# CDIO Introductory Programme

Session 3

## Using the CDIO Syllabus in Educational Development

INTRODUCTION SESSIONS

Session 1: Impact and Benefits of CDIO Approach to Engineering Education

Session 2: Using the CDIO Standards in Education Development

**Session 3 : Using the CDIO Syllabus in Educational Development**

Session 4: CDIO Collaboration and Community

# Overview of the CDIO Introduction Sessions

## Day 1 (Monday)

**Session 1**

**Impact and Benefits of CDIO Approach to Engineering Education,** introduces the CDIO initiative, clarifying its purpose, scope, and key resources. Participants gain an overview of how CDIO can enhance programmes and student learning through practical examples and case studies.

## Day 1 (Monday)

**Session 2**

**Using the CDIO Standards in Education Development,** explores the CDIO Standards as a framework for curriculum design and evaluation. Participants learn to interpret and apply the standards to their teaching practices.

## Day 1 (Monday)

**Session 3**

**Using the CDIO Syllabus in Education Development,** focuses on the structure and application of the CDIO Syllabus in curriculum planning. Participants practise linking syllabus elements to teaching strategies and their own educational development initiatives.

## Day 3 (Wednesday)

**Session 4**

**CDIO Collaboration and Community,** highlights strategies for adopting CDIO, including implementation timelines and early success tips. Emphasises collaboration within the CDIO community and the benefits of shared practices and continuous development.

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INTRODUCTION SESSIONS

# Introductory Programme
## Objectives of Sessions

| Impact and Benefits of CDIO Approach to Engineering Education | Using the CDIO Standards in Education Development | Using the CDIO Syllabus in Education Development | CDIO Collaboration and Community |
|---|---|---|---|
| • Participants will be able to explain the overarching purpose of CDIO Initiative<br>• Participants will be able to describe how their programme and students might benefit from CDIO | • Participants will be able to explain the holistic nature and purpose of the CDIO Standards<br>• Participants will be able to interpret and apply the CDIO Standards<br>• Participants will be able to understand to what extent their current practice is similar to the CDIO Approach | • Participants will be able to explain the nature and purpose of the CDIO Syllabus<br>• Participants will be able to understand how the CDIO Syllabus is organised and can be applied<br>• Participants will be able to define connections between syllabus and their own educational development actions | • Participants will be able to describe the nature of collaborative activities in CDIO and the associated benefits<br>• Participants will be able to devise a broad timeline for their own adoption of CDIO |

# Workshop goals

After this workshop, you will be able to

1. Describe the nature and purpose of the CDIO Syllabus
2. Understand how the CDIO Syllabus is organised and can be applied
3. Use the CDIO Syllabus in practice
4. Connect the Syllabus to their own educational development actions

# Planning 90-minute workshop

| | |
|---|---|
| 5 min | Welcome |
| 10 min | Introduction to the CDIO Syllabus |
| 4 x 12,5 min | Exploring the CDIO Syllabus<br>Cherry picking exercise in groups |
| 20 min | Implications of CDIO syllabus-related changes in programme/course |
| 5 min | Wrap-up |

# What is the CDIO syllabus for?

# The CDIO Syllabus 3.0!

## Cherry-picking futureproof learning objectives

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INTRODUCTION SESSIONS

# The Agility of CDIO

CDIO continuously develops as idea, framework, and community – the syllabus as well!

# Syllabus 3.0

Box 4:

CONCEIVING, DESIGNING, IMPLEMENTING AND OPERATING SYSTEMS IN THE ENTERPRISE, SOCIETAL AND ENVIRONMENTAL CONTEXT – THE INNOVATION PROCESS

| Box 1: | Box 2: | Box 3: |
| --- | --- | --- |
| FUNDAMENTAL KNOWLEDGE AND REASONING | PERSONAL AND PROFESSIONAL SKILLS AND ATTRIBUTES | INTERPERSONAL SKILLS |

Box 5:

LEADERSHIP, ENTREPRENEURSHIP AND RESEARCH

# Standards that have to do with the Syllabus

**Standard 1 — The Context***

Adoption of the principle that product, process, and system lifecycle development and deployment - Conceiving, Designing, Implementing and Operating - are the context for engineering education

## Standard 2 — Learning Outcomes

**Specific, detailed learning outcomes for personal and interpersonal skills, and product, process, and system building skills, as well as disciplinary knowledge, consistent with program goals and validated by program stakeholders**

**Standard 3 — Integrated Curriculum**

A curriculum designed with mutually supporting disciplinary courses, with an explicit plan to integrate personal and interpersonal skills, and product, process, and system building skills

# Standards that have to do with the Syllabus

**Standard 8 — Active Learning**

Teaching and learning based on active experiential learning methods

**Standard 10 — Enhancement of Faculty Teaching Competence**

Actions that enhance faculty competence in providing integrated learning experiences, in using active experiential learning methods, and in assessing student learning

**Standard 11 — Learning Assessment**

Assessment of student learning in personal and interpersonal skills, and product, process, and system building skills, as well as in disciplinary knowledge

# An example of working with the CDIO Syllabus

## Bachelor-programme in Industrial Design Engineering

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## Transformative co-created curriculum innovation

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# Connections between the IDE Competencies and the CDIO Syllabus


| IDE / CDIO | Do Research | Design/Engineer | Organise/Manage | Communicate | Learn |
|---|---|---|---|---|---|
| **1DISCIPLINARY KNOWLEDGE AND REASONING**<br>1.1 KNOWLEDGE OF UNDERLYING MATHEMATICS AND SCIENCES<br>1.2 CORE ENGINEERING FUNDAMENTAL KNOWLEDGE<br>1.3 ADVANCED ENGINEERING FUNDAMENTAL KNOWLEDGE, METHODS AND TOOLS | | | | | |
| **2 PERSONAL AND PROFESSIONAL SKILLS AND ATTRIBUTES** | Do Research | Design/Engineer | Organise/Manage | Communicate | Learn |
| 2.1 ANALYTICAL REASONING AND PROBLEM SOLVING | | | | | |
| 2.2 EXPERIMENTATION, INVESTIGATION AND KNOWLEDGE DISCOVERY | | | | | |
| 2.3 SYSTEM THINKING | | | | | |
| 2.4 ATTITUDES, THOUGHT AND LEARNING | | | | | |
| 2.5 ETHICS, EQUITY AND OTHER RESPONSIBILITY | | | | | |
| **3 INTERPERSONAL SKILLS: TEAMWORK AND COMMUNICATION** | Do Research | Design/Engineer | Organise/Manage | Communicate | Learn |
| 3.1 TEAMWORK | | | | | |
| 3.2 COMMUNICATIONS | | | | | |
| 3.3 COMMUNICATIONS IN FOREIGN LANGUAGES | | | | | |
| **4 CDIO IN THE ENTERPRISE, SOCIETAL AND ENVIRONMENTAL CONTEXT – THE INNOVATION PROCESS** | Do Research | Design/Engineer | Organise/Manage | Communicate | Learn |
| 4.1 EXTERNAL, SOCIETAL, AND ENVIRONMENTAL CONTEXT | | | | | |
| 4.2 ENTERPRISE AND BUSINESS CONTEXT | | | | | |
| 4.3 CONCEIVING | | | | | |
| 4.4 DESIGNING | | | | | |
| 4.5 IMPLEMENTING | | | | | |
| 4.6 OPERATING | | | | | |
| 4.7 LEADING ENGINEERING ENDEAVORS | | | | | |
| 4.8 ENTREPRENEURSHIP | | | | | |

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# Translation to the Assessment Rubric

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| | | | |
|---|---|---|---|
| 3.2. Collaborate within a design team in a multidisciplinary (international) setting | Student actively participates in group work and shares constructive feedback with team members. | Student collaborates with team members from the perspective of a co-established specific role adapting to the feedback loops within the team. | Student iteratively evaluates multiple team roles and dynamics, and initiates and applies new strategies where and when needed. |
| Result | G P F | G P F | G P F |
| 3.3. Show resourcefulness, flexibility and willingness to make decisions in fuzzy (complex) contexts | Student lists possible uncertainties and suggests argumented decisions on how to deal with these . | Student follows decisions made earlier in the design process and integrates new decision making in the next steps. | *Frozen till graduation* |
| Result | G P F | G P F | G P F |
| 3.4. Show entrepreneurship or intrapreneurship | Student outlines entrepreneurial components to the design project. | Student applies intra- or entrepreneurial skills in the design process. | Student formulates and integrates criteria for intra- or entrepreneurial aspects in a design process. |
| Result | G P F | G P F | G P F |
| 3.5. Practice project, stakeholder, time and resource management | Student plans a first year project, lists the activities and modifies the planning to available resources, stakeholder availability, and unforeseen events during the process. | Student applies and modifies a project planning and explains the adjustments made, which are based on challenges and needs of the project. | Student designs and integrates a project planning and prioritises activities based on stakeholder opportunities, demands and (financial) resources. |
| Result | G P F | G P F | G P F |
| 3.6. Break down and model systems and select relevant approaches | Student labels relevant components of a system and explains the interrelations and applications. | Student models a system and its relevant components and applies the proper application of the components and system. | Student evaluates his/her model of a system with relevant arguments and defends the chosen approach towards the application of components and the system. |

# Flexible and dynamic courses including student-owned assessment


# Activity 1: Exploring the CDIO Syllabus

**Use the Introduction session handbook**

1. You are divided in groups over 4 stations: Box 2, 3, 4 and 5
2. First, reflect individually from your context (your engineering programme or course):
    1. Which 2-3 items in this Box do you think become important for students in the near future to learn?
    2. Which of these do you already teach?
    3. Which items would you like to add to your programme/course design?
3. Then, discuss your findings with each other in the group
4. You change box after 12,5 minutes; a signal will be given. Repeat 4 times.

# Activity 2: Implications of CDIO syllabus-related changes in your programme/course

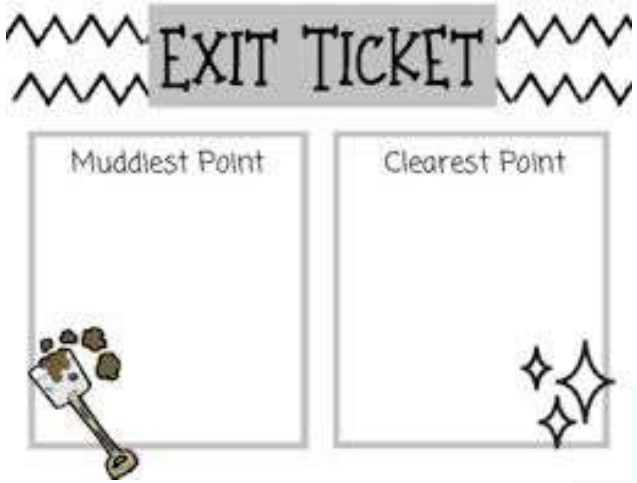
Discuss, considering the items you discussed in Activity 1 that you wanted to add to the programme/course design, what implications would this have on:

- The course content
- The pedagogy used
- The learning environment (physical, digital, social)
- Faculty development

# Wrap-up

After this workshop, you will be able to

1. Describe the nature and purpose of the CDIO Syllabus
2. Understand how the CDIO Syllabus is organised and can be applied
3. Use the CDIO Syllabus in practice
4. Connect the Syllabus to their own educational development actions



# Muddy cards –

## Please give us feedback on today's session

On a GREEN post-it….

Write down the most valuable thing you gained from today's session.

On a YELLOW post-it….

Write down the thing that could be improved in the session.

Stick them on the wall on the way out.

# Thank you!

**Next session:**

**Session 4: CDIO Collaboration and Community**