Participates actively in a uni- and/or multi-disciplinary team**	• Often absent or not showing interest in discussions and activities	• Limited participation or interest in discussions and activities	• Usually participates and shows interest in discussions and activities	• Always participates and shows a great interest in discussions and activities
Quality/Quantity	**IT.2 - Shares the workload**	• Fails to complete own share of responsibilities • Does not complete assigned tasks by deadline	• Inconsistent in doing a fair share of the group's work • Inconsistent in completing assigned tasks by deadline	• Does a fair share of the group's work • Completes assigned tasks by deadline	• Contributes beyond expectations to the group's work • Completes assigned tasks by deadline and assists team members to meet the deadline
Personal Behaviour	**IT.3- Displays good interpersonal skills**	• Treats team members disrespectfully • Rarely listens to other team members • Critical and defensive when giving and receiving feedback	• Sometimes treats team members disrespectfully • Occasionally listens to other team members • Shows difficulties giving and receiving constructive feedback	• Treats team members respectfully • Listens to other team members • Gives and receives constructive feedback	• Treats team members respectfully and fosters a general climate of mutual respect • Listens to other team members and encourages them to participate • Gives and receives constructive feedback; helps others incorporate feedback
Leadership	**IT.4 - Develops leadership skills**	• Never provides direction and facilitates achievement of the team's goals	• Occasionally provides direction and facilitates achievement of the team's goals	• Frequently provides direction and facilitates achievement of the team's goals	• Provides direction and inspiration to the team and facilitates achievement of the team's goals

Communication Skills (CS)

	Indicators	Below expectations <55% (D and F)	Marginal 55-64% (C+ and C)	Meets expectations 65-79% (B+, B and B-)	Exceed expectations 80-100% (A and A-)
Comprehension	**CS.1 - Understands, interprets and/or assesses oral, written, graphical or visual communications**	• Unable to extract critical information from technical documentation	• Extracts critical information with assistance	• Understands most technical communication, misses minor details	• Understands technical communication • Displays an excellent appreciation of rationale
Written Communication	**CS.2 - Produces written engineering reports and design documentation**	• Cannot adhere to technical standards • Communicates simple ideas in a confusing and incomplete manner	• Communicates all essential details with minor errors only	• Presents complicated concepts effectively, minor mistakes only	• Produces industry-standard levels of technical communication with perfect clarity in presentation of complex engineering ideas
Oral Communication	**CS.3 - Demonstrates competency in the oral communication of complex engineering concepts**	• Cannot explain ideas to peers on the same level of understanding • Delivers poor presentations standards	• Explain ideas to peers on the same level of understanding • Delivers presentations that meet minimum standards	• Explains complicated engineering ideas to a limited audience audiences • Exhibits high presentation standards	• Persuasively explains complicated engineering ideas to a variety of audiences (including the general public) • Exhibits impeccable presentation standards • Contributes to peer-reviewed work
Instruction	**CS.4 - Demonstrates an ability to give and effectively respond to clear instructions**	• Exhibits difficulty understanding communications and instructions that have been reduced to very basic levels	• Understands and processes most requests, occasionally misunderstands clear instructions	• Understands and processes all requests without major issue • Overcomes minor deficiencies in instruction with good engineering intuition	• Intuits key engineering details from non-technical communication • Gives confidence about skill-level to instructions given

Professionalism (PR)

	Indicators	Below expectations <55% (D and F)	Marginal 55-64% (C+ and C)	Meets expectations 65-79% (B+, B and B-)	Exceed expectations 80-100% (A and A-)
	PR.1 - Understands the role of engineering in society	• Is incapable of relating classroom engineering to real-world societal challenges	• Recognizes the most obvious externalities of engineering design such as environmental pollution	• Demonstrates an understanding of the positive and negative impacts of engineering design on the environment, society, economy	• Understands how engineering can shape public policy and influence decision-making
	PR.2 - Understands the responsibility of Professional Engineer in protection of the public and its interest	• Demonstrates minimal understanding of the role of the Professional Engineer as it pertains to protection of public and its interest	• Demonstrates some awareness of the role of the Professional Engineer as it pertains to protection of public and its interest	• Demonstrates understanding of the role of the Professional Engineer as it pertains to protection of public and its interest	• Demonstrates exemplary understanding of the role of the Professional Engineer as it pertains to protection of public and its interest
	PR.3 - Knows pertinent codes, laws and regulations	• Ignorant of relevant codes, laws, and regulations	• Rudimentary knowledge of some codes, laws, and regulations	• Knowledge of relevant codes, laws, and regulations	• Knowledge of codes, laws, and regulations, as well as their rationale

Impact of Engineering on Society and the Environment (IE)

	Indicators	Below expectations <55% (D and F)	Marginal 55-64% (C+ and C)	Meets expectations 65-79% (B+, B and B-)	Exceed expectations 80-100% (A and A-)
	IE.1 - Understands the social, environmental, economic, health, safety, legal and/or cultural aspects of engineering activities	• Demonstrates minimal understanding of diverse interactions of engineering on society and the environment.	• Demonstrates some understanding of diverse interactions of engineering on society and the environment.	• Demonstrates understanding of diverse interactions of engineering on society and the environment.	• Considers and evaluates diverse interactions of engineering on society and the environment.
	IE.2 – Understands or is able to analyze the uncertainties in the prediction of interactions between the different aspects of engineering activities	• Does not know how sustainability is linked to uncertainty	• Understands that sustainability entails designing for the future which is uncertain	• Understands and/or uses methods to measure uncertainty and knows how they can apply in the context of sustainability	• Fully integrates measures of uncertainty in the sustainability evaluation of engineering designs and projects
	IE.3 - Conducts social and/or environmental impact analyses	• Is incapable of identifying potential environmental impacts of a specific project in his/her branch of engineering • Is not familiar with different methods to quantify the sustainability of different designs	• Identifies a list of potential environmental impacts of a project in his/her branch of engineering but cannot estimate them • Knows the difference between single objective and multiple objective measures for sustainability evaluation of designs	• Identifies environmental impacts and knows different methods to estimate environmental impacts of engineering designs in his/her branch of engineering • Uses a learned approach to measure the sustainability of designs (e.g., life cycle analysis, multi-criteria analysis, or monetary valuation)	• Fully quantifies the environmental and social impacts associated with engineering project alternatives • Uses a diversity of approaches to "measure" the sustainability of designs (e.g., life cycle analysis, multi-criteria analysis, or monetary valuation)
	IE.4 - Understands and/or applies the concepts of environmental stewardship, sustainable design and sustainable development	• Cannot define sustainable development or sustainable design	• Understands the three dimensions of sustainable development (social justice, environmental preservation, economic growth) but does not know how they relate to engineering	• Demonstrates a good grasp of the three pillars of sustainable development as well as the trade-offs between them • Knows how they affect engineering design/implementation	• Formulates sustainable development into a set of design objectives as well as into evaluation criteria for engineering project alternatives • Develops novel methods for evaluating the sustainability of engineering designs

Ethics and Equity (EE)

	Indicators	Below expectations <55% (D and F)	Marginal 55-64% (C+ and C)	Meets expectations 65-79% (B+, B and B-)	Exceed expectations 80-100% (A and A-)
	EE.1 - Appreciates and articulates issues and dilemmas related to equity	• Unable to identify issues and dilemmas related to equity	• Appreciates some issues and dilemmas in equity	• Appreciates and articulates issues and dilemmas in equity	• Appreciates and articulates sophisticated issues and dilemmas in equity, and in relation to larger, substantive issues
Knowledge	**EE.2 - Demonstrates knowledge of ethical standards (i.e. Code of Ethics)**	• Demonstrates minimal understanding of the Quebec Code of Ethics	• Demonstrates some understanding of the Quebec Code of Ethics	• Demonstrates understanding of the Quebec Code of Ethics	• Demonstrates complete understanding of the Quebec Code of Ethics
Analysis		• Cannot analyze the ethical issues involved in different situations	• Analyzes the ethical issues involved in some situation but cannot apply ethical standards	• Analyzes the ethical issues involved in most situation and applies ethical standards	• Analyzes the ethical issues involved in different situation and applies ethical standards
	EE.3 – Understands and /or resolves ethical issues	• Cannot generate approaches to address nor resolve ethical issues	• Generates approaches for resolving some aspects of ethical issues and dilemmas	• Generates and understands approaches for resolving ethical dilemmas in relation to professional ethics	•Generates and understands approaches for resolving ethical dilemmas and issues in relation to both professional and substantive ethics
	EE.4 - Demonstrates individual accountability	• Cannot recommend actions that are accountable	• Infrequently recommends actions that are not accountable	• Recommends actions that are accountable	• Recommends actions that demonstrate accountability and that have broader implications

Economics and Project Management (EP)

	Indicators	Below expectations <55% (D and F)	Marginal 55-64% (C+ and C)	Meets expectations 65-79% (B+, B and B-)	Exceed expectations 80-100% (A and A-)
Engineering Economics	**EP.1 - Understands economic concept in an engineering context**	• Does not understand concepts of engineering economics	• Has some understanding of the principles of engineering economics and is unable to apply them in practical situations	• Understands the principles of engineering economics and is able to apply some of them in practical engineering situations	• Understands and can apply engineering economics principles as appropriate in engineering activities
Project Management	**EP.2 - Understands project management life cycle and its limitations**	• Does not understand the notion of project process (i.e., the phases of initiation, planning, execution, closure nor the tasks needed to complete each phase) • Is unable to identify any of the constraints in a project	• Has some understanding of the project process (e.g., can identify the phases but is unable to define the tasks necessary to complete the phases) • Identifies only the obvious constraint	• Understands the phases of the project process and can define the necessary tasks for each • Identifies correctly all constraints in a project	• Understands and can apply all aspects of the project process within the broader scope of project management • Identifies all constraints in a project, the relations between them, and how these relations can impact the project process
Limitation		• Does not understands the limitations of the different project management tools	• Understands some of the limitations of the different project management tools	• Understands the limitations of the different project management tools in general	• Understands the limitations of the different project management tools in an engineering context
Business tools	**EP.3 - Applies business tools and economics principles in managing engineering projects (or the engineering practice)**	• Does not understand the various tools of project management (e.g., planning, organizing, securing, managing resources, risk management, change management, etc.) • Is unable to apply project management tools	• Has an understanding of some project management tools but cannot apply them	• Identifies, selects, and uses the appropriate project management tools	• Has a holistic approach for project management, from detailed knowledge and application of project processes, business tools, project management tools, •Uses appropriate business tools in engineering project
Economic		• Cannot understand the role of economics in engineering projects	• Has an understanding of some economic principles but cannot apply them	• Can apply some of the economic principles in engineering projects	• Uses appropriate economics principles in engineering projects

Life-Long Learning (LL)

	Indicators	Below expectations <55% (D and F)	Marginal 55-64% (C+ and C)	Meets expectations 65-79% (B+, B and B-)	Exceed expectations 80-100% (A and A-)
	LL.1 - Sets goals	• Not focused on studies • Has no career goal • Does not engage in extracurricular activities	• Student's goal is to pass course/exam, makes little or no effort in other aspects academic life • Has no clear career goal	• Aims to place in top 20% of the class; is a member of some teams or extra-curricular groups • Has career goals	• Is driven to perform; excels in several other areas (sports, music), taking a minor • Plans for the career goals, plans on future studies (e.g. graduate school)
	LL.2 - Applies appropriate knowledge and skills to learning activities	• Demonstrates no independent ability to explore a subject/topic • Unable to relate academic learning to practical issues	• Demonstrates some independent ability to explore a subject/topic • Relates academic learning to some practical issues in his/her own field	• Demonstrates an ability to explore a subject/topic independently • Relates academic learning to practical issues in his/her own field	• Demonstrates a skillful ability to explore a subject/topic independently • Relates and applies academic learning to a variety range of practical issues
	LL.3 - Engages in self-direction and self-evaluation	• Lacks basic understanding in many areas but makes no attempt remedy situation	• Focuses on memorization, learns mechanical procedures • Does not look outside the course content	• Is unsatisfied with superficial explanations or understanding; Questions assumptions • Engages in self-study on topics of interest	• Strives for the deepest possible understanding • Identifies limitations in traditional understanding in an area • Attempts rigorous solutions to problems
	LL.4 - Locates required information	• Refers only to course textbook or class notes for information (i.e., data, methods, solutions); fails to realize their information is incomplete; abandons problem or deems problem unsolvable due to lack of required information	• Resents having to find extra sources and performs only the most cursory searches • Does not follow references; uses first source found regardless of validity; continually asks professor to explain concepts	• Student accepts that some information must be found • Finds information in the valid sources and checks relevant references • Finds all required information, assesses its credibility, refers to course or recommended textbook(s) for details	• Performs very deep search; finds highly detailed or advanced information; discovers esoteric (but valid) sources • Uses advanced information to approach problem from a new direction • Seeks out non-course books for additional clarification
	LL.5 - Adapts learning strategies to new conditions	• Unable to identify analogies or parallels between problems; slight variations make familiar problems unsolvable	• Realizes a new problem relates to a familiar situation, but fails to make the all necessary adaptations	• Recognizes parallels, analogies or similarities to a more familiar situation • Is able to adapt from known approach • Is able to generate few new tactics as needed	• Generates a solution to a new problem by drawing from numerous situations; similarities are found with significantly different situations; final solution is highly novel, adept and/or elegant