



# **IEA / WASHINGTON ACCORD (WA) / SYDNEY ACCORD (SA) / DUBLIN (DA) GRADUATE ATTRIBUTES**

**UTeM WORKSHOP  
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# Eng Tech Registration (BEM)

- According to Section 7 (1B) of the Act, an Engineering Technologist will be entitled to describe himself or hold himself out under any name, style or title using the abbreviation “Eng.Tech.” after his name or in any way associate with his name

# Sydney Accord

- In Sydney Accord, qualifications accredited or recognised by other signatories are recognised by each signatory as being substantially equivalent to accredited or recognised qualifications for the practice of engineering technology at the appropriate level within the engineering team

# Distinguishing Factors

## WA

WASHINGTON ACCORD  
ENGINEER



**PROFESSIONAL  
ENGINEERING  
GRADUATES**

are expected to work  
with

**Complex Engineering  
Problems**

## SA

SYDNEY ACCORD  
ENGINEERING  
TECHNOLOGIST



**TECHNOLOGIST  
GRADUATES**

to work with  
**Broadly Defined  
Engineering  
Problems**

## DA

DUBLIN ACCORD  
ENGINEERING  
TECHNICIAN



**TECHNICIAN  
GRADUATES**

to work with  
**Well-defined  
Engineering  
Problems**

# Depth of Knowledge Required

## WA

WASHINGTON ACCORD  
ENGINEER



**Complex Engineering Problems (Engineer)**

Requires in-depth knowledge that allows a fundamentals-based first principles analytical approach

## SA

SYDNEY ACCORD  
ENGINEERING  
TECHNOLOGIST



**Broadly Defined Problems (Technologist)**

Requires knowledge of principles and applied procedures or methodologies

## DA

DUBLIN ACCORD  
ENGINEERING  
TECHNICIAN



**Well-defined Problems (Technician)**

Can be solved using limited theoretical knowledge, but normally requires extensive practical knowledge

# Range of Engineering Activities

**WA**

WASHINGTON ACCORD  
ENGINEER



**Complex  
Engineering  
Activities or  
Projects**

**SA**

SYDNEY ACCORD  
ENGINEERING  
TECHNOLOGIST



**Broadly  
Defined  
Engineering  
Activities or  
Projects**

**DA**

DUBLIN ACCORD  
ENGINEERING  
TECHNICIAN



**Well-defined  
Engineering  
Activities or  
Projects**

# TERMINOLOGIES

**CP=WP**

- Complex Problem Solving

**EA**

- Complex Engineering Activities

**PO=WA**

- Graduate Attributes

**WK**

- Knowledge Profile

**CP-EA-WA-WK**

# KNOWLEDGE PROFILE

**WA** = Requires in-depth knowledge that allows a fundamentals-based first principles analytical approach

**SA** = Requires knowledge of principles and applied procedures or methodologies

**DA** = Can be solved using limited theoretical knowledge, but normally requires extensive practical knowledge

- WK1- natural sciences
- WK2 – mathematics
- WK3 – engineering fundamentals
- WK4 – specialist knowledge
- WK5 – engineering design
- WK6 – engineering **practice**
- WK7 – comprehension
- WK8 – **research** literature

- SK1- natural sciences
- SK2 – mathematics
- SK3 – engineering fundamentals
- SK4 – specialist knowledge
- SK5 – engineering design
- SK6 – engineering **technologies**
- SK7 – comprehension
- SK8 – **technological** literature

- DK1- natural sciences
- DK2 – mathematics
- DK3 – engineering fundamentals
- DK4 – specialist knowledge
- DK5 – engineering design
- DK6 – **practical** engineering **knowledge**
- DK7 – comprehension



**WA-WK**  
**SA-SK**  
**DA-DK**

**PROFESSIONAL  
ENGINEERING  
GRADUATES -  
Complex  
Engineering  
Problems**

**TECHNOLOGIST  
GRADUATES -  
Broadly Defined  
Engineering  
Problems**

**TECHNICIAN  
GRADUATES -  
Well-Defined  
Engineering  
Problems**

| <b>GRADUATE ATTRIBUTES (Keywords)</b> | <b>WA-WK's</b> | <b>WP/EA</b> | <b>SA-SK's</b> | <b>BD/EA</b> | <b>DA-DK's</b> | <b>WD/EA</b> |
|---------------------------------------|----------------|--------------|----------------|--------------|----------------|--------------|
| 1. Engineering Knowledge              | WK1-WK4        | WP           | SK1-SK4        | BD           | DK1-DK4        | WD           |
| 2. Problem Analysis                   | WK1-WK4        | WP           | SK1-SK4        | BD           | DK1-DK4        | WD           |
| 3. Design/Development of Solutions    | WK5            | WP           | SK5            | BD           | DK5            | WD           |
| 4. Investigation                      | WK8            | WP           | SK8            | BD           | -              | WD           |
| 5. Modern Tool Usage                  | WK6            | WP           | SK6            | BD           | DK6            | WD           |
| 6. The Engineer and Society           | WK7            | WP           | SK7            | BD           | DK7            | WD           |
| 7. Environment and Sustainability     | WK7            | WP           | SK7            | BD           | DK7            | WD           |
| 8. Ethics                             | WK7            |              | SK7            |              | DK7            |              |
| 9. Individual and Team work           |                |              |                |              |                |              |
| 10. Communication                     |                | EA           |                | TA           |                | NA           |
| 11. Project Management and Finance    |                |              |                |              |                |              |
| 12. Life Long Learning                |                |              |                |              |                |              |

Assessments provide adequate feedback to the programme to identify strengths and weaknesses for CQI

# Knowledge Profile **SK1-SK8**

| SK  | Characteristics          |                                                                                                                                                                                                          |
|-----|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SK1 | Natural sciences         | A systematic, theory-based understanding of the natural sciences applicable to the discipline.                                                                                                           |
| SK2 | Mathematics              | Conceptually-based mathematics, numerical analysis, statistics and formal aspects of computer and information science to support analysis and modelling applicable to the discipline.                    |
| SK3 | Engineering fundamentals | A systematic, theory-based formulation of engineering fundamentals required in the engineering discipline.                                                                                               |
| SK4 | Specialist knowledge     | Engineering specialist knowledge that provides theoretical frameworks and bodies of knowledge for the accepted practice areas in the engineering discipline; much is at the forefront of the discipline. |

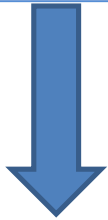
# Knowledge Profile **WK1-WK8**

| SK  | Characteristics      |                                                                                                                                                                                                                                                                                                     |
|-----|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SK5 | Engineering design   | Knowledge that supports engineering design in a practice area.                                                                                                                                                                                                                                      |
| SK6 | Engineering practice | Knowledge of engineering practice (technology) in the practice areas in the engineering discipline.                                                                                                                                                                                                 |
| SK7 | Comprehension        | Comprehension of the role of engineering in society and identified issues in engineering practice in the discipline: ethics and the professional responsibility of an engineer to public safety; the impacts of engineering activity: economic, social, cultural, environmental and sustainability. |
| SK8 | Research literature  | Engagement with selected knowledge in the research literature of the discipline.                                                                                                                                                                                                                    |

# Range of Engineering Activities

**WA**

WASHINGTON ACCORD  
ENGINEER



**Complex  
Engineering  
Activities or  
Projects (EA)**

**SA**

SYDNEY ACCORD  
ENGINEERING  
TECHNOLOGIST



**Broadly  
Defined  
Engineering  
Activities or  
Projects (TA)**

**DA**

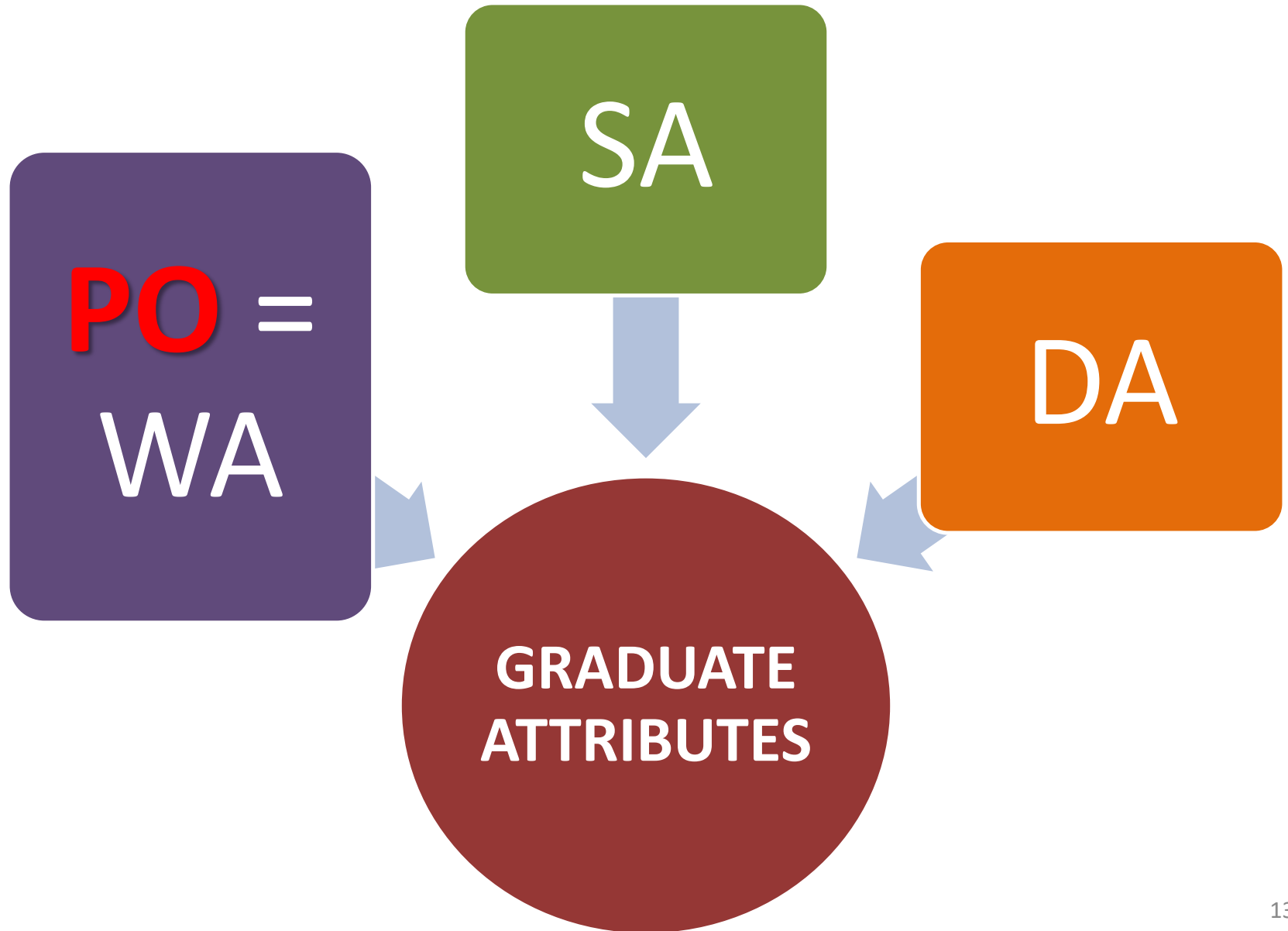
DUBLIN ACCORD  
ENGINEERING  
TECHNICIAN



**Well-defined  
Engineering  
Activities or  
Projects (NA)**

**WA10, SA10, DA10 COMMUNICATION**

# IEA ACCORDS





# Graduate Attributes **SA1-SA12**

| <b>SA</b>  | <b>Characteristics</b>                                                                                                                                                                                                                                                                         | <b>SK</b>                   | <b>SP/<br/>TA</b> |
|------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|-------------------|
| <b>SA1</b> | Apply <b>knowledge</b> of mathematics, natural science, engineering fundamentals and an engineering specialization as specified in SK1 to SK4 respectively to defined and applied engineering procedures, processes, systems or methodologies                                                  | SK1,<br>SK2,<br>SK3,<br>SK4 | SP                |
| <b>SA2</b> | Identify, formulate, research literature and <b>analyse</b> broadly-defined engineering problems reaching substantiated conclusions using analytical tools appropriate to the discipline or area of specialisation. (SK1 to SK4)                                                               | SK1,<br>SK2,<br>SK3,<br>SK4 | SP                |
| <b>SA3</b> | <b>Design solutions</b> for broadly- defined engineering technology problems and contribute to the design of systems, components or processes to meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations. (SK5) | SK5                         | SP                |
| <b>SA4</b> | Conduct <b>investigations</b> of broadly-defined problems; locate, search and select relevant data from codes, data bases and literature (SK8), design and conduct experiments to provide valid                                                                                                | SK8                         | SP                |

# Graduate Attributes **SA1-SA12**

| <b>SA</b>  | <b>Characteristics</b>                                                                                                                                                                                                                   | <b>SK</b> | <b>SP/ TA</b> |
|------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|---------------|
| <b>SA5</b> | Select and apply appropriate techniques, resources, and <b>modern</b> engineering and IT <b>tools</b> , including prediction and modelling, to <i>broadly-defined</i> engineering problems                                               | SK6       | SP            |
| <b>SA6</b> | Demonstrate understanding of the societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to <b>engineering technology practice</b> and solutions to broadly defined engineering problems. (SK7) | SK7       | SP            |
| <b>SA7</b> | Understand and evaluate the <b>sustainability</b> and impact of engineering technology work in the solution of broadly defined engineering problems in societal and <b>environmental</b> contexts. (SK7)                                 | SK7       | SP            |
| <b>SA8</b> | Understand and commit to <b>professional ethics</b> and responsibilities and norms of engineering technology practice. (SK7)                                                                                                             | SK7       | —             |



# Graduate Attributes **SA1-SA12**

| <b>SA</b>   | <b>Characteristics</b>                                                                                                                                                                                                                                                                        | <b>WK</b> | <b>SP/ TA</b> |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|---------------|
| <b>SA9</b>  | Function effectively as an <b>individual</b> , and as a member or leader in diverse <b>teams</b>                                                                                                                                                                                              | -         | -             |
| <b>SA10</b> | <b>Communicate</b> effectively on <i>broadly-defined</i> engineering activities with the engineering community and with society at large, by being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instruct | -         | TA            |
| <b>SA11</b> | Demonstrate knowledge and understanding of engineering management principles and apply these to one's own work, as a member or leader in a team and to <b>manage projects</b> in multidisciplinary environments                                                                               | -         | -             |
| <b>SA12</b> | Recognize the need for, and have the ability to engage in independent and <b>life-long learning</b> in specialist technologies                                                                                                                                                                | -         | -             |

# Range of Problem Solving

## SP1-SP7

### Depth of knowledge required

- **SP1** engineering knowledge at the level of one or more of **SK 4**, **SK5**, and **SK6** supported by **SK3** with a strong emphasis on the application of developed technology

### Range of conflicting requirements

- **SP2** Involve a variety of factors which may impose conflicting constraints

### Depth of analysis required

- **SP3** Can be solved by application of well-proven analysis techniques

SP1 & some or all of SP2-SP7

# Range of Problem Solving

## SP1-SP7

### Familiarity of issues

- **SP4** Belong to families of familiar problems which are solved in well-accepted ways

### Extent of applicable codes

- **SP5** May be partially outside those encompassed by standards or codes of practice

### Extent of stakeholder involvement & conflicting requirements

- **SP6** Involve several groups of stakeholders with differing and occasionally conflicting needs

### Interdependence

- **SP7** Are parts of, or systems within complex engineering problems

SP1 & some or all of SP2-SP7

# Range of Activities

## Broadly-Defined Activities TA1-TA5

### Range of resources

- **TA1** Involve a variety of resources (and for this purposes resources includes people, money, equipment, materials, information and technologies)

### Level of interactions

- **TA2** Require resolution of occasional interactions between technical, engineering and other issues, of which few are conflicting

### Innovation

- **TA3** Involve the use of new materials, techniques or processes in non-standard ways

some or all

# Range of Activities

## Broadly-Defined Activities TA1-TA5

### Consequences to society and the environment

- **TA4** Have reasonably predictable consequences that are most important locally, but may extend more widely

### Familiarity of issues

- **TA5** Require a knowledge of normal operating procedures and processes

some or all

|                                                                              |    |             |                                 |                                                     |                              |     |     |     |     |                                  |                            |                       |                            |                                                              |                    |                    |                       |            |                                       |                       |                  |            |                         |                      |                  |            |                         |                      |                    |                     |                      |               |               |               |  |
|------------------------------------------------------------------------------|----|-------------|---------------------------------|-----------------------------------------------------|------------------------------|-----|-----|-----|-----|----------------------------------|----------------------------|-----------------------|----------------------------|--------------------------------------------------------------|--------------------|--------------------|-----------------------|------------|---------------------------------------|-----------------------|------------------|------------|-------------------------|----------------------|------------------|------------|-------------------------|----------------------|--------------------|---------------------|----------------------|---------------|---------------|---------------|--|
|  | NO | COURSE CODE | COURSE NAME                     | PO                                                  | COMPLEX PROBLEM SOLVING (WP) |     |     |     |     |                                  |                            |                       |                            |                                                              | COMPLEX ACTIVITIES |                    |                       |            |                                       | KNOWLEDGE PROFILE     |                  |            |                         |                      |                  |            |                         |                      |                    |                     |                      |               |               |               |  |
|                                                                              |    |             |                                 |                                                     | WP1                          |     |     |     |     | WP2                              | WP3                        | WP4                   | WP5                        | WP6                                                          | WP7                | EA1                | EA2                   | EA3        | EA4                                   | EA5                   | PO1              |            |                         |                      | PO2              |            |                         |                      | PO3                | PO4                 | PO5                  | PO6           | PO7           | PO8           |  |
|                                                                              |    |             |                                 |                                                     | DEPTH OF KNOWLEDGE           |     |     |     |     | RANGE OF CONFLICTING REQUIREMENT | DEPTH OF ANALYSIS REQUIRED | FAMILIARITY OF ISSUES | EXTENSIVE APPLICABLE CODES | EXTEND OF STAKEHOLDERS INVOLVEMENT & CONFLICTING REQUIREMENT | INTERDEPENDENCE    | RANGE OF RESOURCES | LEVEL OF INTERACTIONS | INNOVATION | CONSEQUENCES TO SOCIETY & ENVIRONMENT | FAMILIARITY OF ISSUES | WK1              | WK2        | WK3                     | WK4                  | WK1              | WK2        | WK3                     | WK4                  | WK5                | WK8                 | WK6                  | WK7           | WK7           | WK7           |  |
|                                                                              |    |             |                                 |                                                     | WK3                          | WK4 | WK5 | WK6 | WK8 |                                  |                            |                       |                            |                                                              |                    |                    |                       |            |                                       |                       | NATURAL SCIENCES | MATHEMATIC | ENGINEERING FUNDAMENTAL | SPECIALIST KNOWLEDGE | NATURAL SCIENCES | MATHEMATIC | ENGINEERING FUNDAMENTAL | SPECIALIST KNOWLEDGE | ENGINEERING DESIGN | RESEARCH LITERATURE | ENGINEERING PRACTICE | COMPREHENSION | COMPREHENSION | COMPREHENSION |  |
| 1                                                                            |    |             | FINAL YEAR PROJECT I            | PO2, PO4, PO5, PO8, PO9, PO10, PO12                 |                              |     |     |     |     |                                  |                            |                       |                            |                                                              |                    |                    |                       |            |                                       |                       |                  |            |                         |                      |                  |            |                         |                      |                    |                     |                      |               |               |               |  |
| 2                                                                            |    |             | INTEGRATED DESIGN PROJECT (IDP) | PO1, PO2, PO3, PO5, PO7, PO8, PO9, PO10, PO11, PO12 |                              |     |     |     |     |                                  |                            |                       |                            |                                                              |                    |                    |                       |            |                                       |                       |                  |            |                         |                      |                  |            |                         |                      |                    |                     |                      |               |               |               |  |

Which PO model?

Courses addressed all WP/EA/WK?

SAMPLE

CO-PO-WK-WP-EA

MATRIX

# PO ASSESSMENT MODELS

1

- **Accumulated model** – **ALL** courses contributing to the PO measurements

2

- **Dominating model** – **SELECTED** courses contributing to the PO measurements, normally accounted in several CORE courses.

3

- **Culminating model** – **SELECTED FEW** usually between 3-5 courses contributing to the PO measurements, normally conducted during the final year of study.



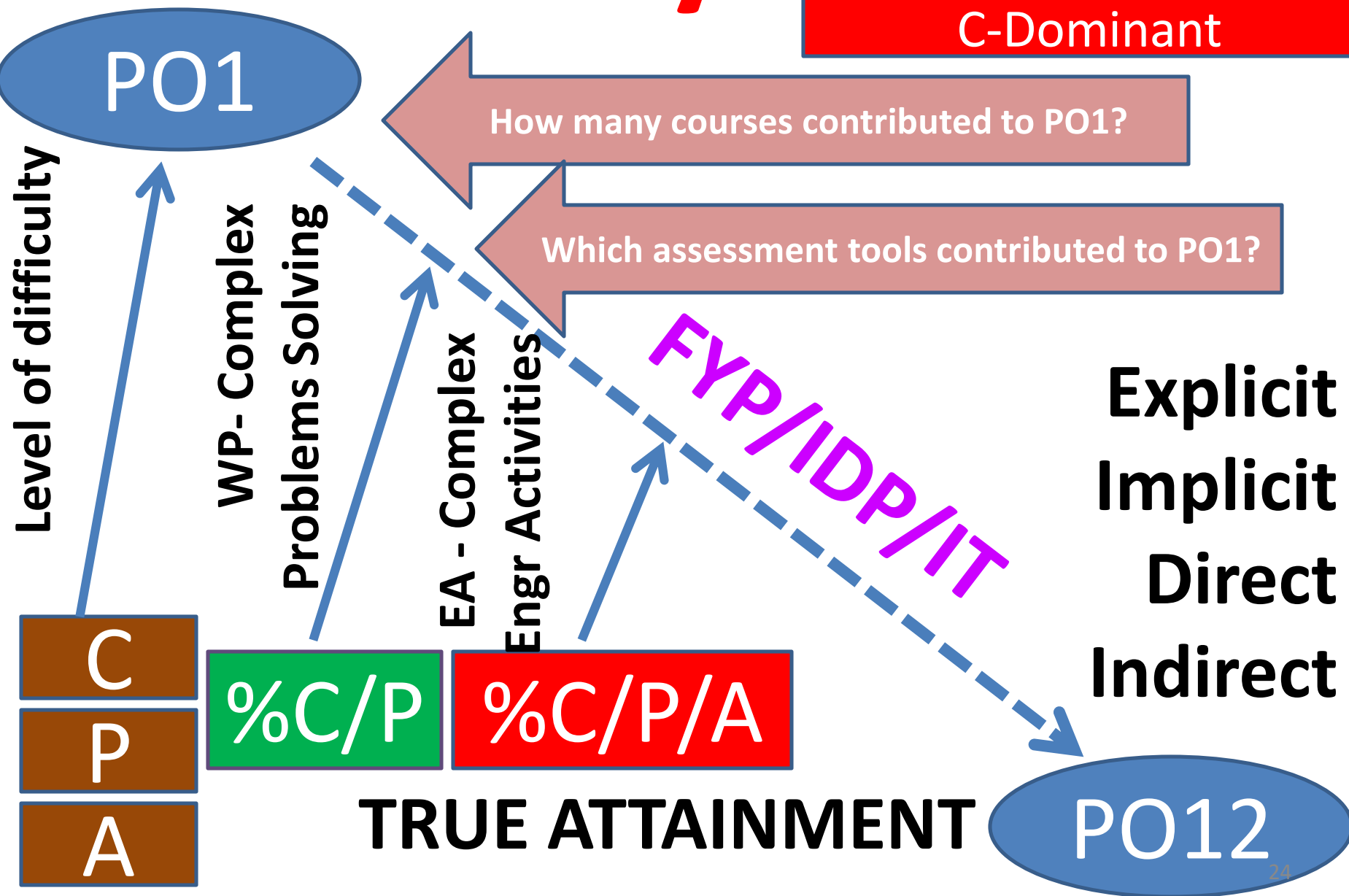
# Internal Audit/Moderation

| Lecturer's Name                                    |                                                                              | Course Code and Name                          |   |
|----------------------------------------------------|------------------------------------------------------------------------------|-----------------------------------------------|---|
| <b>WA</b> assigned with <b>EA</b>                  | <b>WA10</b> Level of communication according to type of activities performed |                                               |   |
| Projects/Performance/<br>Activities with <b>EA</b> | (m)                                                                          |                                               | % |
| Attributes                                         |                                                                              | Some or all of the following characteristics: |   |
| Range of resources                                 | <b>EA1</b>                                                                   | Yes / No & Comments :                         |   |
| Level of interaction                               | <b>EA2</b>                                                                   | Yes / No & Comments :                         |   |
| Innovation                                         | <b>EA3</b>                                                                   | Yes / No & Comments :                         |   |
| Consequences to society and environment            | <b>EA4</b>                                                                   | Yes / No & Comments :                         |   |
| Familiarity of issues                              | <b>EA5</b>                                                                   | Yes / No & Comments :                         |   |



# 12 PO Trays

A-Culminating-Enabling  
B-Accumulated  
C-Dominant





# References

- IEA Graduate Attributes and Professional Competency Profiles, Version 3: 21 June 2013

## Points for Clarifications

- Chung-Lim.Law@Nottingham.edu.my