



OBE

Outcome Based Education


EET142 Introduction to Electrical Engineering

Outline

Overview on outcome based education.
Programme Education Objectives (PEO),
Programme Outcome (PO), Course
Outcome (CO). Bloom's Taxonomy.

A large black circle is centered on a blue background. Inside the black circle, there is a ring of small yellow dots. The text "Outcome Based Education" is written in white, sans-serif font in the center of the black circle.

Outcome Based Education



OBE is a process that involves assessment and evaluation practices in education to reflect the attainment of expected learning outcomes and showing mastery in the programme area



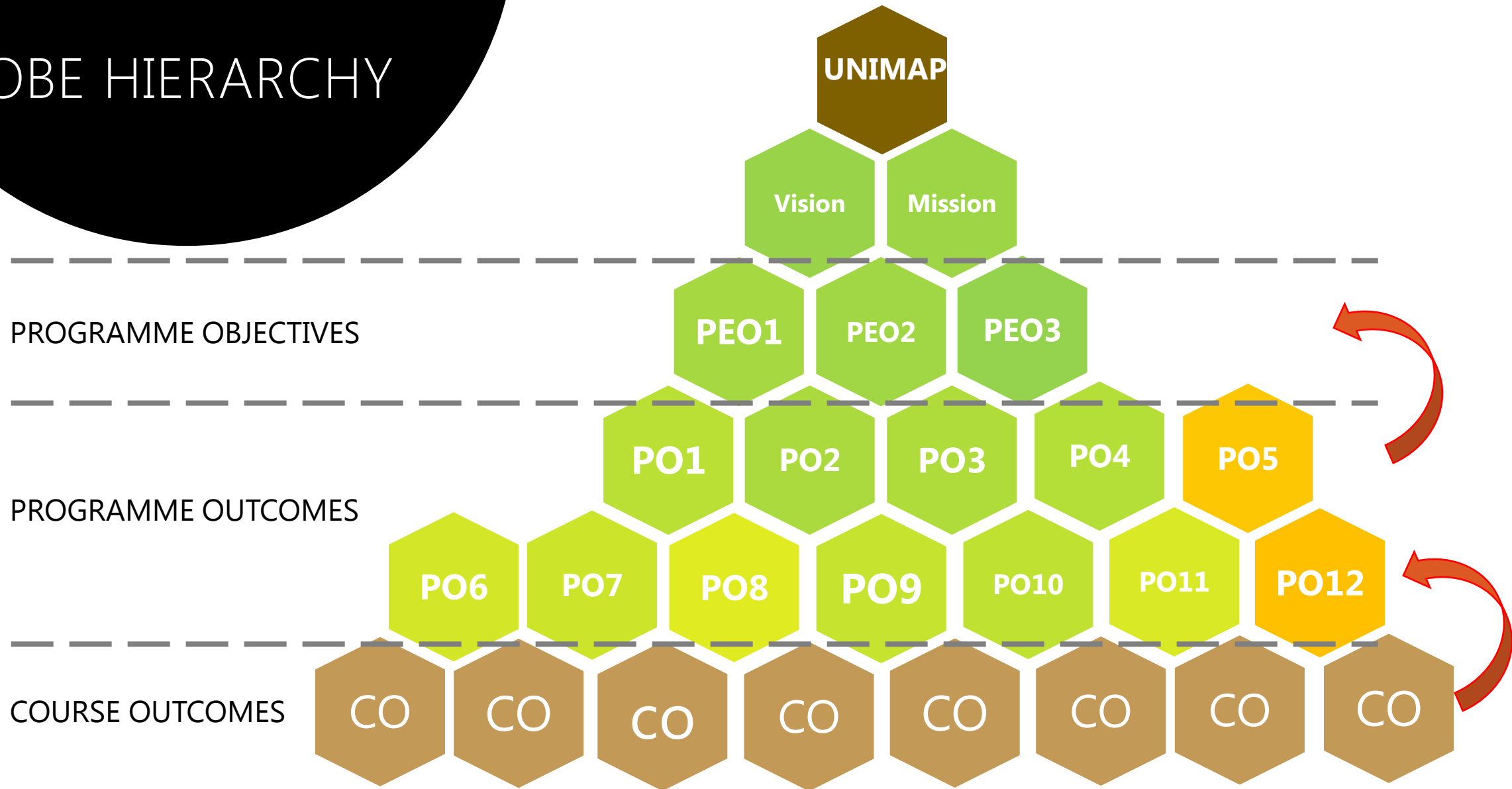
“A powerful first step in becoming successful is to define your
End in Mind by developing a mission statement.
Begin with the End in Mind.”

—Dr. Stephen R. Covey , The 7 Habits of Highly Effective People

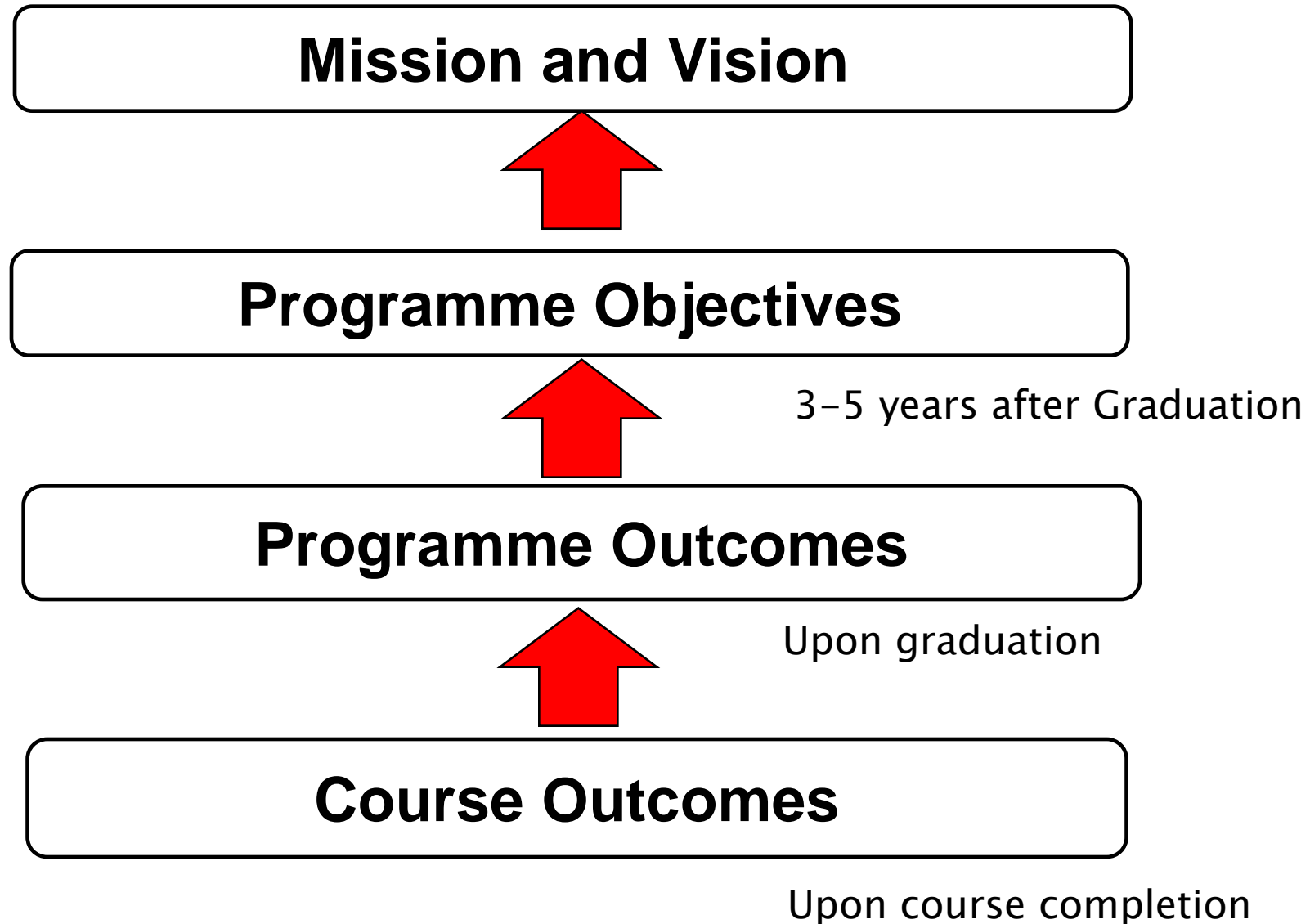
OBE EDUCATIONAL FRAMEWORK



OBE HIERARCHY



Different Levels of Outcomes



- **Programme Objectives (PEO)** are specific goals consistent with the mission and vision of the IHL, are responsive to the expressed interest of programme stakeholders, and describe the expected achievements of graduates in their career and professional life a few years after graduation.
- **Processes and Results:**
 - Clear linkage between Programme Objectives and Programme Outcomes
 - Process of on-going assessment and evaluation that demonstrates the achievement with documented results
 - Evaluation results that are used in the continual improvement of the programme.

Graduates who have demonstrated **career advancement** in the field of Electrical Engineering or related engineering field.

appointed as a leader such as senior position, supervisor, specialist, technical leader, group leader, engineering entrepreneur, business creator or assigned multiple responsibilities.

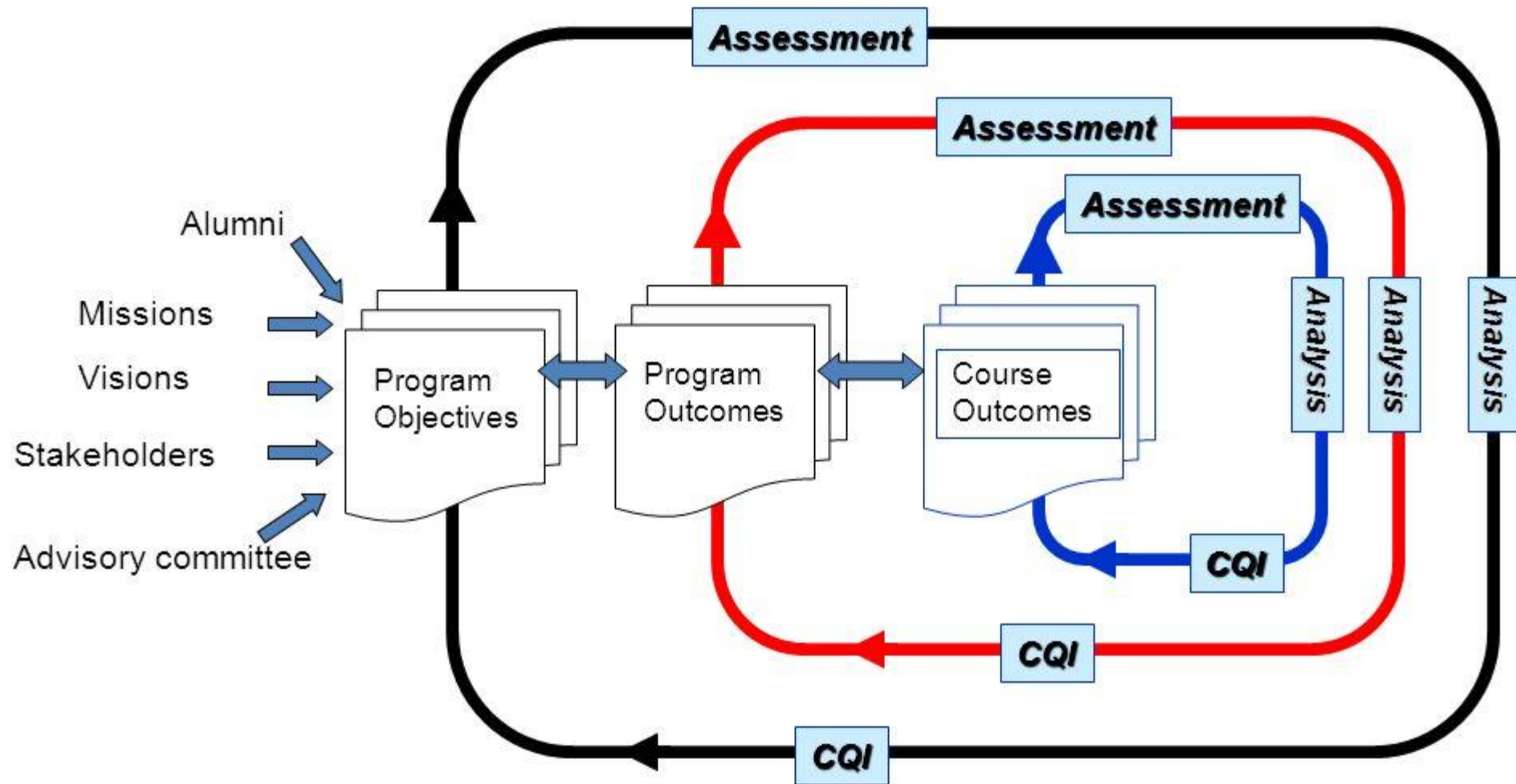
Graduates who are involved in a **professional body or society.**

such as BEM, IEM (Corporate member), IEEE, IMechE, IET, BCS, NGO, Mercy and other reputable Organization

Graduates who pursue **life-long learning**.

postgraduate studies or participate in continual development
activities

Outcome-Based Education (Closing the Loops)



PROGRAMME OUTCOMES

PO1	Engineering Knowledge	Breadth & depth of knowledge
PO2	Problem Analysis	Complexity of analysis
PO3	Design/Development of Solutions	Breadth & uniqueness of engineering problems i.e. the extent to which problems are original and to which solutions have previously been identified and coded
PO4	Investigation	Breadth & depth of investigation and experimentation
PO5	Modern Tool Usage	Level of understanding of the appropriateness of the tool
PO6	The Engineer and Society	Level of knowledge and responsibility
PO7	Environment and Sustainability	Type of solutions
PO8	Ethics	Understanding and level of practice
PO9	Individual and Team Work	Role in and diversity of team
PO10	Communication	Level of communication according to type of activities performed
PO11	Life-long Learning	Preparation for and depth of continuing learning
PO12	Project Management and Finance	Level of management required for differing types of activity

PROGRAMME OUTCOME

(PO1) Engineering Knowledge – Breadth & Depth of Knowledge

(WA1) Apply knowledge of mathematics, natural science, engineering fundamentals and an engineering specialisation to the solution of complex engineering problems; (WK1 to WK4)

WA = Programme Outcome

WK = Knowledge Profile = Curriculum

PROGRAMME OUTCOME

(PO2) Problem Analysis - Complexity of analysis

(WA2) Identify, formulate, research literature and analyse complex engineering problems reaching substantiated conclusions using **first principles** of mathematics, natural sciences and engineering sciences (WK1 – WK4)

PROGRAMME OUTCOME

(PO3) Design/Development of Solutions – Breadth and uniqueness of engineering problems i.e. the extent to which problems are original and to which solutions have previously been identified or codified

(WA3) Design solutions for complex engineering problems and design systems, components or processes that **meet specified** needs with appropriate consideration for **public health and safety, cultural, societal, and environmental considerations** (WK5)

PROGRAMME OUTCOME

(PO4) Investigation - Breadth & Depth of Investigation & Experimentation

(WA4) Conduct investigation of complex problems using **research based knowledge** (WK8) and research methods including **design of experiments, analysis and interpretation of data, and synthesis of information** to provide valid conclusions

PROGRAMME OUTCOME

(PO5) Modern Tool Usage - Level of understanding of the appropriateness of the tool

(WA5) Create, select and apply **appropriate techniques, resources, and modern engineering and IT tools**, including **prediction** and **modelling**, to **complex** engineering problems, with an understanding of the limitations. (WK6)

PROGRAMME OUTCOME

(PO6) The Engineer and Society - Level of knowledge and responsibility

(WA6) 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)

PROGRAMME OUTCOME

(PO7) Environment and Sustainability - Type of solutions

(WA7) Understand and evaluate the sustainability and **impact of** professional engineering work in the **solutions** of complex engineering problems in **societal and environmental** contexts (demonstrate knowledge of and need for sustainable development) (WK7)

PROGRAMME OUTCOME

(PO8) Ethics - Understanding and level of practice

(WA8) Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice. (WK7)

PROGRAMME OUTCOME

(PO9) Individual and Team Work – Role in and diversity of team

(WA9) Function effectively as an individual, and as a member or leader in **diverse teams and in multi-disciplinary settings**

PROGRAMME OUTCOME

(PO10) Communication – Level of communication according to type of activities performed

(WA10) Communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to **comprehend and write** effective reports and design documentation, make **effective presentations**, and give and receive **clear instructions**

PROGRAMME OUTCOME

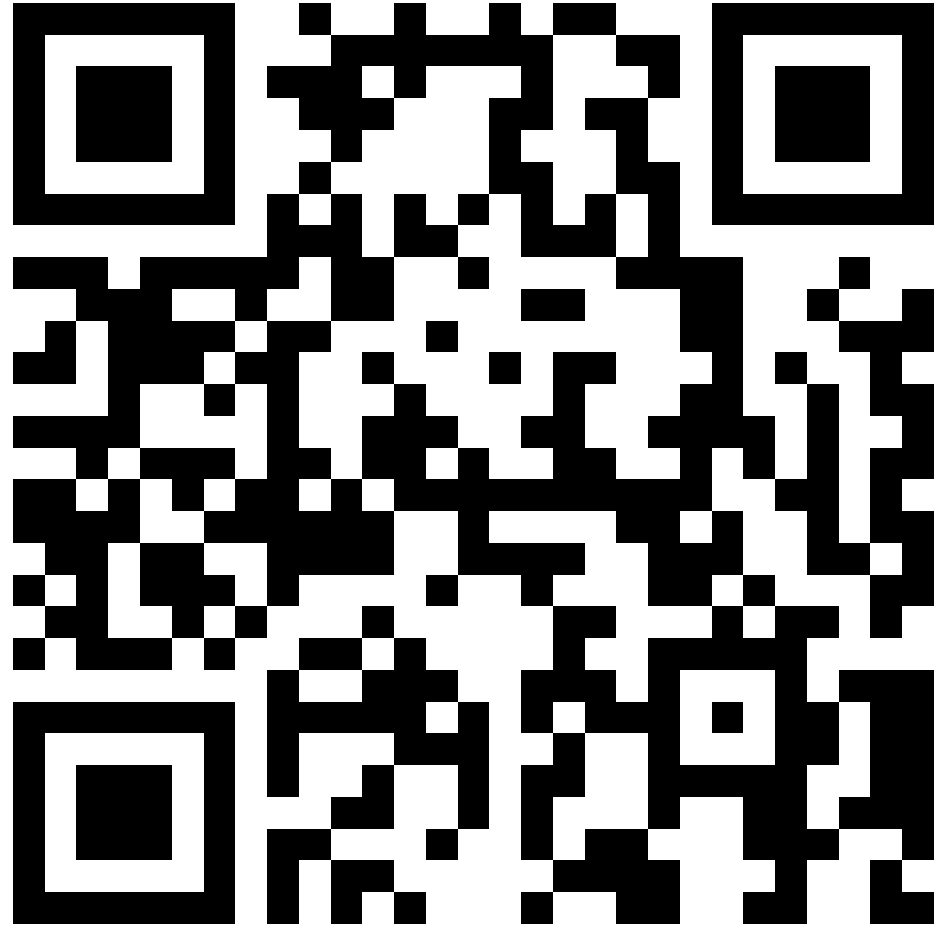
(PO11) Life-long Learning – Preparation for and depth of continuing learning

(WA12) Recognise the need for, and have the preparation and ability to **engage in independent and life-long learning** in the broadest context of technological change

PROGRAMME OUTCOME

(PO12) Project Management and Finance – Level of management required for differing types of activity

(WA11) Demonstrate knowledge and understanding of engineering and **management principles** and **economic decision-making** and **apply** these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments





BLOOM'S TAXONOMY

Bloom's Taxonomy

create

Produce new or original work

Design, assemble, construct, conjecture, develop, formulate, author, investigate

evaluate

Justify a stand or decision

appraise, argue, defend, judge, select, support, value, critique, weigh

analyze

Draw connections among ideas

differentiate, organize, relate, compare, contrast, distinguish, examine, experiment, question, test

apply

Use information in new situations

execute, implement, solve, use, demonstrate, interpret, operate, schedule, sketch

understand

Explain ideas or concepts

classify, describe, discuss, explain, identify, locate, recognize, report, select, translate

remember

Recall facts and basic concepts

define, duplicate, list, memorize, repeat, state

Ask yourself upon
preparing
assessment

Bloom's Taxonomy

Creating:

Can students create a new product or point of view?
They would be able to assemble, construct, create, design, develop, formulate, write, or invent.

Evaluating:

Can the student justify a stand or decision?
To evaluate information, a student might: appraise, argue, defend, judge, select, support, value, and evaluate.

Analyzing:

Can the student distinguish between the different parts?
They would be able to compare, contrast, criticize, differentiate, discriminate, distinguish, examine, experiment, question, or test.

Applying:

Can the student use the information in a new way?
They would be able to choose, demonstrate, dramatize, employ, illustrate, interpret, operate, sketch, solve, use, or write.

Understanding:

Can the student explain ideas or concepts?
They would be able to classify, describe, discuss, explain, identify, locate, recognize, report, select, translate, or paraphrase.

Remembering:

Can the student recall or remember the information?
They would be able to define, duplicate, list, memorize, recall, repeat, reproduce, or state.

Sample Unit : Travel



Remembering	
Understanding	
Applying	
Analysing	
Evaluating	
Creating	



Remembering	What is the formula related to Ohm's Law
Understanding	Derive Ohm's Law
Applying	
Analysing	
Evaluating	
Creating	

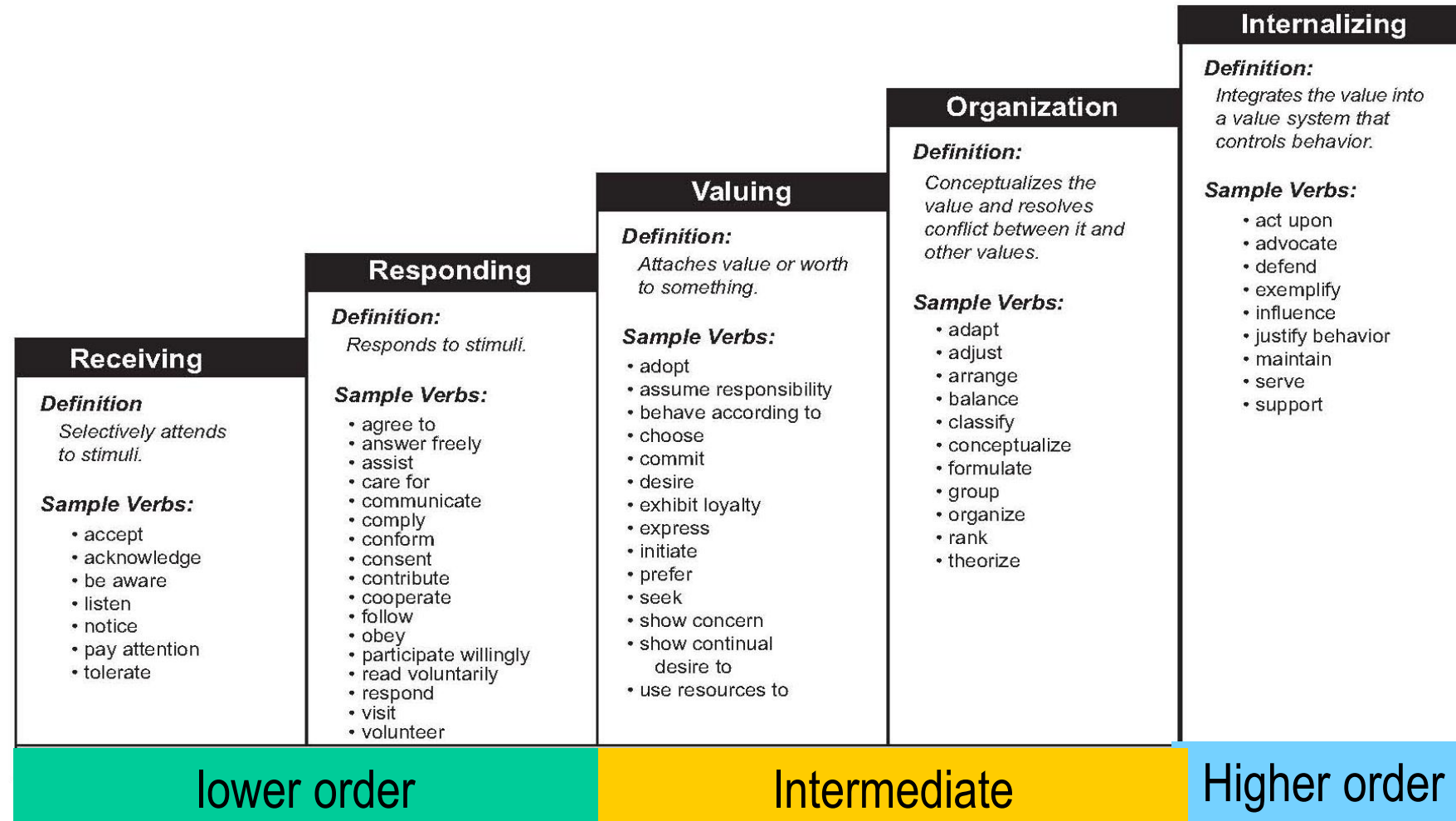
Psychomotor Domain

(doing, skills)

lower order			Intermediate		Higher order	
Perception	Set	Guided Response	Mechanism	Complete Overt Response	Adaption	Organization
<p>Definition: <i>Senses cues that guide motor activity.</i></p> <p>Sample Verbs:</p> <ul style="list-style-type: none"> • detect • hear • listen • observe • perceive • recognize • see • sense • smell • taste • view • watch 	<p>Definition: <i>Is mentally, emotionally, and physically ready to act.</i></p> <p>Sample Verbs:</p> <ul style="list-style-type: none"> • achieve a posture • assume a body stance • establish a body position • place hands, arms, etc. • position the body • sit • stand • station 	<p>Definition: <i>Imitates and practices skills, often in discrete steps.</i></p> <p>Sample Verbs:</p> <ul style="list-style-type: none"> • copy • duplicate • imitate • manipulate with guidance • operate under supervision • practice • repeat • try 	<p>Definition: <i>Performs acts with increasing efficiency, confidence, and proficiency.</i></p> <p>Sample Verbs:</p> <ul style="list-style-type: none"> • complete with confidence • conduct • demonstrate • execute • improve efficiency • increase speed • make • pace • produce • show dexterity 	<p>Definition: <i>Performs automatically.</i></p> <p>Sample Verbs:</p> <ul style="list-style-type: none"> • act habitually • advance with assurance • control • direct • excel • guide • maintain efficiency • manage • master • organize • perfect • perform automatically • proceed 	<p>Definition: <i>Adapts skill sets to meet a problem situation.</i></p> <p>Sample Verbs:</p> <ul style="list-style-type: none"> • adapts • reorganizes • alters • revises • changes 	<p>Definition: <i>Creates new patterns for specific situations.</i></p> <p>Sample Verbs:</p> <ul style="list-style-type: none"> • designs • originates • combines • composes • constructs

Affective Domain

(feeling, attitudes)



Complex Problems *(Need High Taxonomy Level)*

Complex Engineering Problems have characteristic WP1 and some or all of WP2 to WP7, EP1 and EP2, that can be resolved with in-depth forefront knowledge

WP1	Depth of Knowledge required	Resolved with forefront in-depth engineering knowledge (WK3, WK4, WK5, WK6 or WK8) which allows a fundamentals-based, first principles analytical approach
WP2	Range of conflicting requirements	Involve wide-ranging or conflicting technical, engineering and other issues.
WP3	Depth of analysis required	Have no obvious solution and require abstract thinking, originality in analysis to formulate suitable models.
WP4	Familiarity of issues	Involve infrequently encountered issues
WP5	Extent of applicable codes	Beyond codes of practice
WP6	Extent of stakeholder involvement and level of conflicting requirements	Involve diverse groups of stakeholders with widely varying needs .
WP7	Interdependence	Are high level problems including many component parts or sub-problems.
EP1	Consequences	Have significant consequences in a range of contexts.
EP2	Judgement	Require judgement in decision making

Complex Engineering Activities (*Project based*)

Preamble	Complex activities means (engineering) activities or projects that have some or all of the following characteristics listed below
Range of resources	Diverse resources (people, money, equipment, materials, information and technologies).
Level of interaction	Require resolution of significant problems arising from interactions between wide ranging or conflicting technical, engineering or other issues.
Innovation	Involve creative use of engineering principles and research-based knowledge in novel ways
Consequences to society and the environment	Have significant consequences in a range of contexts , characterised by difficulty of prediction and mitigation.
Familiarity	Can extend beyond previous experiences by applying principles-based approaches.

ACROSTIC COMPETITION

For PEO and PO

The acrostic must be catchy and unique.



THANK YOU