CULMINATION OF PO – FYDP & ALTERNATIVE ASSESSMENT

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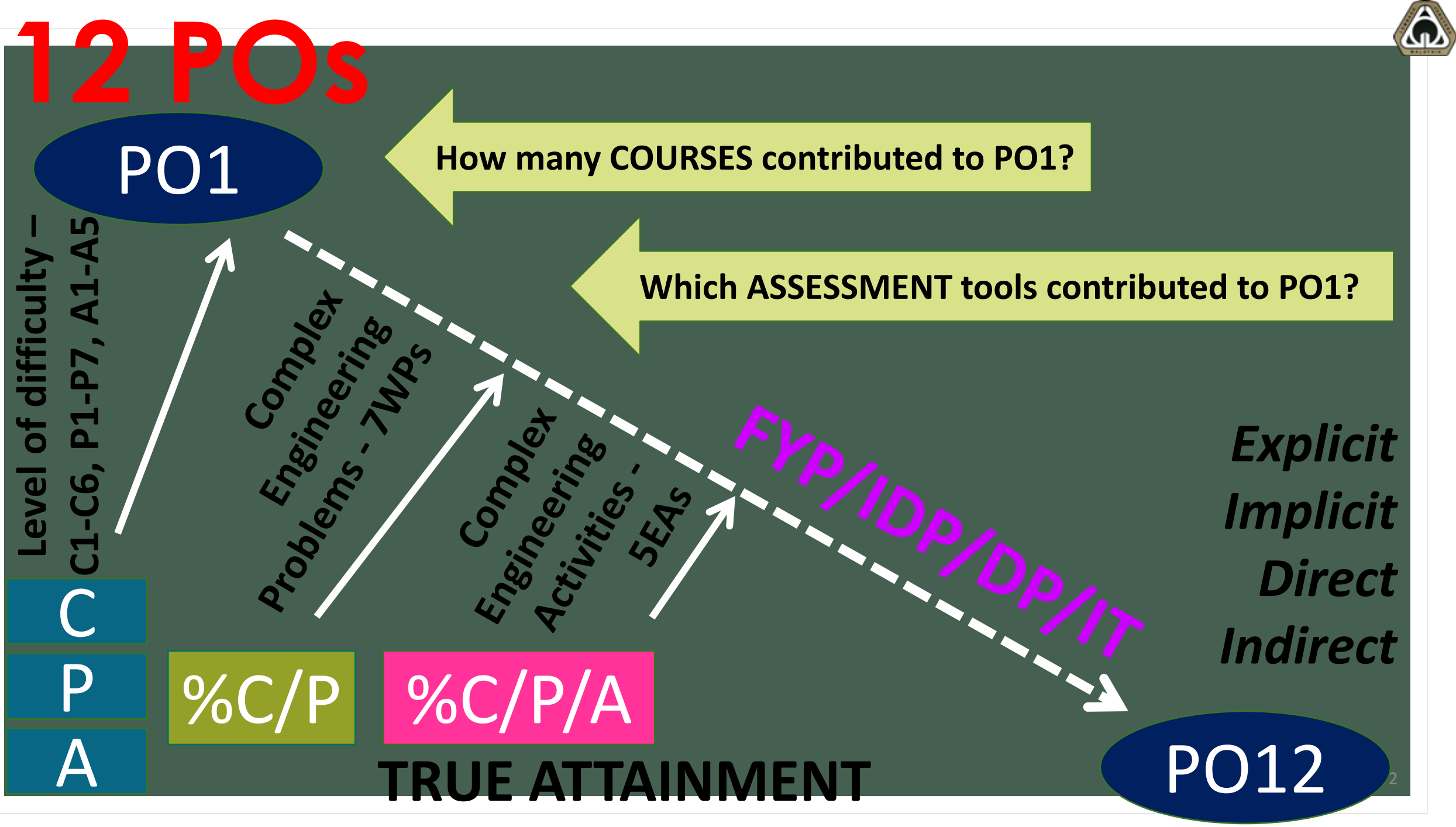
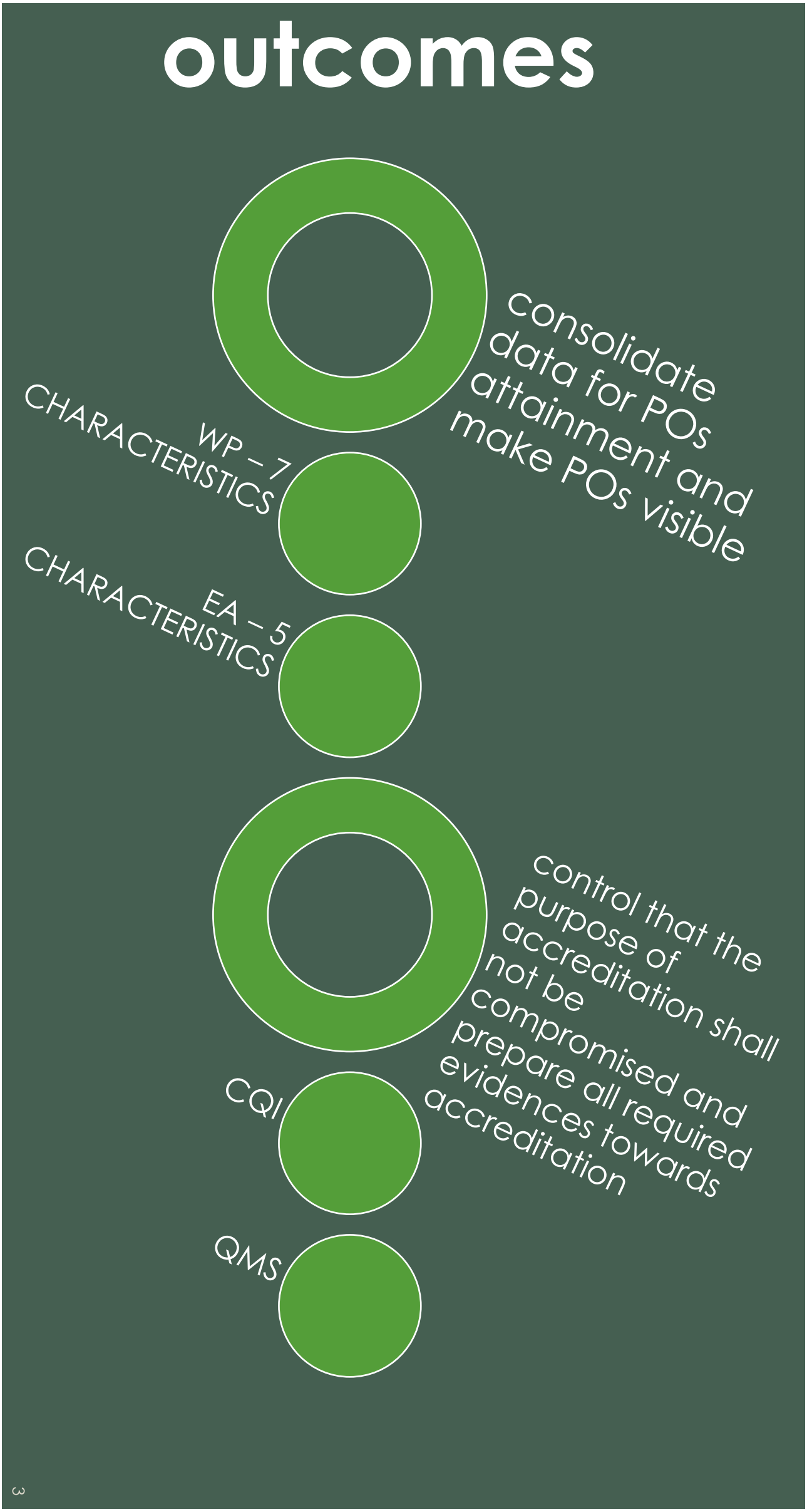

12 POs
PO1
How many COURSES contributed to PO1?
Which ASSESSMENT tools contributed to PO1?
Level of difficulty – C1-C6, P1-P7, A1-A5
Complex Engineering Problems - 7WPs
Complex Engineering Activities - 5EAs
FYP/IDP/DP/IT
Explicit
Implicit
Direct
Indirect
C
P
A
%C/P
%C/P/A
TRUE ATTAINMENT
PO12

outcomes


consolidate data for POs attainment and make POs visible
WP – 7 CHARACTERISTICS
EA – 5 CHARACTERISTICS
control that the purpose of accreditation shall not be compromised and prepare all required evidences towards accreditation
CQI
QMS

OBE CURRICULA

Have programme educational objectives, programme outcomes, course outcomes and performance indicators/ criteria or rubrics

PEO,PO, CO,LO

CONSTRUCTIVE ALIGNMENT

Stated objectives and outcomes can be assessed and evaluated

Centered around the needs of the students and the stakeholders

STUDENT CENTRED

C/P/A

Programme outcomes address Knowledge, Skill & Attitude (C,P,A) to be attained by students

OUTCOMES

Course outcomes must satisfy the stated programme outcomes. There is no need for ANY (individual) course to address all programme outcomes.

Teaching/ Learning method may have to be integrated to include different delivery methods to complement the traditional LECTURING method.

ACTIVE LEARNING

CQI

Learning outcomes are intentional and assessed using suitable performance indicators

Intended outcomes must clearly be indicated

CONSTRUCTIVE ALIGNMENT

ELEMENTS OF COURSE DESIGN

WHAT

learning outcomes

WP&EA

CLOSE LOOP

STUDENT

SCL	TCL
PBL	Lecture
POPBL	E-Learning
CBL	
Blended	
Laboratory	

instruction ⟷ assessment

HOW TO HELP

HOW TO KNOW

Formative/ Summative

Direct/ Indirect

Course/ Programme Level

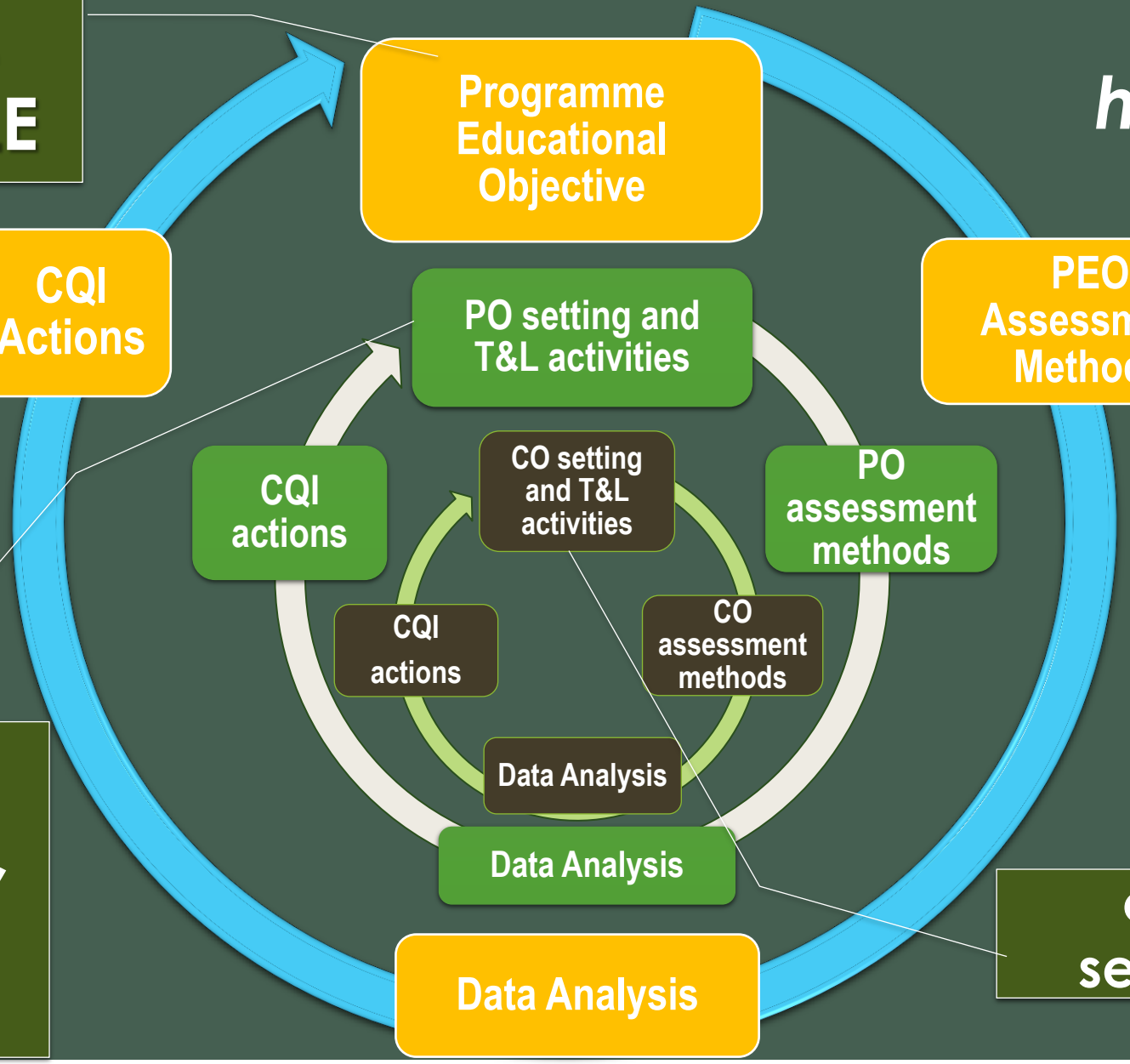
Activity will match outcomes

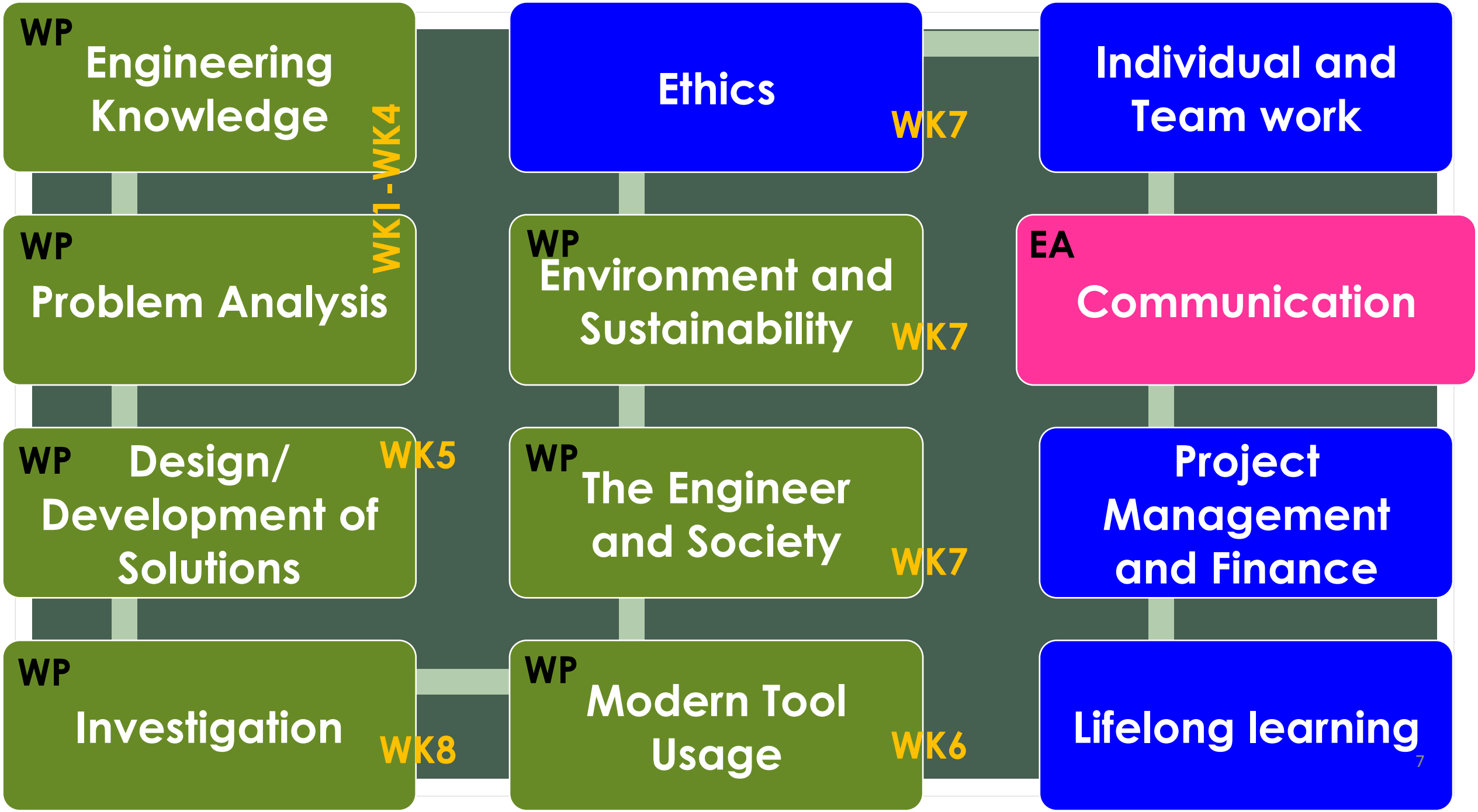
OBE requires T&L activities to be CONSTRUCTIVELY ALIGNED to intended learning outcomes

CQI heart of OBE

CQI process instituted

- Describe the process and significance of CQI in the programme planning




WP
Engineering Knowledge
WK1 - WK4
Ethics
WK7
Individual and Team work
WP
Problem Analysis
WP
Environment and Sustainability
WK7
EA
Communication
WP
Design/ Development of Solutions
WK5
WP
The Engineer and Society
WK7
Project Management and Finance
WP
Investigation
WK8
WP
Modern Tool Usage
WK6
Lifelong learning

ANALYSIS OF PROBLEMS & SYNTHESIS OF SOLUTIONS

PO1 - ENGINEERING KNOWLEDGE
PO2 - PROBLEM ANALYSIS
PO3 - DESIGN
PO4 - INVESTIGATION
PO5 - MODERN TOOLS

RESPONSIBILITIES

PO6 - ENGINEERS & SOCIETY
PO7 - ENVIRONMENT & SUSTAINABILITY
PO8 - ETHICS

REQUIRED IN WORKPLACE

PO9 - TEAMWORK
PO10 - COMMUNICATION
PO11 - PROJECT MANAGEMENT & FINANCE
PO12 - LIFELONG LEARNING

PO attainment

Culminating model

- 3-5 courses
- FYP, IDP, IT, EIS
- Enabling courses/Pre Requisites
- Entry point – Year 3/4

Dominating model

- >5 courses
- Selective
- Core, Design, FYP, IDP, IT, EIS, PM
- Entry point – Year 1/2/3

Accumulating model

- All courses
- Averaging
- Entry point – Year 1

TIPS TO CONSIDER

- **Direct assessment** means sample of actual student work such as reports, exams, demonstrations, performances, and completed works.
- Reviewers assess how well students meet expectations.
- **Strength of direct measurement** - capture a sample of what students can do providing very strong evidence of student learning.
- **Weakness of direct measurement** - not everything can be demonstrated in a direct way, such as values, perceptions, feelings, and attitudes.

- **Explicit assessment** means precisely, clearly expressed, readily observable and fully revealed measurements, expressed without vagueness, implication, or ambiguity

Harmonisation of the 12 POs to bring about a holistic programme improvement need to be demonstrated.

PO	Attribute	Examples of Assessment Tools and Domain
PO1	**Engineering Knowledge**	Quiz (C), Test (C), Final Exam (C), Assignment (C)
PO2	**Problem Analysis**	Quiz (C), Test (C), Final Exam (C), Assignment (C)
PO3	**Design/Development of Solutions**	Quiz (C), Test (C), Final Exam (C), Assignment (C), PBL/Project (C)
PO4	**Investigation**	Practical Examination (P), Laboratory Report (C), Participation (A)
PO5	**Modern Tool Usage**	Practical Examination (P), Assignment (C) , Design, Drawing, Other activities using common/specialised software (P)
PO6	**The Engineer and Society**	Quiz (C), Test (C), Final Exam (C), Case Studies/PBL (C), Participation (A)
PO7	**Environmental and Sustainability**	Quiz (C), Test (C), Final Exam (C), Case Studies/PBL (C), Participation (A)
PO8	**Ethics**	Quiz (C), Test (C), Final Exam (C), Case Studies/PBL (C), Participation (A)
PO9	**Individual and Teamwork**	Presentation (A), Viva (A), Poster Competition (A), Project Report (C)
PO10	**Communication**	Presentation (A), Viva (A), Poster Competition (A), Project Report (C), Youtube/Video (A), Logbook (C)
PO11	**Project Management and Finance**	Quiz (C), Test (C), Final Exam (C), Case Studies/PBL (C), Participation (A)
PO12	**Lifelong Learning**	Quiz (C), Test (C), Final Exam (C), Case Studies/PBL (C), Participation (A)

BAETE (Mar 2019) 2nd ed, 4.6 CURRICULUM & TEACHING LEARNING PROCESSES

- The programme should demonstrate the **culmination of programme outcomes (POs)** at the level of solving complex engineering problems, preferably through a final year design project or capstone project extending over a period of one year.

EAC STANDARD 2020, 6.3 Criterion 3 : Academic Curriuclum

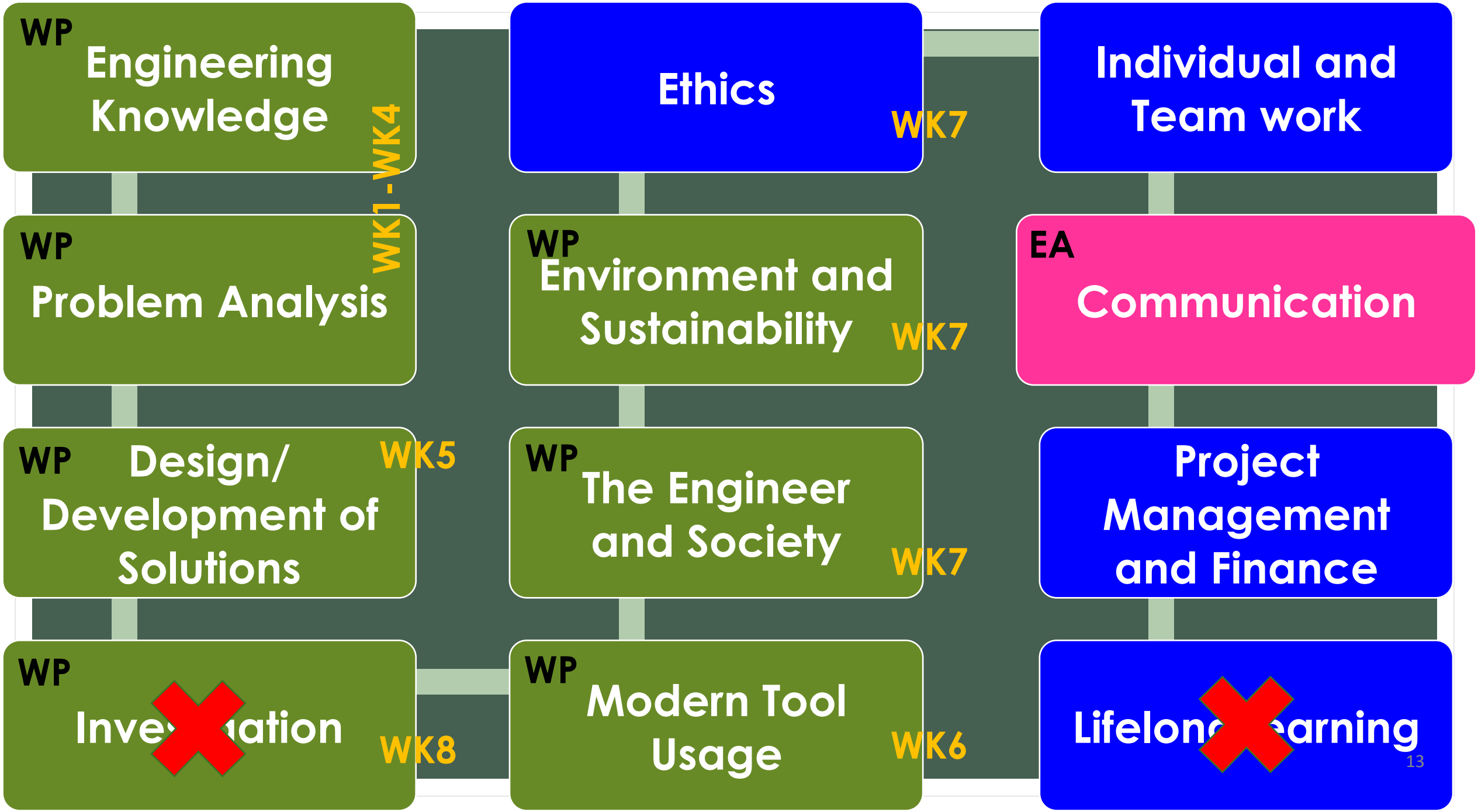
- Integrated Design Projects shall include the followings (p.16):

✓complex engineering problems and design systems,

✓components or processes integrating core areas,

✓meet specified needs with appropriate consideration for public health and safety, cultural, societal, project management, economy, and environmental considerations.

- Multifaceted assignment that serves as a **culminating academic and intellectual experience for students**, typically towards the end of an academic programme/learning pathway experience.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FYDP Elements	Graduate Attribute	WK	WP/ EA
Apply mathematics, natural science, engineering fundamentals and engineering specialization	**PO1** Engineering Knowledge	WK1, WK2, WK3, WK4	WP
Identify, formulate, research literature and analyse complex engineering problems reaching substantiated conclusions	**PO2** Problem Analysis	WK1, WK2, WK3, WK4	WP
Design solutions and design systems, components or processes with appropriate consideration for public health and safety, cultural, societal, and environmental considerations	**PO3** Design /Development of Solutions	WK5	WP
Utilise appropriate modern technology in some aspects of the work	**PO5** Modern Tool Usage	WK6	WP
Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice	**PO6** Engineer & Society	WK7	WP
Understand and evaluate the sustainability and impact of professional engineering work	**PO7** Environment & Sustainability	WK7	WP
Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice.	**PO8** Ethics	WK7	
Function effectively as an individual and as a member or leader in diverse teams and in multi-disciplinary setting	**PO9** Individual & Team Work	-	-
Communicate effectively with the engineering community and with society and able to comprehend, write, present, give and receive instructions	**PO10** Communication	-	EA
Demonstrate knowledge and understanding of engineering management principles and economic decision-making	**PO11** Project Mgmt & Finance	-	-

Design your FYDP curriculum

>5 PO?

ALL WK?

FY DESIGN PROJECT IDEAS

- societal
- sustainable
- cultural
- public health and safety
- environmental
- complexity
- design system
- integrating core areas
- engineering applications
- project management
- economy

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

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

WP = must have characteristic of WP1 and some or all of WP2 to WP7

- WP1 (KNOWLEDGE) - **in-depth engineering knowledge** at the level of one or more of WK3, WK4, WK5, WK6 or WK8 which allows a fundamental based, first principles analytical approach
- WP2 (CONFLICTING)- **wide-ranging or conflicting** technical, engineering and other issues
- WP3 (ANALYSIS) - **no obvious solution** and require abstract thinking, originality in analysis to formulate suitable models
- WP4 (FAMILIARITY) - **infrequently** encountered issues
- WP5 (CODES) - **outside problems** encompassed by **standards and codes of practice** for professional engineering
- WP6 (STAKEHOLDER) - **diverse** groups of stakeholders with **widely varying needs**
- WP7 (INTERDEPENDENCE) - **high level problems** including many component parts or **sub-problems**

EA = some or all of EA1 to EA5

- EA1 (RESOURCES) - involve the use of **diverse resources** (and for this purpose resources includes people, money, equipment, materials, information and technologies)
- EA2 (INTERACTION) - require resolution of **significant problems** arising from **interactions** between **wide-ranging or conflicting technical, engineering or other issues**
- EA3 (INNOVATION) - involve **creative use** of engineering principles and research-based knowledge in novel ways
- EA4 **(SOCIETY & ENV) -** have **significant consequences** in a range of contexts, characterized by difficulty of prediction and mitigation
- EA5 (FAMILIARITY) - can extend **beyond previous experiences** by applying principles-based approaches.

DESIGN FYDP SYLLABUS

	WP1 – MUST HAVE						WP2	WP3	WP4	WP5	WP6	WP7
	WK3	WK4	WK5	WK6	WK7	WK8						
PO1 (WK1-4)	X		X					X		X		
PO2 (WK1-4)	X	X					X	X				
PO3 (WK5)			X				X			X		
PO4 (WK8)		X				X		X				X
PO5 (WK6)		X		X					X	X		
PO6 (WK7)					X						X	X
PO7 (WK7)					X				X		X	
PO8 (WK7)					X							

WK5: engr design

WP5: CODES

address OEL?

WK6: engr practise

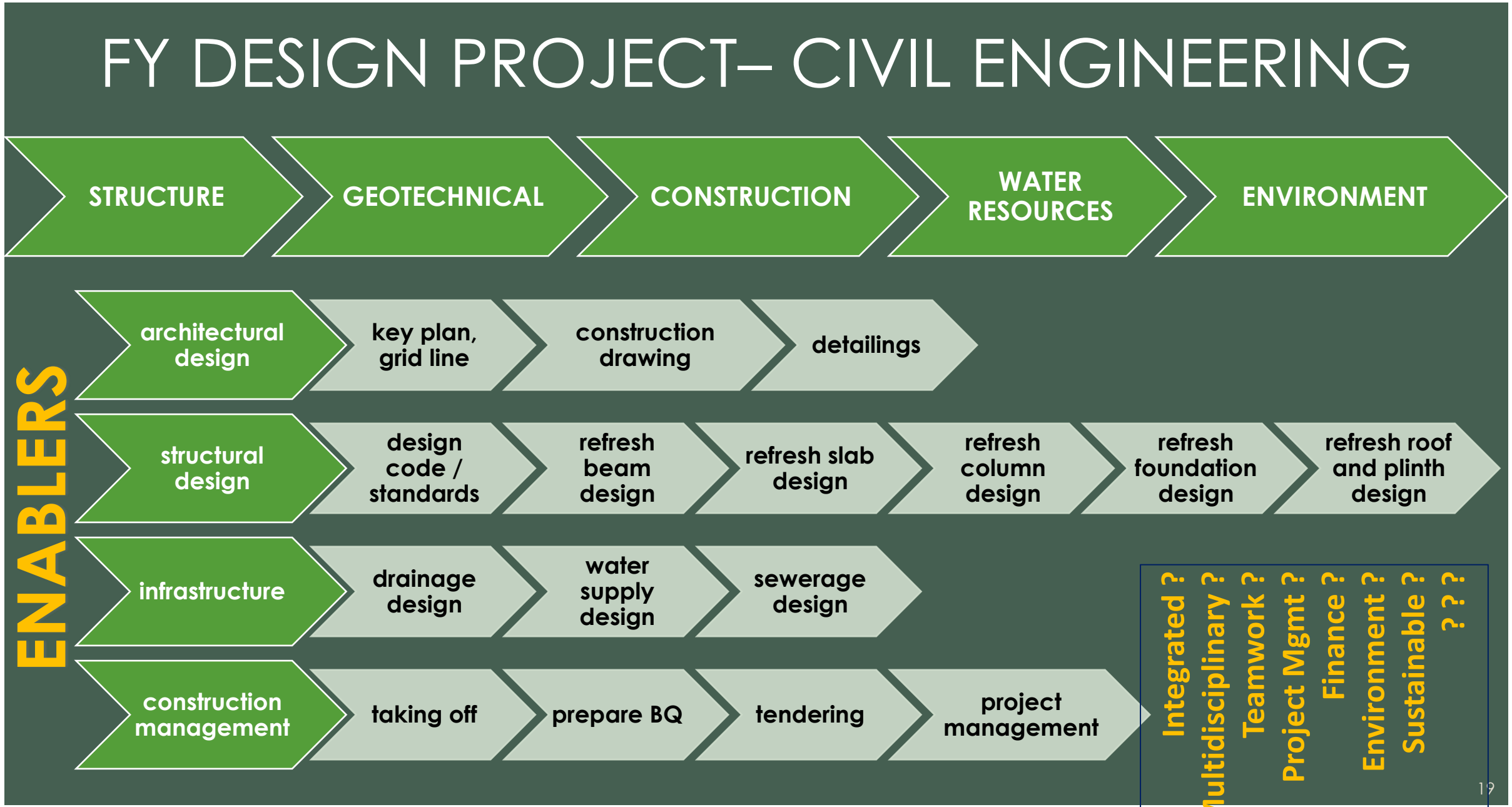
WP5: CODES

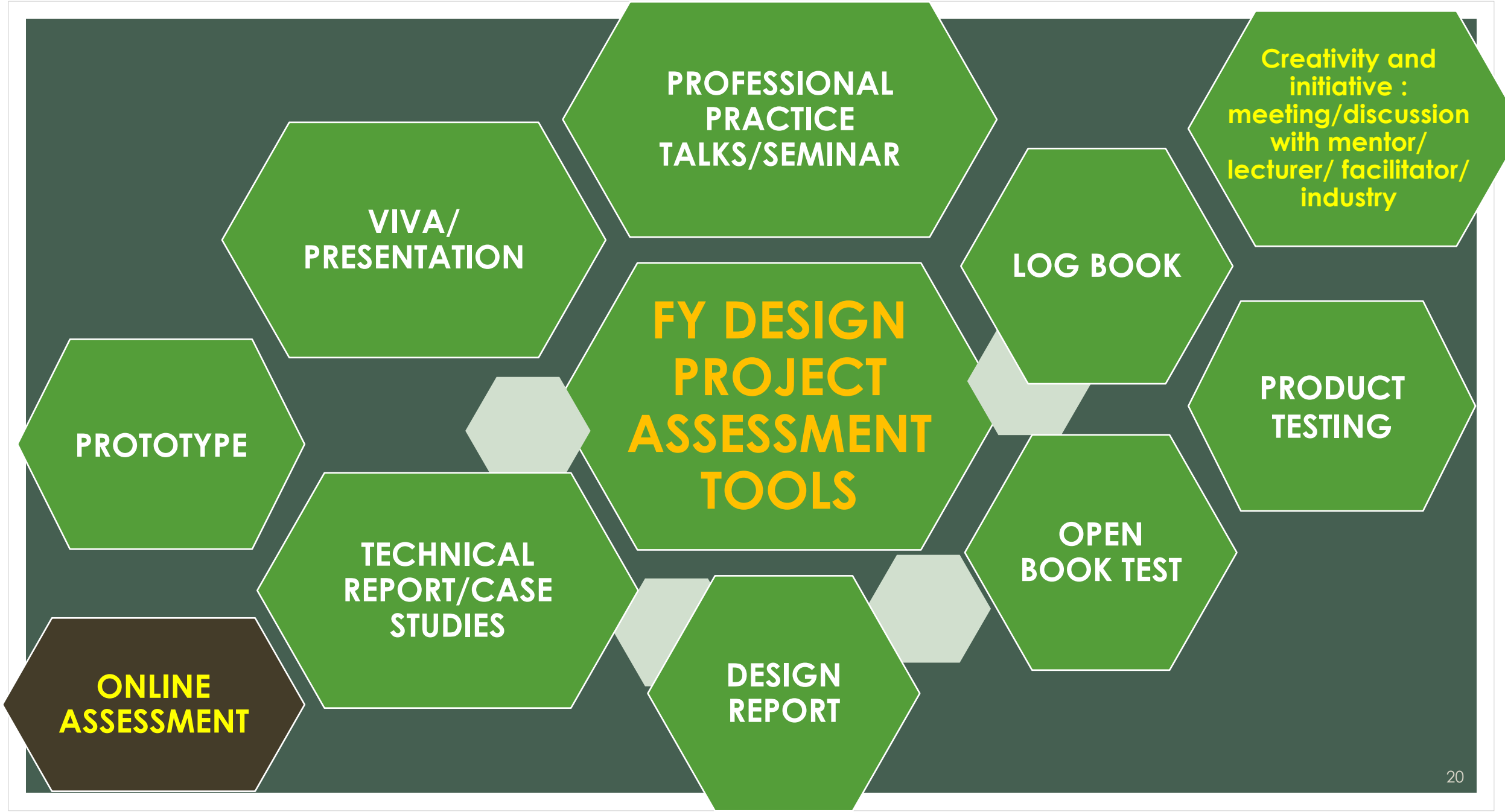
WK aligned to WP?

COMPUTER SIMULATION/SOFTWARE IN FYP (MODERN TOOLS)

	WP1 – MUST HAVE						WP2	WP3	WP4	WP5	WP6	WP7
	WK3	WK4	WK5	WK6	WK7	WK8						
PO4		X				X		X				X
PO5		X		X	WK6: engr practise		X	X	X	X	X	X
PO6	WK4: specialist knowledge				X					WP5: CODES	X	X
PO7					X				X		X	
PO8					X							
PO9												
PO10	COMPLEX ENGINEERING ACTIVITIES (EA1, EA2, EA3, EA, EA5)											
PO11												
PO12												

FY DESIGN PROJECT– CIVIL ENGINEERING




FY DESIGN PROJECT ASSESSMENT TOOLS
PROFESSIONAL PRACTICE TALKS/SEMINAR
Creativity and initiative : meeting/discussion with mentor/ lecturer/ facilitator/ industry
VIVA/ PRESENTATION
LOG BOOK
PROTOTYPE
PRODUCT TESTING
TECHNICAL REPORT/CASE STUDIES
OPEN BOOK TEST
ONLINE ASSESSMENT
DESIGN REPORT

FY DESIGN PROJECT ASSESSMENT TOOLS

MODERN TOOLS :

Design and drawing activities using common/specialised software available in the industry

TEAMWORK :

Clarification of roles and common understanding, functioning, leadership and performing

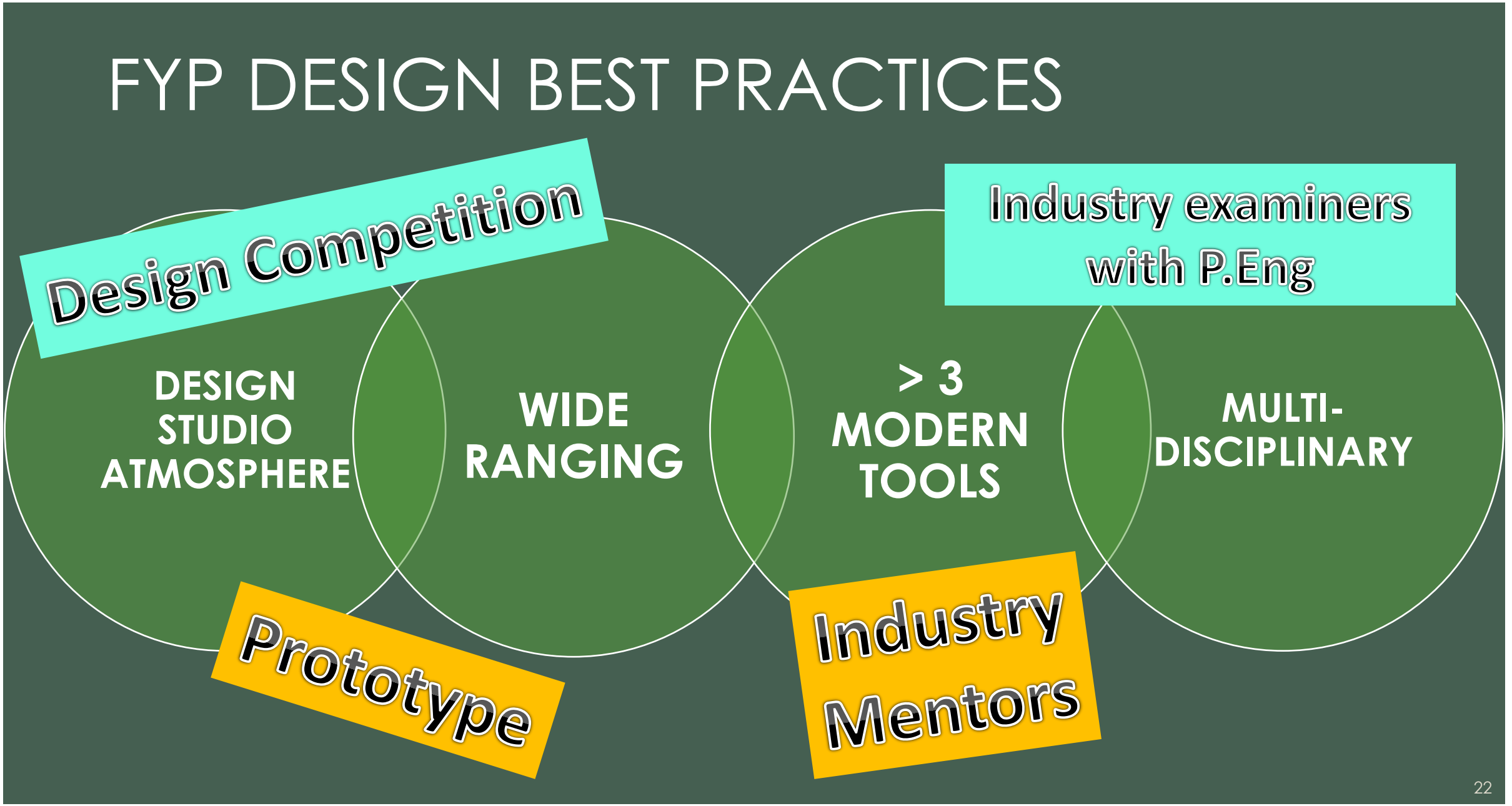
CONSULTATION :

Creativity and initiative in carrying out the DP activities, planning, scheduling, design progress, meeting/discussion with mentor/ lecturer/facilitator/industry

ETHICS & ENGINEER IN SOCIETY :

Implementation of Codes/Design Standards suitable to the society at large. Conduct optimises the local context, manage health and safety effectively.

FYP DESIGN BEST PRACTICES



Culminating Model ~ 12POs

"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 graduate from an accredited programme." (IEA, 2013)

Final Year Design Project

THE OBE PLANTING CYCLE

ACCULTURATION (2020-2030)

PLANTING AWARENESS (1999-2005)

IMPLEMENTATION (2006-2015)

OUTCOME EVIDENT (2016-2017)

HARVESTING (2018-2019)

CONTACT US

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