

Graduate Attribute and Curriculum Improvement Process

Dr. Gérard Lachiver, FIC, ing.
Chair Canadian Engineering Accreditation Board (CEAB)
Dr. Malcolm J. Reeves, FEC, FGC, P.Eng., P.Geo.
Past Chair Canadian Engineering Accreditation Board (CEAB)

*

December 5, 2014
U of Toronto

Criteria new to CEAB

- Criterion 3.1.1 Graduate Attributes
- Criterion 3.1.2 Continual Improvement
 - Programs (HEI) define and measure themselves against their own expectations
 - CEAB needs to define and maintain a minimum expectation (threshold) consistent with national and international standards
 - AB may find that program expectations are marginal or insufficient with respect minimum AB expectations even if the program has met its own expectations

Background

Accreditation Board (AB) has allowed a six-year transition period (2008-2014) for programs within institutions to develop processes to demonstrate GA and CI

AB chose **not to constrain institutions in any way** but provided resources and many opportunities for discussion and consultation (2008-2014)

AB eventually recognized the need to provide guidance for visiting teams for the first cycle of visits applying new criteria (2013-2014)

Guidance and Guidelines

VT guidance is intended as a “roadmap” to help the VT extract critical information from the program questionnaire and site visit

- without constraining the program in presenting their case
- without adding workload for the program

Intended to provide a consistent framework for the AB review and assessment of programs

- not intended to be an assessment instrument
- not intended as a required template or checklist

As a result of the freedom extended to programs in presenting their case preparation of VT guidance and AB guidelines was (and will continue to be) challenging

VT Guidance Template

Graduate Attribute	CEAB Graduate Attribute Description	CEAB Threshold Expectations	Potential (suggested) Indicators of Compliance	Information Sources	VT Finding
GA number and short title	Full text of criterion from AB criteria and procedures documentation	Broad GA description broken down into sub-elements	List of some ways in which the program might have demonstrated compliance	Where the information is likely to be found	Comments on the completeness and alignment of information found

VT Findings (no complexity issue)

GA	CEAB Graduate Attribute Description	CEAB Threshold Expectations	Potential (suggested) Indicators of Compliance	Information Sources	VT Finding
3.1.8 Professionalism	An understanding of the roles and responsibilities of the professional engineer in society, especially the primary role of protection of the public and the public interest.	Graduates are aware of the roles and responsibilities of professional engineers in their chosen discipline	Graduates can identify protection of the public and the public interest as the primary responsibility of professional engineers	GA assessment instruments, GA collected data, GA data analysis, PV and/or GV based on triangulated student and faculty interviews	Confirmed in interviews with graduating class. Minimal coverage in course materials.
		Graduates are introduced to their professional association, the code of ethics and the Engineering Act in their local jurisdiction.	Graduates understand the concept of a self-regulating profession.		Some exposure in course materials. In interviews, most graduating students have clear understanding. Many faculty members are less well-informed.
		Graduates have had opportunities to meet with licensed professional engineers who practice outside the academic setting	Graduates have experienced at least one meeting with practising members of the profession arranged by the program or equivalent opportunity for exposure to engineering professionals		Many formal and informal activities documented and confirmed with students, faculty and advisory board members.
		Graduates are aware of the steps necessary to become a licensed professional engineer following graduation	Graduates understand the restriction on the use of the title "engineer" and the concept of "supervised" experience as an engineer-in-training		Based on interviews, some graduating students intend to become engineers-in-training but many unaware that the use of the term "engineer" is restricted

AB Review

GA	CEAB Graduate Attribute Description	CEAB Threshold Expectations	VT Finding	AB Review
3.1.8 Professionalism	An understanding of the roles and responsibilities of the professional engineer in society, especially the primary role of protection of the public and the public interest.	Graduates are aware of the roles and responsibilities of professional engineers in their chosen discipline	Confirmed in interviews with graduating class. Minimal coverage in course materials.	Compliance demonstrated
		Graduates are introduced to their professional association, the code of ethics and the Engineering Act in their local jurisdiction.	Some exposure in course materials. In interviews, most graduating students have clear understanding. Many faculty members are less well-informed.	Compliance demonstrated (Faculty members are not the target)
		Graduates have had opportunities to meet with licensed professional engineers who practice outside the academic setting	Many formal and informal activities documented and confirmed with students, faculty and advisory board members.	Compliance demonstrated
		Graduates are aware of the steps necessary to become a licensed professional engineer following graduation	Based on interviews, some graduating students intend to become engineers-in-training but many unaware that the use of the term "engineer" is restricted	Compliance marginal

Characteristics of Complexity

WP1	Cannot be resolved without in-depth engineering knowledge at an advanced level
WP2	Involve wide-ranging or conflicting technical, engineering and other issues
WP3	Have no obvious solution - require abstract thinking, originality in analysis to formulate suitable models
WP4	Involve infrequently encountered issues
WP5	Are outside problems encompassed by standards and codes of practice for professional engineering
WP6	Involve diverse groups of stakeholders with widely varying needs
WP7	Are high level problems including many component parts or sub-problems

VT Findings (complexity issue)

GA	CEAB Graduate Attribute Description	CEAB Threshold Expectations	Potential (suggested) Indicators of Compliance	Information Sources	VT Finding
<p align="center">3.1.9 Impact of Engineering on Society and the Environment</p>	<p>An ability to analyze social and environmental aspects of engineering activities. Such ability includes an understanding of the interactions that engineering has with the economic, social, health, safety, legal, and cultural aspects of society, the uncertainties in the prediction of such interactions; and the concepts of sustainable design and development and environmental stewardship.</p>	<p>Graduates apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice and solutions to complex engineering problems. (WK7)</p>	<p>Program (HEI) demonstrates that graduates have experienced at least one learning activity involving assessment of societal issues relevant to professional engineering practice and requiring in-depth (advanced) engineering knowledge</p>	<p>Curriculum maps, Course Information Sheets (CIS), student work (exams, quizzes, labs, assignments, projects, etc), GA assessment instruments, GA collected data, GA data analysis.</p> <p>Could all be satisfied by major design/project experience</p>	<p>Societal and issues addressed but activities (with the exception of safety) do not require advanced engineering knowledge</p>
		<p>Assessment of social, health, safety, legal and cultural issues involve at least one additional characteristic of complexity (WP2 to WP7)</p>	<p>Program (HEI) demonstrates that graduates have experienced at least one learning activity involving assessment of societal issues exhibits a second characteristic of complexity in addition to requiring application of in-depth (advanced) engineering knowledge.</p>		<p>No evidence of activities involving complexity as defined by CEAB</p>
		<p>Graduates understand and evaluate the sustainability and impact of professional engineering work in the solution of complex engineering problems in societal and environmental contexts. (WK7)</p>	<p>Program (HEI) demonstrates that graduates have experienced at least one learning activity that involving assessment of environmental and sustainable issues relevant to professional engineering practice and requiring in-depth (advanced) engineering knowledge</p>		<p>Course information sheets, GA assessment instruments and student work confirms that activities required advanced engineering knowledge</p>
		<p>Assessment of sustainability and environmental issues involves at least one additional characteristic of complexity (WP2 to WP7)</p>	<p>Program (HEI) demonstrates that graduates have experienced at least one learning activity involving environmental and sustainability issues exhibits a second characteristic of complexity in addition to requiring application of in-depth (advanced) engineering knowledge.</p>		<p>Activities involve multiple characteristics of complexity WP2, WP5 and WP6</p>

AB Review

GA	CEAB Graduate Attribute Description	CEAB Threshold Expectations	VT Finding	AB Review
<p align="center">3.1.9 Impact of Engineering on Society and the Environment</p>	<p>An ability to analyze social and environmental aspects of engineering activities. Such ability includes an understanding of the interactions that engineering has with the economic, social, health, safety, legal, and cultural aspects of society, the uncertainties in the prediction of such interactions; and the concepts of sustainable design and development and environmental stewardship.</p>	<p>Graduates apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice and solutions to complex engineering problems. (WK7)</p>	<p>Societal and other issues addressed but activities (with the exception of safety) do not require advanced engineering knowledge</p>	<p align="center">Compliance marginal</p>
		<p>Assessment of social, health, safety, legal and cultural issues involve at least one additional characteristic of complexity (WP2 to WP7)</p>	<p>No evidence of activities involving complexity as defined by CEAB</p>	<p align="center">Compliance unacceptable</p>
		<p>Graduates understand and evaluate the sustainability and impact of professional engineering work in the solution of complex engineering problems in societal and environmental contexts. (WK7)</p>	<p>Course information sheets, GA assessment instruments and student work confirms that activities required advanced engineering knowledge</p>	<p align="center">Compliance demonstrated</p>
		<p>Assessment of sustainability and environmental issues involves at least one additional characteristic of complexity (WP2 to WP7)</p>	<p>Activities involve multiple characteristics of complexity WP2, WP5 and WP6</p>	<p align="center">Compliance demonstrated</p>



Questions?



For more information:

Email: ceab@engineerscanada.ca

Phone: 613-232-2474

*The terms P.ENG. and ING. are official marks held by the Canadian Council of Professional Engineers.