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Alignment of Assessments, Course Learning Outcomes and Program Learning Outcomes

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Learning Outcomes: A Toolkit for Assessment
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Outline

- Introduction
- Constructive Alignment
- Engineering Accreditation Context
- Alignment Tool
- Alignment Activity

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Introduction

Clear Learning Outcomes

Measure student performance

Assess program quality

Need:

- Tools for faculty
- Student & faculty engagement

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Constructive Alignment

(Intended) Learning Outcomes

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graph TD; A[Teaching and Learning Activities] --> B[Context Process Content]; C[Feedback and Assessment Methods] --> B
```

Context
Process
Content

Teaching and Learning Activities

Feedback and Assessment Methods

.... high level engagement ought not to be left to serendipity, or to individual student brilliance, but should be actively encouraged by the teacher." (Biggs, 1996, p. 353)

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Alignment Across the Curriculum

The diagram illustrates the alignment across the curriculum through three concentric circles. The outermost circle is labeled 'Institutional Outcomes and Assessments'. The middle circle is labeled 'Program Outcomes and Assessments'. The innermost circle is labeled 'Course Outcomes and Assessments'. Arrows point from the outer circle to the middle, and from the middle to the inner, indicating a hierarchical and aligned relationship between these levels.

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Engineering Context

Engineering is a professional program

- All undergrad programs undergo accreditation
- Canadian Engineering Accreditation Board (CEAB)

Accreditation issues

- Data-informed curriculum improvement process
- CEAB defined 12 Graduate Attributes

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Engineering Context

*“There must be **processes** in place that demonstrate that **program outcomes** are being **assessed** in the context of the graduate attributes, and that the **results are applied** to the further development of the program.” **

**2013 Canadian Engineering Accreditation Board – Accreditation Criteria and Procedures*

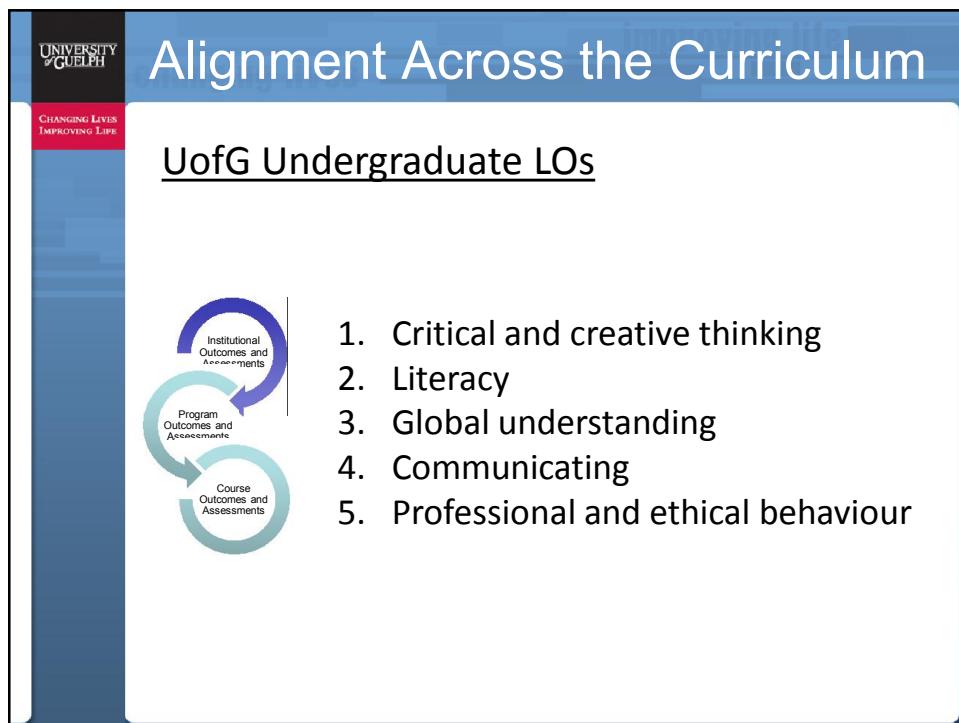
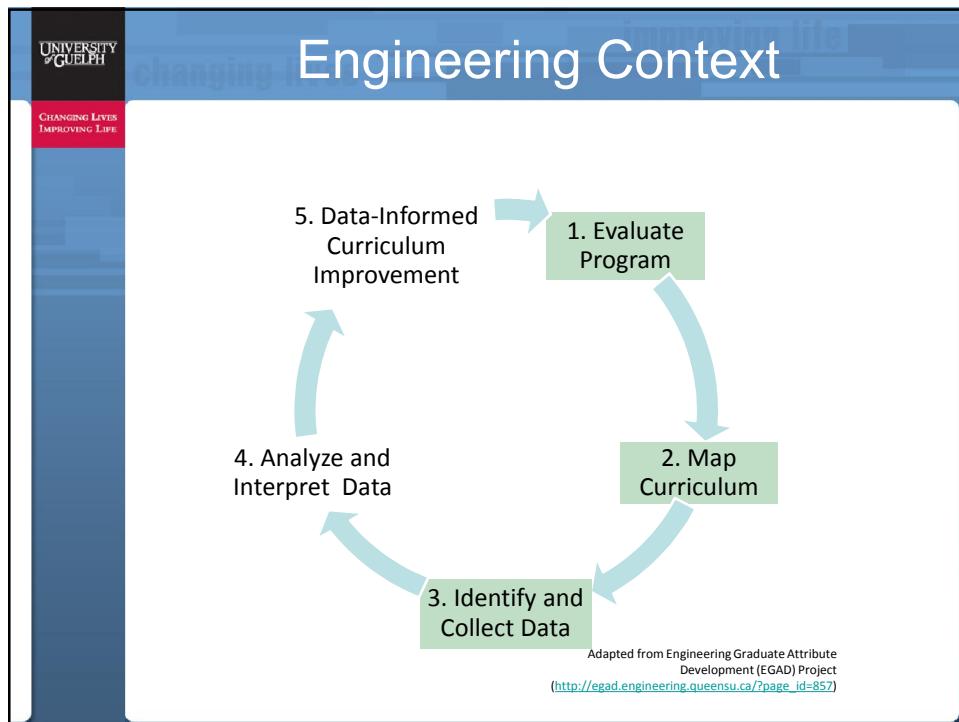
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Engineering Context

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graph TD; 1[1. Evaluate Program] --> 2[2. Map Curriculum]; 2 --> 3[3. Identify and Collect Data]; 3 --> 4[4. Analyze and Interpret Data]; 4 --> 5[5. Data-Informed Curriculum Improvement]; 5 --> 1
```

1. Evaluate Program
2. Map Curriculum
3. Identify and Collect Data
4. Analyze and Interpret Data
5. Data-Informed Curriculum Improvement

Adapted from Engineering Graduate Attribute Development (EGAD) Project
(http://egad.engineering.queensu.ca/?page_id=857)



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Alignment Across the Curriculum

Graduate Attributes



1. A knowledge base for engineering	7. Communication skills
2. Problem analysis	8. Professionalism
3. Investigation	9. Impact of engineering on society and the environment
4. Design	10. Ethics and equity
5. Use of engineering tools	11. Economics and project management
6. Individual and team work	12. Life-long learning

*2012 Canadian Engineering Accreditation Board – Accreditation Criteria and Procedures

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Alignment Across the Curriculum

Graduate Attribute 2 - PROBLEM ANALYSIS

An ability to use appropriate knowledge and skills to identify, formulate, analyze, and solve complex engineering problems in order to reach substantiated conclusions.*

*2013 Canadian Engineering Accreditation Board – Accreditation Criteria and Procedures

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Alignment Across the Curriculum

Course to Program Alignment



Engage individual faculty

- Course LOs
- Map to program LOs
- Common course outline

Engage students

- Common course outline

HOW?

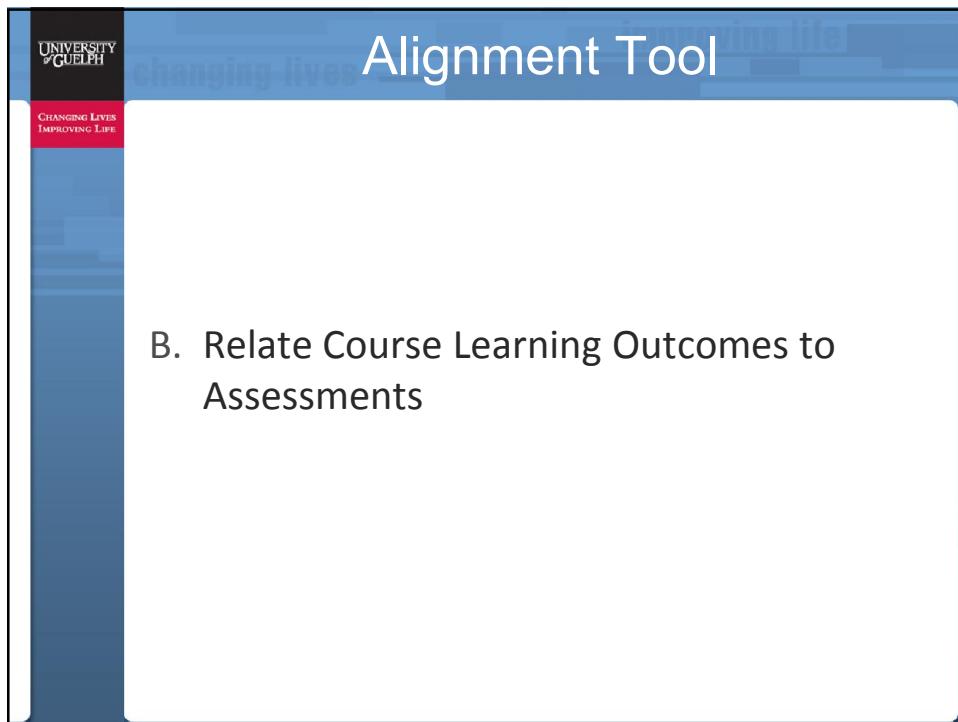
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Alignment Tool

Alignment Tool

A. Identify Course Learning Outcomes (CLOs)

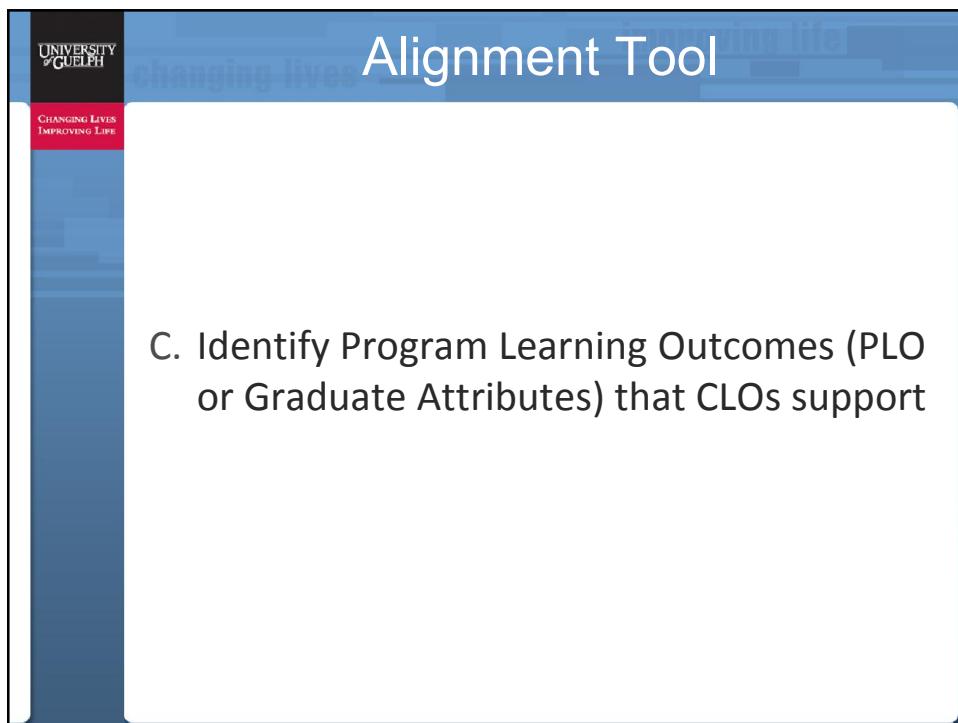


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Alignment Tool

B. Relate Course Learning Outcomes to Assessments

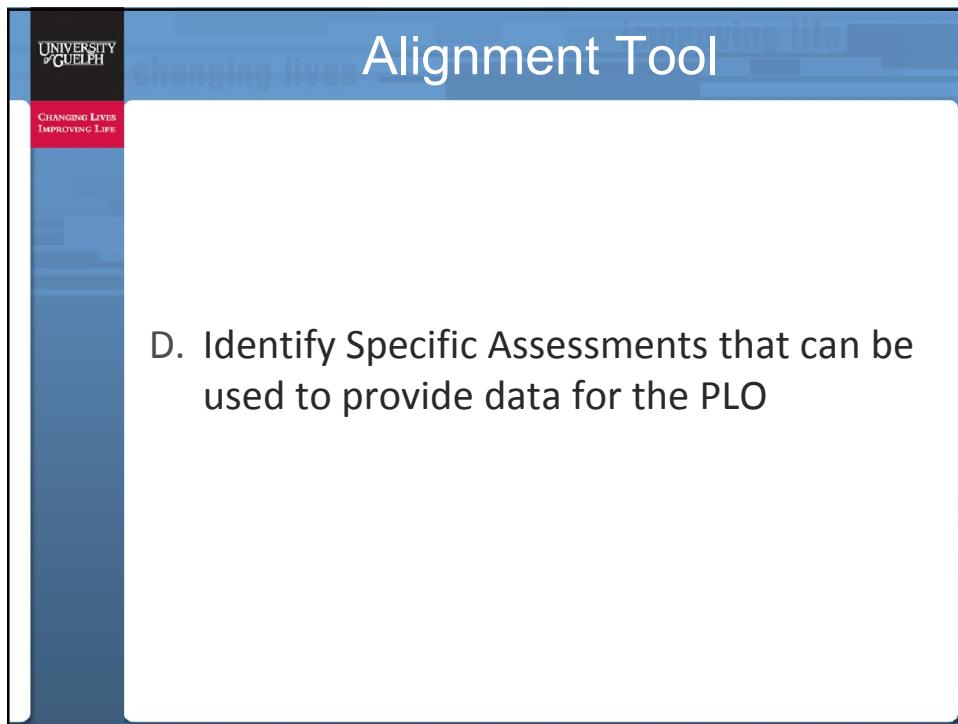


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Alignment Tool

C. Identify Program Learning Outcomes (PLO or Graduate Attributes) that CLOs support

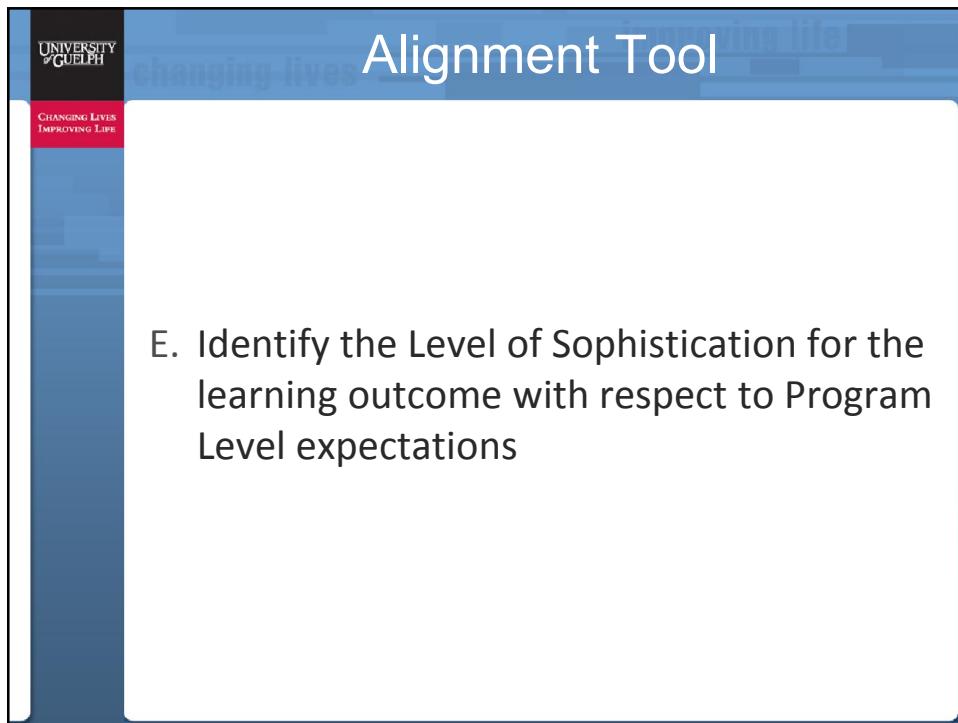


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D. Identify Specific Assessments that can be used to provide data for the PLO

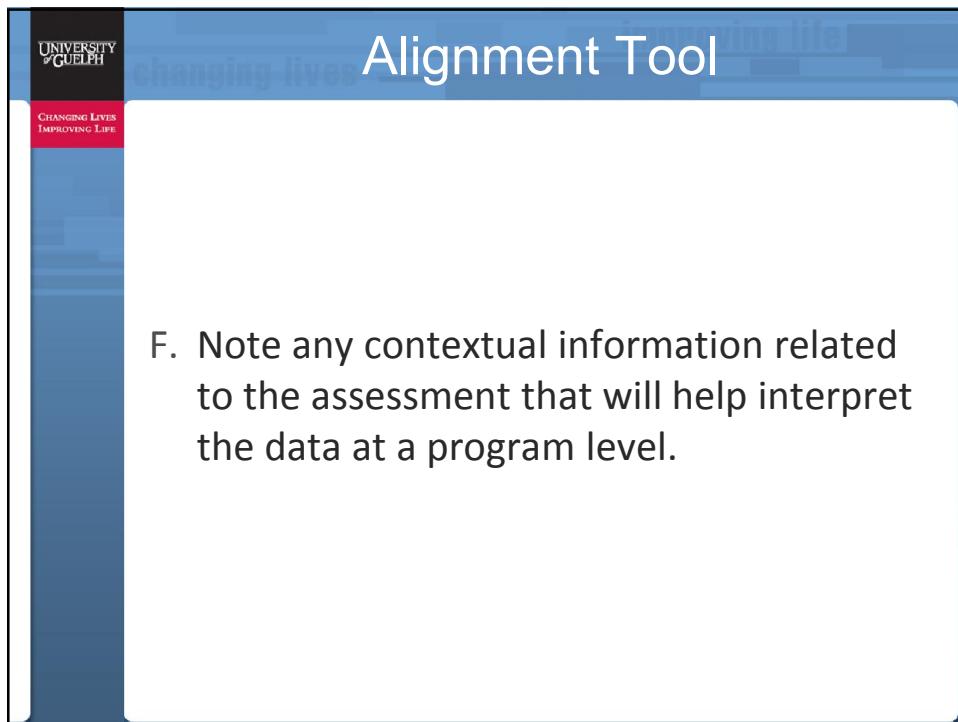


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E. Identify the Level of Sophistication for the learning outcome with respect to Program Level expectations

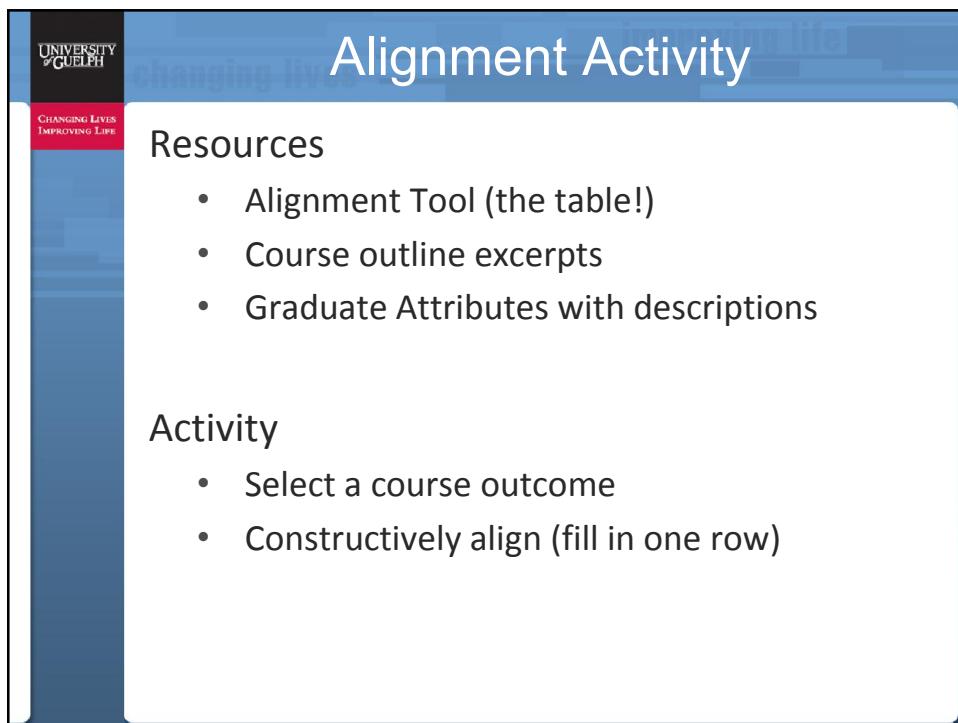


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Alignment Tool

F. Note any contextual information related to the assessment that will help interpret the data at a program level.



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Alignment Activity

Resources

- Alignment Tool (the table!)
- Course outline excerpts
- Graduate Attributes with descriptions

Activity

- Select a course outcome
- Constructively align (fill in one row)



Alignment Activity

Report Back

- Challenges you encountered?
- How might you apply in your course, department or institution?
- What would you change?



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- Computer
- Biomedical
- Biological
- Water Resources
- Systems and Computing
- Environmental
- Mechanical