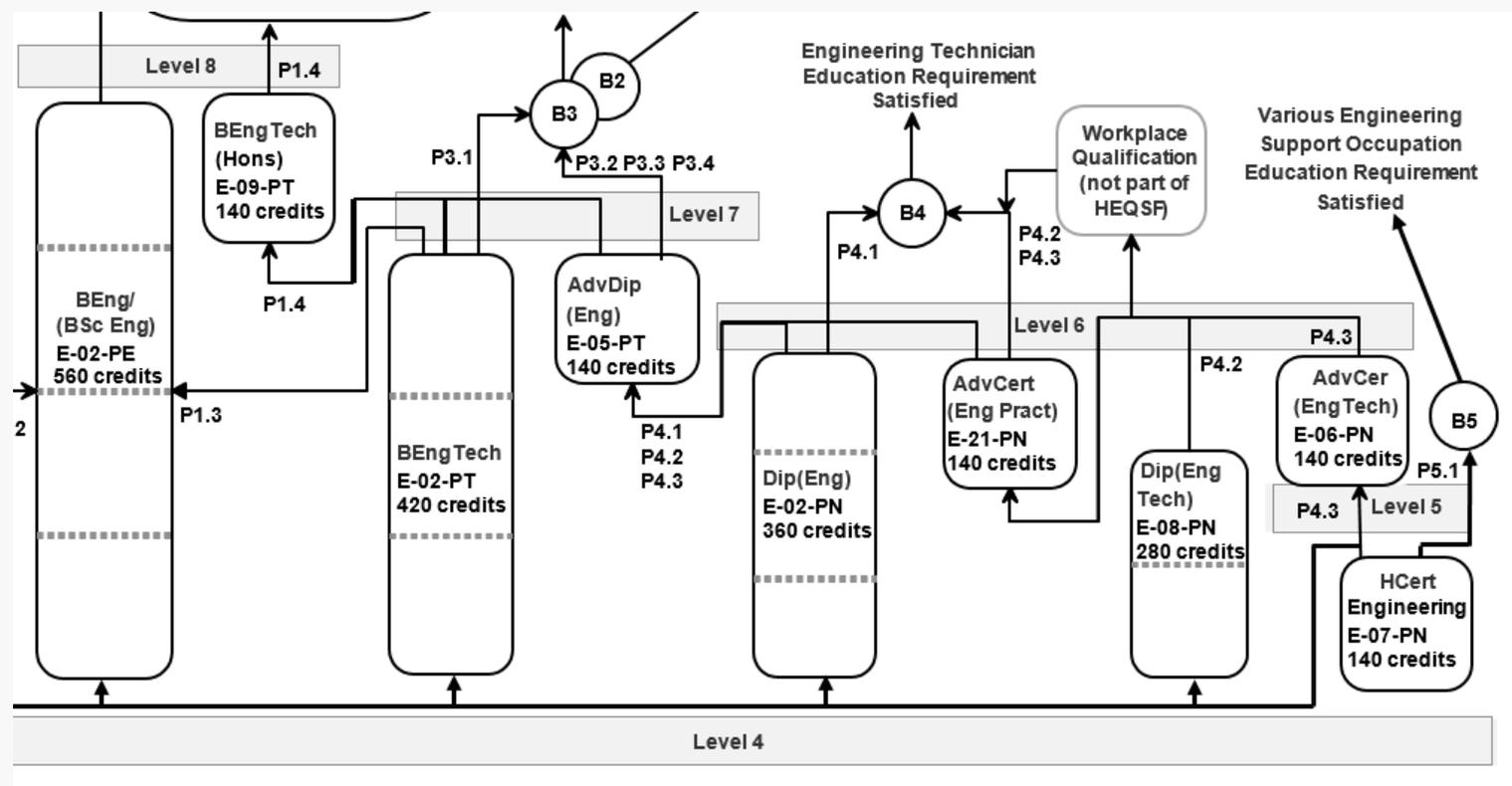


Assessment strategies for ECSA ELOs

Brandon Collier-Reed

Engineering qualifications in the HEQSF



What are these ELOs anyway?

Course/module



<http://tlc.ln.edu.hk/caobe-repository/doku.php?id=introduction>

- Knowledge (*KNOW*)
- Skills (*DO*)
- Attitudes (*BE*)

Statement of the learning outcomes the student must demonstrate at the exit level to qualify for award of a qualification; these actions indicate the student's capability to fulfil the educational objectives.

E-01-P

Exit Level Outcomes



What are these ELOs anyway?

Course/module



- Knowledge (*KNOW*)
- Skills (*DO*)
- Attitudes (*BE*)

Graduate attributes form a set of individually assessable outcomes that are the components indicative of the graduate's potential to acquire competence to practise at the appropriate level. The graduate attributes are exemplars of the attributes expected of graduates from an accredited programme. Graduate attributes are clear, succinct statements of the expected capability, qualified if necessary by a range indication appropriate to the type of programme.

Graduate attributes



ELO/GA 3: Engineering Design

Qualification-level learning outcome:

Perform creative, procedural and non-procedural design and synthesis of components, systems, engineering works, products or processes.

Competency



Associated Assessment Criteria / Competency Indicators:

Evidence

The candidate executes an acceptable design process encompassing the following:

1. Identifies and formulates the design problem to satisfy user needs, applicable standards, codes of practice and legislation;
2. Plans and manages the design process: focusses on important issues, recognises and deals with constraints;
3. Acquires and evaluates the requisite knowledge, information and resources: applies correct principles, evaluates and uses design tools;
4. Performs design tasks including analysis, quantitative modelling and optimisation;
5. Evaluates alternatives and preferred solution: exercises judgment, tests implementability and performs techno-economic analyses;
6. Assesses impacts and benefits of the design: social, legal, health, safety, and environmental;
7. Communicates the design logic and information.

Range Statement:

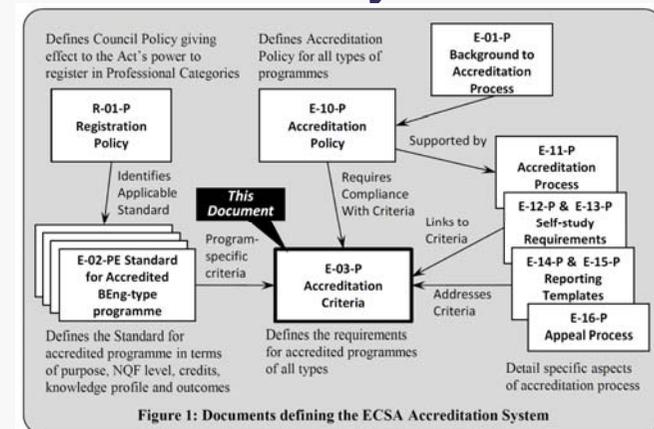
Context / Level

Design problems used in exit-level assessment must conform to the definition of a complex engineering problem. A major design problem should be used to provide evidence. The design knowledge base and components, systems, engineering works, products or processes to be designed are dependent on the discipline or practice area.

E-03-P: Criteria for Accreditation

Criterion 2: Assessment of Exit-level Outcomes

- The assessment process within the programme must:
 - Ensure that all graduates satisfy each exit-level outcome defined in the relevant standard;
 - Use a **documented set of assessment criteria** and processes that, taken together, demonstrate that the outcomes are satisfied at the level indicated by the range statement.
- Note: Providers are accorded flexibility to use **either the set of exemplar assessment criteria** in the relevant standard, if any, or an alternative fully documented set that demonstrates achievement of each of the learning outcomes at the specified level.

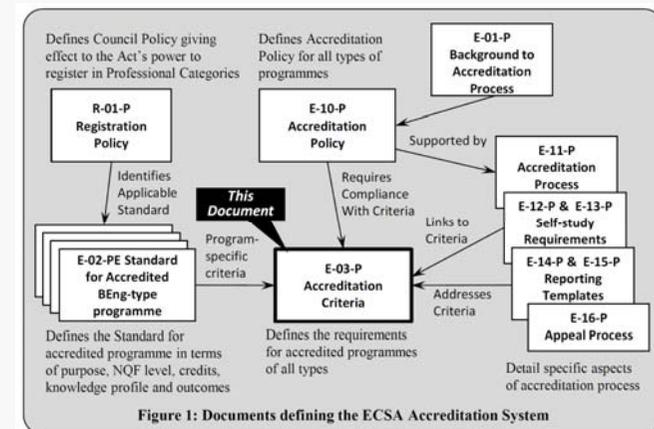


E-03-P: Criteria for Accreditation

Criterion 3: Quality of Teaching and Learning

- The programme must provide an effective teaching and learning process toward achievement of the outcomes as evidenced by the following:

11: Exit-level assessment is subject to external moderation.



Progression of GAs – Table 3

Code	Course/module Name	Role of course/module in developing student toward Exit Level Outcomes									
		ELO 1	ELO 2	ELO 3	ELO 4	ELO 5	ELO 6	ELO 7	ELO 8	ELO 9	ELO 10
CEM1008F	Chemistry for Engineers	6	6								
MAM1003W	Mathematics 1003	6	6								
MAM1042S	Engineering Statics	6	6								
MEC1002W	Engineering Drawing	6	6	6		6	6		6	6	6
MEC1004W	Engineering I		5		5	6	5	5	5		5
MEC2042F	Materials Science in Engineering	6	7	6		6		7			6
EEE3041S	Energy Conversion and Utilization	6	6								
EEE3061W	Mechatronics Design I			8							8
EEE3062F	Digital Electronics		6			6					
EEE3070S	Measurement and Microprocessors	6	6	6	6	6	6				
MAM2082F	Computer Programming in Matlab					7					
MEC2026S	Project Management	7	7				6	6	7		
MEC3023F	Mechanics of Solids	7	8	7	6	6			7		
MEC3031S	Dynamics II	7	8	6	6	6			7		
MEC3033F	Thermofluids II	7	7		7			7			
MEC3035F	CIM and Robotics	7	7		8	7					
MEC3037S	Professional Communication Studies						7				
MEC4053Z	Measurement and Control	8		7	6	7					
MEC4055Z	Design III	8		8		8	8		8		
MEC4061Z	Individual Laboratory/Research Project	8	7	8	8	7	8	8	8	8	8
MEC4063C	Industrial Ecology						7	7	7	7	7

Use of Table 4: Example 1

ECSA ELO	ELO 4: Demonstrate competence to design and conduct investigations and experiments	
Where is the Outcome Assessed?	The definitive point of exit-level assessment is in the course XYE401 Research Project. (This course is also used to assess ELO 6: Professional Communications and the Teamwork aspect of ELO 8)	
How is the Outcome Assessed?	The student, working with a fellow student, is required to undertake a research project assigned from a list provided by the department. All assignments are vetted by the course committee for compliance with the expected level of problem solving. Each student writes up an individual report, clearly indicating the individual contribution. The report is subject to internal and external examination, including an oral examination	
What is Satisfactory Performance?	<p>The assessment requires the student to do/reflect in the report:</p> <ol style="list-style-type: none"> 1. Identify the research question; 2. Plan the work 3. Survey the literature 4. Execute the work 5. Use appropriate methods 6. Analyse the results 7. Draw conclusions 8. Report on the work 	<p>The above criteria are assessed on the approved 5-point scale defined in the detailed course brief in Appendix 1: "Acceptable (3)" ratings are expected against all in order to be awarded a passmark.</p> <p>(Assessment criteria 8 receives a more detailed assessment contributing to ELO 6: See ELO 6 entry.)</p>

Objective 11): Use appropriate equipment and/or software. [ELO 4]

Where and how is this learning objective assessed?

This outcome is assessed as part of the class test. A question will be asked in the test where a particular scenario is presented. A student will then be required to, based on the data to be collected, determine what an appropriate choice of equipment would be to do so.

What constitutes satisfactory performance?

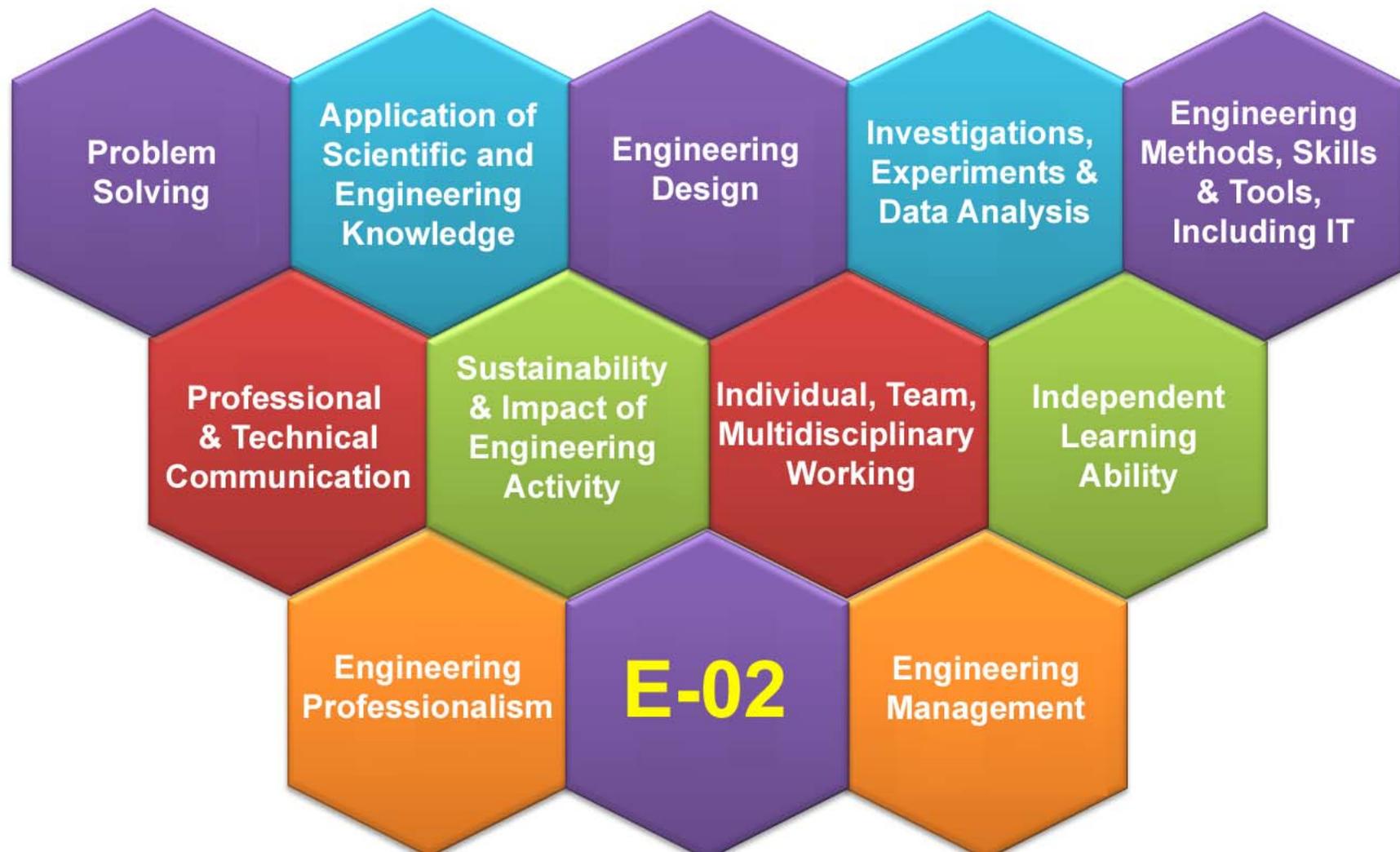
After consideration of the written response to the question asked in the class test, the internal examiner will be required to complete an assessment form to indicate whether the candidate has demonstrated that they are competent to use appropriate equipment and/or software in a manner that is considered “not satisfactory” or “satisfactory.”

Compare to previous

What strategy is to be followed should this learning objective not be satisfactorily attained?

Should a student's competence in this outcome not be considered satisfactory, s/he will be given the opportunity before the end of the course to complete an oral test covering this objective only. Success in this oral test will not impact on the mark awarded for the class test, but will result in this DP requirement for the course being attained. Should the student not be successful at the oral test, s/he will not receive DP for the course.

Graduate Attributes / ELOs



Engineering professionalism

- **GA / ELO:** Demonstrate critical awareness of the need to act professionally and ethically and to exercise judgment and take responsibility within own limits of competence.
- **Range Statement:** Evidence includes case studies typical of engineering practice situations in which the graduate is likely to participate.



Engineering professionalism

“Exemplified Associated Competency Indicators” – BEng Tech:

- The nature and complexity of ethical dilemmas is described.
- The ethical implications of decisions made are described.
- Ethical reasoning is applied to evaluate engineering solutions.
- Continued competence is maintained through keeping abreast of up-to-date tools and techniques available in the workplace.
- The system of continuing professional development is understood and embraced as an ongoing process.
- Responsibility is accepted for consequences stemming from own actions.
- Judgements are made in decision making during problem solving and design.
- Decision making is limited to area of current competence.



Sustainability & impact of eng activity

- **GA / ELO:** Demonstrate critical awareness of the sustainability and impact of engineering activity on the social, industrial and physical environment.
- **Range Statement:** The combination of social, workplace (industrial) and physical environmental factors must be appropriate to the discipline or other designation of the qualification.
Comprehension of the role of engineering in society and identified issues in engineering practice in the discipline: health, safety and environmental protection; risk assessment and management and the impacts of engineering activity: economic, social, cultural, environmental and sustainability.



Sustainability & impact of eng activity

“Associated Assessment Criteria” – BEng:

- The candidate identifies and deals with an appropriate combination of issues in:
 - The impact of technology on society;
 - Occupational and public health and safety;
 - Impacts on the physical environment;
 - The personal, social, cultural values and requirements of those affected by engineering activity.



Independent Learning Ability

- **GA / ELO:** Engage in independent and life-long learning through well-developed learning skills.
- **Range Statement:** The learning context is varying and unfamiliar. Some information is drawn from the technological literature.



Independent
Learning
Ability

Independent Learning Ability

“Exemplified Associated Competency Indicators” – BEng Tech:

- Learning tasks are managed autonomously and ethically, individually and in learning groups.
- Learning undertaken is reflected on and own learning requirements and strategies are determined to suit personal learning style and preferences.
- Relevant information is sourced, organised and evaluated .
- Knowledge acquired outside of formal instruction is comprehended and applied.
- Assumptions are challenged critically and new thinking is embraced.

