

PO	Knowledge Profile	Range of Complex Engineering Problem Solving	Range of Complex Engineering Activities	Bloom's Taxonomy Domain [LOCK 2017]
PO1 - Engineering knowledge	K1 - K4	P1 - P7		C
PO2 - Problem analysis	K1 - K4	P1 - P7		C
PO3 - Design/development of solutions	K5	P1 - P7		C & A
PO4 - Investigation	K3	P1 - P7		C & P
PO5 - Modern tool usage	K6	P1 - P7		P & C
PO6 - The engineer and society	K7	P1 - P7		A
PO7 - Environment and sustainability	K7	P1 - P7		A & C
PO8 - Ethics	K7			A
PO9 - Individual work and teamwork				P & A
PO10 - Communication			A1 - A5	P & A
PO11 - Project management and finance				C & P
PO12 - Life-long learning				A & P

# Outcome - "Culminating Demonstration of Learning"

[Spady et al. (2018)]

12

8

7

5

# *The Role of the IAP for the Outcome-Based BAETE Accreditation of the Mechanical Engineering Program at AUST*

Professor Dr. Mazharul Islam, P.Eng. (Alberta, Canada)

Department of Mechanical and Production Engineering  
Ahsanullah University of Science and Technology, Dhaka, Bangladesh

Licensed under the Creative Commons Attribution-ShareAlike 4.0 International License  
(<https://creativecommons.org/licenses/by-sa/4.0/>)

*What is OBE?*

*Why is OBE Important?*

*The Washington Accord*

*BAETE Accreditation*

*OBE at AUST*

*PEO*

*PO*

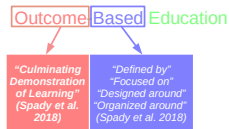
*CO*

*CQI*

*The Role of the IAP Bibliography*

# CONTENTS

- 1 *What is OBE?*
- 2 *Why is OBE Important?*
- 3 *The Washington Accord*
- 4 *BAETE Accreditation*
- 5 *OBE at AUST*
- 6 *PEO*
- 7 *PO*
- 8 *CO*
- 9 *CQI*
- 10 *The Role of the IAP*



# *Brain Storming Session*

What is meant by **OBE**?

*What is OBE?*

*Why is OBE  
Important?*

*The Washington  
Accord*

*BAETE  
Accreditation*

*OBE at AUST*

*PEO*

*PO*

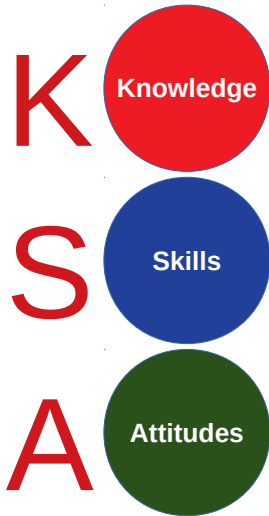
*CO*

*CQI*

*The Role of the IAP*

*Bibliography*

## What is OBE?



*"In OBE, the faculty of a program reaches consensus on a set of program learning outcomes - knowledge, skills, and attitudes that the students are supposed to acquire by the time they graduate." [4]*

*What is OBE?*

*Why is OBE Important?*

*The Washington Accord*

*BAETE Accreditation*

*OBE at AUST*

*PEO*

*PO*

*CO*

*CQI*

*The Role of the IAP*

*Bibliography*

## *Expanded Meaning of OBE [6]*

# Outcome-Based Education

```
graph TD; A[Outcome-Based Education] --> B["Culminating Demonstration of Learning (Spady et al. 2018)"]; A --> C["Defined by Focused on Designed around Organized around (Spady et al. 2018)"]
```

***“Culminating  
Demonstration  
of Learning”  
(Spady et al.  
2018)***

***“Defined by”  
“Focused on”  
“Designed around”  
“Organized around”  
(Spady et al. 2018)***

Adapted from [7]

*What is OBE?*

*Why is OBE  
Important?*

*The Washington  
Accord*

*BAETE  
Accreditation*

*OBE at AUST*

*PEO*

*PO*

*CO*

*CQI*

*The Role of the IAP*

*Bibliography*

# CONTENTS

- 1 *What is OBE?*
- 2 *Why is OBE Important?*
- 3 *The Washington Accord*
- 4 *BAETE Accreditation*
- 5 *OBE at AUST*
- 6 *PEO*
- 7 *PO*
- 8 *CO*
- 9 *CQI*
- 10 *The Role of the IAP*

## *Why is OBE Important?*

- A Quality Assurance (QA) mechanism
- Required by the University Grants Commission of Bangladesh (UGC)
- Required by Bangladesh Accreditation Council (BAC)
- Required by Board of Accreditation for Engineering and Technical Education (BAETE), IEB

*What is OBE?*

*Why is OBE Important?*

*The Washington Accord*

*BAETE Accreditation*

*OBE at AUST*

*PEO*

*PO*

*CO*

*CQI*

*The Role of the IAP*

*Bibliography*



# CONTENTS

- 1 *What is OBE?*
- 2 *Why is OBE Important?*
- 3 *The Washington Accord*
- 4 *BAETE Accreditation*
- 5 *OBE at AUST*
- 6 *PEO*
- 7 *PO*
- 8 *CO*
- 9 *CQI*
- 10 *The Role of the IAP*

## *The Washington Accord*

**"AN INTERNATIONAL  
AGREEMENT BETWEEN BODIES  
RESPONSIBLE FOR  
ACCREDITING ENGINEERING  
DEGREE PROGRAMMES"**

(Ref: <http://www.ieagreements.org/accords/washington/>)

*What is OBE?*

*Why is OBE  
Important?*

*The Washington  
Accord*

*BAETE  
Accreditation*

*OBE at AUST*

*PEO*

*PO*

*CO*

*CQI*

*The Role of the IAP*

*Bibliography*

# Signatories with Full Rights - 21 Countries <sup>1</sup>

(<https://www.ieagreements.org/accords/washington/signatories/>)

- Australia (1989)
- Canada (1989)
- China (2016)
- Chinese Taipei (2007)
- Costa Rica (2020)
- Hong Kong China (1995)
- India (2014)
- Ireland (1989)
- Japan (2005)
- Korea (2007)
- Malaysia (2009)
- New Zealand (1989)
- Pakistan (2017)
- Peru (2018)
- Russia (2012)
- Singapore (2006)
- South Africa (1999)
- Sri Lanka (2014)
- Turkey (2011)
- United States (1989)
- United Kingdom (1989)

---

<sup>2</sup>as of Dec 14, 2020

*What is OBE?*

*Why is OBE Important?*

*The Washington Accord*

*BAETE Accreditation*

*OBE at AUST*

*PEO*

*PO*

*CO*

*CQI*

*The Role of the IAP*

*Bibliography*

# Provisional Signatories - 7 Countries<sup>2</sup>

(<https://www.ieagreements.org/accords/washington/signatories/>)

- Chile
- Thailand
- Bangladesh
- Mexico
- Phillipines
- Myanmar
- Indonesia

---

<sup>1</sup>as of Dec 14, 2020

*What is OBE?*

*Why is OBE  
Important?*

*The Washington  
Accord*

*BAETE  
Accreditation*

*OBE at AUST*

*PEO*

*PO*

*CO*

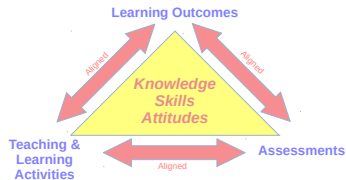
*CQI*

*The Role of the IAP*

*Bibliography*

# CONTENTS

- 1 *What is OBE?*
- 2 *Why is OBE Important?*
- 3 *The Washington Accord*
- 4 *BAETE Accreditation*
- 5 *OBE at AUST*
- 6 *PEO*
- 7 *PO*
- 8 *CO*
- 9 *CQI*
- 10 *The Role of the IAP*



# Ten Major Criteria for BAETE Accreditation [2]

- 1 Organization and Governance
- 2 Financial and Physical Resources
- 3 Faculty
- 4 Students
- 5 Academic Facilities and Technical Support
- 6 Curriculum and Teaching-Learning Processes
- 7 Program Educational Objectives (PEOs)
- 8 Program Outcomes and Assessments (POs)
- 9 Continuous Quality Improvement
- 10 Interactions with the Industry

*What is OBE?*

*Why is OBE  
Important?*

*The Washington  
Accord*

*BAETE  
Accreditation*

*OBE at AUST*

*PEO*

*PO*

*CO*

*CQI*

*The Role of the IAP*

*Bibliography*

# *The Main Parameters of OBE-based Systems according to [2]*

## **Program Educational Objectives (PEOs)**

Determined by the Program

## **Program Learning Outcomes (POs)**

Graduate Attributes Determined by the Accreditation Agency (i.e. BAETE)

## **Course Learning Outcomes (COs)**

Determined by the Course instructor considering Bloom's Taxonomy

## **Continuous Quality Improvement (CQI)**

Mechanisms used for monitoring and improving the curriculum and the attainments of COs, POs & PEOs

*What is OBE?*

*Why is OBE Important?*

*The Washington Accord*

*BAETE Accreditation*

*OBE at AUST*

*PEO*

*PO*

*CO*

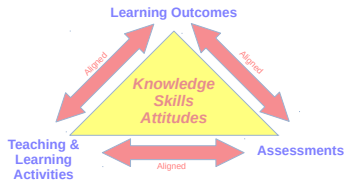
*CQI*

*The Role of the IAP*

*Bibliography*

# CONTENTS

- 1 *What is OBE?*
- 2 *Why is OBE Important?*
- 3 *The Washington Accord*
- 4 *BAETE Accreditation*
- 5 ***OBE at AUST***
- 6 *PEO*
- 7 *PO*
- 8 *CO*
- 9 *CQI*
- 10 *The Role of the IAP*





# Overview of the Present OBE System at AUST

- ① "Culminating Model" for determining the final POs
- ② 4 CQI Loops for quality improvement of
  - ① Curricula
  - ② CO Attainment
  - ③ PO Attainment
  - ④ PEO Attainment
- ③ 5 Documents prepared by the Instructors
  - ① Course Outline
  - ② Course Specification
  - ③ Final Exam Vetting Form
  - ④ Direct Measurements of CO-PO
  - ⑤ Course Report
- ④ Course File for each course

*What is OBE?*

*Why is OBE  
Important?*

*The Washington  
Accord*

*BAETE  
Accreditation*

*OBE at AUST*

*PEO*

*PO*

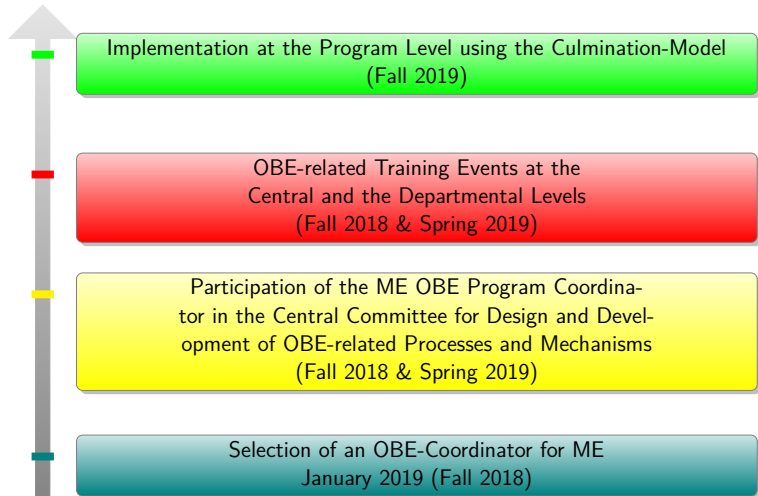
*CO*

*CQI*

*The Role of the IAP*

*Bibliography*

# The Timeline of OBE Implementation in the ME Program at AUST



*What is OBE?*

*Why is OBE Important?*

*The Washington Accord*

*BAETE Accreditation*

*OBE at AUST*

*PEO*

*PO*

*CO*

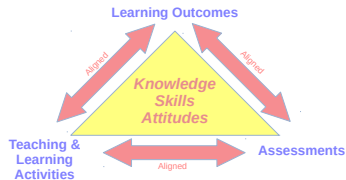
*CQI*

*The Role of the IAP*

*Bibliography*

# CONTENTS

- 1 *What is OBE?*
- 2 *Why is OBE Important?*
- 3 *The Washington Accord*
- 4 *BAETE Accreditation*
- 5 *OBE at AUST*
- 6 *PEO*
- 7 *PO*
- 8 *CO*
- 9 *CQI*
- 10 *The Role of the IAP*



## *Program Educational Objectives (PEOs)*

- "broad statements that describe the career and professional accomplishments that the program is preparing graduates to achieve" [1, Section 4.7]
- should be determined by the program

*What is OBE?*

*Why is OBE  
Important?*

*The Washington  
Accord*

*BAETE  
Accreditation*

*OBE at AUST*

*PEO*

*PO*

*CO*

*CQI*

*The Role of the IAP*

*Bibliography*

# The Three PEOs for the ME Program at AUST

## PEO1 - Professionalism

Graduates will demonstrate sound professionalism in mechanical engineering or related fields.

## PEO2 - Continuous Personal Development

Graduates will engage in life-long learning in multi-disciplinary fields for industrial and academic careers.

## PEO3 - Sustainable Development

Graduates will promote sustainable development at local and international levels.

*What is OBE?*

*Why is OBE Important?*

*The Washington Accord*

*BAETE Accreditation*

*OBE at AUST*

*PEO*

*PO*

*CO*

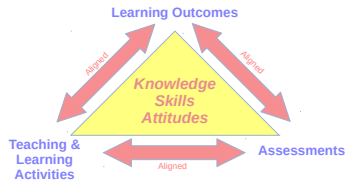
*CQI*

*The Role of the IAP*

*Bibliography*

# CONTENTS

- 1 *What is OBE?*
- 2 *Why is OBE Important?*
- 3 *The Washington Accord*
- 4 *BAETE Accreditation*
- 5 *OBE at AUST*
- 6 *PEO*
- 7 *PO*
- 8 *CO*
- 9 *CQI*
- 10 *The Role of the IAP*



# *Program Learning Outcomes (PLOs) / Program Outcomes (POs)*

- "describe what students are expected to know and be able to do by the time of graduation" [1, Section 4.8]
- 12 POs are prescribed by BAETE
- Programs can adopt additional POs if required

*What is OBE?*

*Why is OBE Important?*

*The Washington Accord*

*BAETE Accreditation*

*OBE at AUST*

*PEO*

*PO*

*CO*

*CQI*

*The Role of the IAP*

*Bibliography*

# *POs related to "Analysis of Problems & Synthesis of Solutions" [5, Slide 18]*

- 1 PO1 - Engineering Knowledge
- 2 PO2 - Problem Analysis
- 3 PO3 - Design/development of Solutions
- 4 PO4 – Investigation
- 5 PO5 - Modern Tool Usage

**CORE ENGINEERING SCIENCE**

*What is OBE?*

*Why is OBE Important?*

*The Washington Accord*

*BAETE Accreditation*

*OBE at AUST*

*PEO*

*PO*

*CO*

*CQI*

*The Role of the IAP Bibliography*



## *POs related to "RESPONSIBILITIES" [5, Slide 18]*

- ❶ PO6 - The Engineer and Society
- ❷ PO7 - Environment and Sustainability
- ❸ PO8 – Ethics

**PROFESSIONAL DUE DILIGENCE**

*What is OBE?*

*Why is OBE  
Important?*

*The Washington  
Accord*

*BAETE  
Accreditation*

*OBE at AUST*

*PEO*

*PO*

*CO*

*CQI*

*The Role of the IAP*

*Bibliography*

## *POs related to "Required in Workplace" [5, Slide 18]*

- 1 PO9 - Individual Work and Teamwork
- 2 PO10 - Communication
- 3 PO11 - Project Management and Finance
- 4 PO12 - Life-long Learning

**PROFESSIONAL ENGINEERING  
PRACTICES**

*What is OBE?*

*Why is OBE  
Important?*

*The Washington  
Accord*

*BAETE  
Accreditation*

*OBE at AUST*

*PEO*

*PO*

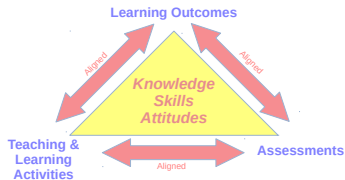
*CO*

*CQI*

*The Role of the IAP  
Bibliography*

# CONTENTS

- 1 *What is OBE?*
- 2 *Why is OBE Important?*
- 3 *The Washington Accord*
- 4 *BAETE Accreditation*
- 5 *OBE at AUST*
- 6 *PEO*
- 7 *PO*
- 8 *CO*
- 9 *CQI*
- 10 *The Role of the IAP*



# Course Learning Outcomes (CLOs) / Course Outcomes (COs)

- "statements of what students should be able to accomplish after completing the course" [3]
- Instructors of the courses will write the COs and share through the Course Outlines

*What is OBE?*

*Why is OBE Important?*

*The Washington Accord*

*BAETE Accreditation*

*OBE at AUST*

*PEO*

*PO*

*CO*

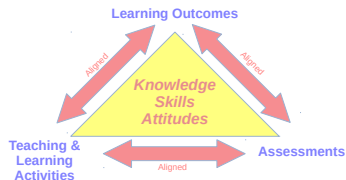
*CQI*

*The Role of the IAP*

*Bibliography*

# CONTENTS

- 1 *What is OBE?*
- 2 *Why is OBE Important?*
- 3 *The Washington Accord*
- 4 *BAETE Accreditation*
- 5 *OBE at AUST*
- 6 *PEO*
- 7 *PO*
- 8 *CO*
- 9 *CQI*
- 10 *The Role of the IAP*



# *Continuous Quality Improvement (CQI)*

- Required for BAETE Accreditation [1, Criterion 9, pg. 7-24 to 7-26]
- Extremely critical
- Should be dealt proactively

*What is OBE?*

*Why is OBE Important?*

*The Washington Accord*

*BAETE Accreditation*

*OBE at AUST*

*PEO*

*PO*

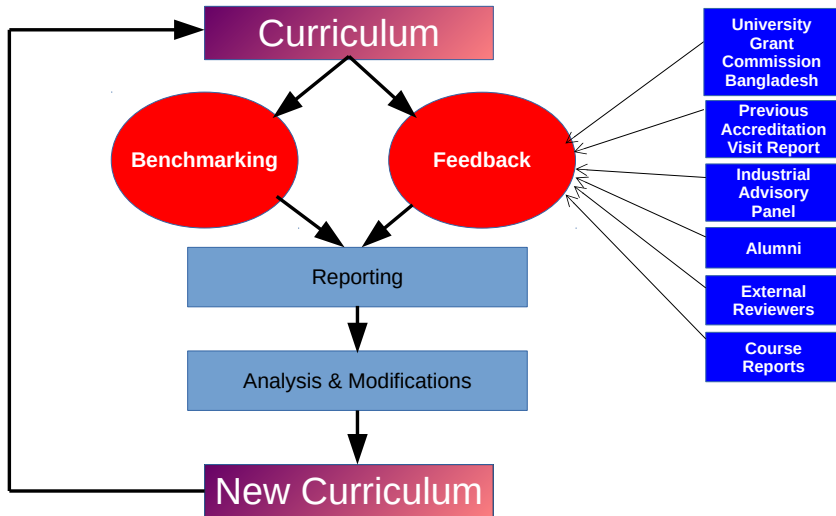
*CO*

*CQI*

*The Role of the IAP*

*Bibliography*

# CQI Loops for Curriculum



*What is OBE?*

*Why is OBE Important?*

*The Washington Accord*

*BAETE Accreditation*

*OBE at AUST*

*PEO*

*PO*

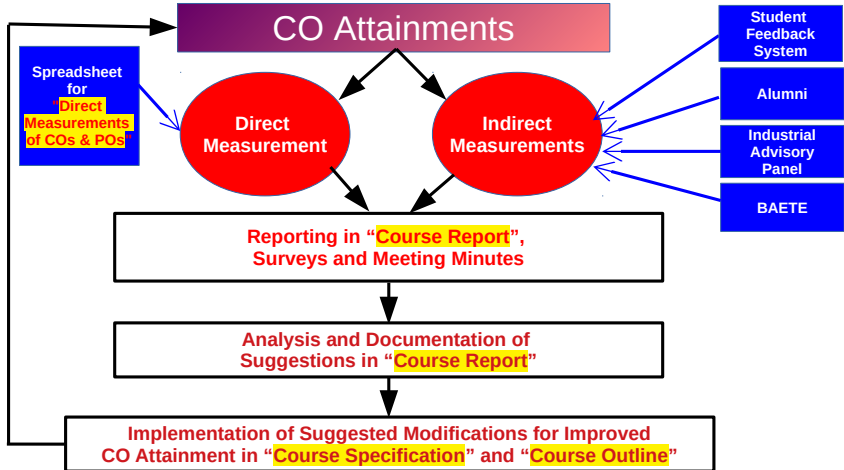
*CO*

*CQI*

*The Role of the IAP*

*Bibliography*

# CQI Loops for Course Outcomes (COs)



What is OBE?

Why is OBE Important?

The Washington Accord

BAETE Accreditation

OBE at AUST

PEO

PO

CO

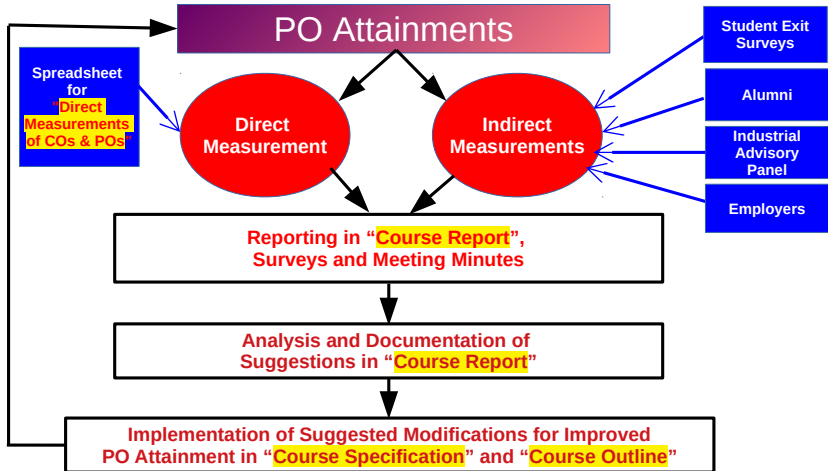
CQI

The Role of the IAP

Bibliography



# CQI Loops for Program Outcomes (POs)



*What is OBE?*

*Why is OBE Important?*

*The Washington Accord*

*BAETE Accreditation*

*OBE at AUST*

*PEO*

*PO*

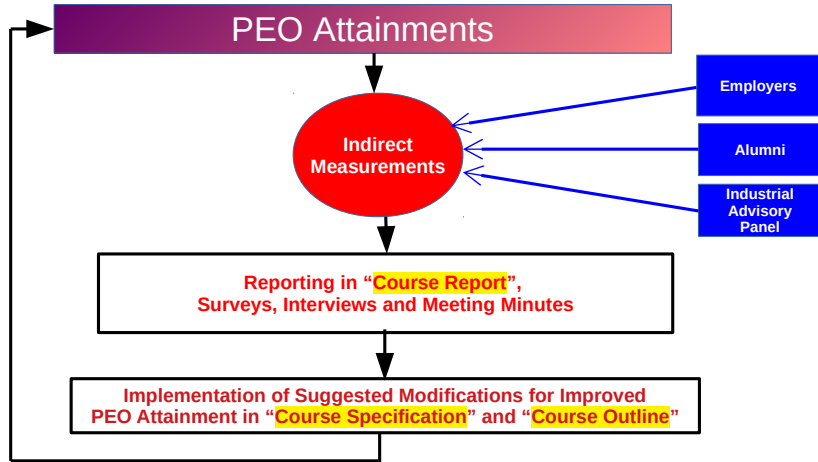
*CO*

*CQI*

*The Role of the IAP*

*Bibliography*

# CQI Loops for Program Educational Objectives (PEOs)



What is OBE?

Why is OBE Important?

The Washington Accord

BAETE Accreditation

OBE at AUST

PEO

PO

CO

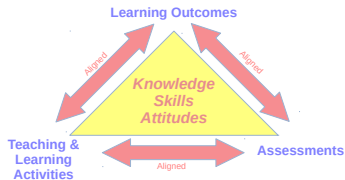
CQI

The Role of the IAP

Bibliography

# CONTENTS

- 1 *What is OBE?*
- 2 *Why is OBE Important?*
- 3 *The Washington Accord*
- 4 *BAETE Accreditation*
- 5 *OBE at AUST*
- 6 *PEO*
- 7 *PO*
- 8 *CO*
- 9 *CQI*
- 10 *The Role of the IAP*



# Industrial Advisory Panel (IAP)

- Required for BAETE Accreditation [2, Criterion 10.1, p. 7-26]
- Play an important role in the CQIs of
  - ① Curriculum
  - ② COs
  - ③ POs
  - ④ PEOs

*What is OBE?*

*Why is OBE Important?*

*The Washington Accord*

*BAETE Accreditation*

*OBE at AUST*

*PEO*

*PO*

*CO*

*CQI*

*The Role of the IAP*

*Bibliography*

*BAETE Accreditation Requirements related to the IAP  
[2, Criterion 10, p. 7-26]*

- *"Submit copies of notices for the industrial advisory panel meetings and attendee lists of meetings held over the last three academic years"*
- *"The minutes of these meetings should be made available to members of the Evaluation Team during the on-site visit"*

*What is OBE?*

*Why is OBE  
Important?*

*The Washington  
Accord*

*BAETE  
Accreditation*

*OBE at AUST*

*PEO*

*PO*

*CO*

*CQI*

*The Role of the IAP*

*Bibliography*

# *The Main Role of the IAP - 1*

Participation in the Surveys to improve [2, Criterion 9, pp. 7-25 to 7-26]

- ① COs attainments [2, Criterion 9.4.3, p. 7-26]
- ② POs attainments [2, Criterion 9.4.2, p. 7-25]
- ③ PEOs attainments [2, Criterion 9.4.1, p. 7-25]

*What is OBE?*

*Why is OBE Important?*

*The Washington Accord*

*BAETE Accreditation*

*OBE at AUST*

*PEO*

*PO*

*CO*

*CQI*

*The Role of the IAP*

*Bibliography*

## *The Main Role of the IAP - 2*

Feedback during the Consultation Meetings [2, Criterion 10.1, p. 7-26] to improve the existing and the new Curricula [2, Criterion 9.4.3, p. 7-26]

Supports Industrial Engagement of the Students

- 1 Internships [2, Criterion 10.3.1, p. 7-26]
- 2 Final-year Design Project [2, Criterion 10.3.2, p. 7-26]
- 3 Industry Visits [2, Criterion 10.3.3, p. 7-27]

*What is OBE?*

*Why is OBE Important?*

*The Washington Accord*

*BAETE Accreditation*

*OBE at AUST*

*PEO*

*PO*

*CO*

*CQI*

*The Role of the IAP*

*Bibliography*

Any  
Question?



# THANK YOU

*For further clarifications/feedback, contact:*

**Dr. Mazharul Islam, P.Eng. (APEGA,Canada)  
Professor**

**Department of Mechanical and Production Engineering  
Ahsanullah University of Science and Technology  
141 & 142, Love Road, Tejgaon Industrial Area, Dhaka-1208, Bangladesh  
E-mail: [mazharul.islam.mpe@aust.edu](mailto:mazharul.islam.mpe@aust.edu)  
Web: <http://bit.do/mazhar>**

# References

## I

- [1] BAETE (2017). Accreditation Manual for Undergraduate Engineering Programmes.
- [2] BAETE (2019). Accreditation Manual for Undergraduate Engineering Programmes.
- [3] Dyjur, P., Kelly, P., Norman, D., Yu, L., and Pedersen, R. (2014). Course Design Program. url: [https://live-taylor-institute.ucalgary.ca/sites/default/files/uploaded-documents/resources/course-design/course\\_design\\_program\\_manual\\_2014\\_12\\_18.pdf](https://live-taylor-institute.ucalgary.ca/sites/default/files/uploaded-documents/resources/course-design/course_design_program_manual_2014_12_18.pdf).
- [4] Felder, R. M. and Brent, R. (2016). *Teaching and Learning STEM: A Practical Guide*. Jossey-Bass, USA. url: <http://www4.ncsu.edu/unity/lockers/users/f/felder/public/TeachSTEM/TeachSTEM.html>.

*What is OBE?*

*Why is OBE Important?*

*The Washington Accord*

*BAETE Accreditation*

*OBE at AUST*

*PEO*

*PO*

*CO*

*CQI*

*The Role of the IAP*

*Bibliography*

## II

- [5] Hamzah, S. H. and Pao, L. C. (2019). Workshop on the Implementation of Complex Engineering Problem Solving (WP) and Complex Engineering Activities (EA). url: <http://www.baetebangladesh.org/download/2019%20BAETE%20WPEA%20WORKSHOP%2018\protect\discretionary{\char\hyphenchar\font}{\ }19June.pdf>.
- [6] Spady, W., Hussain, W., Largo, J., and Uy, F. A. (2018). *Beyond Outcomes Accreditation: Exploring the Power of 'Real' OBE Practices*.
- [7] Spady, W. G. (1994). Choosing outcomes of significance. *Educational Leadership*, 51(6):18–22.

*What is OBE?*

*Why is OBE Important?*

*The Washington Accord*

*BAETE Accreditation*

*OBE at AUST*

*PEO*

*PO*

*CO*

*CQI*

*The Role of the IAP*

*Bibliography*