



Elements of a professional framework for technology development and innovation

CAST INTERNATIONAL FORUM

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Engineer your career • Improve our society

An engineer's career is never straightforward, but their professional development should be.



Importance of Professional Development

Due to the speed of technological progress and advancements, it is more important than ever that engineers are constantly learning and professionally developing themselves. This includes:

- The theoretical knowledge of new and advancing technology in their workfields and others'
- New applications, methods, processes, and systems
- Sustainability and ethics
- Development of professional skills as well as technical knowledge.

Learning and opportunities to learn do not stop at graduation, but the structure for learning does.

CHALLENGES (1/2)

What are today's challenges in the engineering sector?

- very rapid technology development
- increasing multi-faceted problems that need a multi-disciplinary approach
- complex projects requiring strong leadership, excellent project management and quality control
- issues with safety, sustainability and professional ethics

CHALLENGES (2/2)

What are today's challenges in the engineering sector?

- In all technical sectors transformations are taking place, in terms of knowledge, issues and roles
- young professionals have difficulty in acquiring the skillset to grow to more senior positions
- current pool of engineers may (partially) not have the desired skill set that is needed to take on current and future ambitions; this may be the case both on company level as well as on national level

PROFESSIONAL FRAMEWORK

competence based

- To help deal with the challenges
- and foster technology development and innovation
- from 3 perspectives:
 - **Personal:** the individual engineer
 - **Industry:** advancement for individual companies and for sectors as a whole (e.g. building, infrastructure, mobility, high tech, process industry etc.)
 - **Society:** to serve the public and the public interest

ADVANTAGES OF FRAMEWORK

- Support through different career stages, jobs, companies and roles.
- Advancement of technical knowledge while broadening professional skills.
- Engineers can identify areas that they are strong in or may need more development. Therefore they can set goals and advance quicker.
- More focussed learning
- Promotes innovation and creativity
- Gives context to both formal and non-formal learning, across multiple disciplines
- Company and industry benefits by giving alignment on strategy

PROFESSIONAL FRAMEWORK

competence based

Focus on the requirements necessary

to sustain engineers who serve our
societies

and are excellent, innovative, uphold
high

ethical standards and a sustainable
development

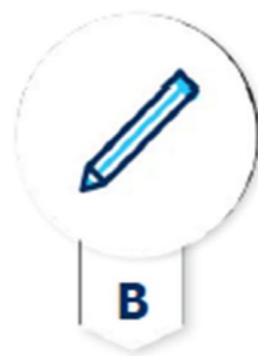
COMPETENCE AREAS

KIVI's 5 core competence areas.



Knowledge & understanding of Engineering

Focuses on your engineering knowledge and technical language.

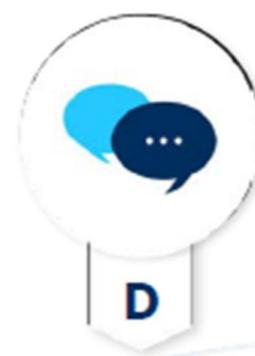


Design & development of processes, systems, services or products



Leadership, responsibility & management

Focuses on other professional and soft skills.



Communication & interpersonal skills



Professional commitment

COMPETENCES

These 5 core-competence areas are broken down into 18 sub-competencies.

 COMPETENCE A	 COMPETENCE B	 COMPETENCE C	 COMPETENCE D	 COMPETENCE E
<p>Knowledge and understanding of engineering</p>	<p>Design, develop and create innovative products, systems, processes or services</p>	<p>Leadership, responsibility & management</p>	<p>Stakeholders, communication & interpersonal skills</p>	<p>Professional commitment</p>
<p>A1: Extend your theoretical knowledge of new and advancing technology.</p> <p>A2: Contribute to the development of the theory of engineering technology.</p>	<p>B1: Identify potential projects and opportunities.</p> <p>B2: Conduct appropriate research, and undertake design and development of new and creative engineering solutions.</p> <p>B3: Manage implementation of design solutions, and evaluate their effectiveness.</p> <p>B4: Exercise sound judgement when stakes are conflicting or knowledge is incomplete.</p>	<p>C1: Plan for effective project implementation.</p> <p>C2: Budget, organise, direct and control tasks, people and resources.</p> <p>C3: Lead teams and develop staff to meet changing technical and managerial needs.</p> <p>C4: Bring about continuous improvement through quality management.</p> <p>C5: Be a leader within your work field and society.</p>	<p>D1: Identify all stakeholders and communicate with others at all levels.</p> <p>D2: Present and discuss proposals.</p> <p>D3: Demonstrate personal and social skills, including the ability to work in teams.</p>	<p>E1: Demonstrate ethical behaviour and comply with relevant legal and regulatory requirements.</p> <p>E2: Design, manage and apply safe systems of work.</p> <p>E3: Undertake engineering activities in a way that contributes to sustainable development and a circular economy.</p> <p>E4: Demonstrate your development strategy and how you plan to carry out and record CPD in order to maintain and enhance all competences A-E.</p>

PROFESSIONAL REGISTRATION

THE CHARTERED ENGINEER STANDARD

KIVI offers two professional titles:



Chartered Engineer (CEng)



Incorporated Engineer (IEng)

Provides an internationally recognised qualification, based on a high quality standard and commitment to ethics and to continuous professional development.

- Degree required
- Minimum 5 years work experience
- Portfolio assessment
- 90 minute Professional Review Interview
- Mandatory CPD

<https://www.kivi.nl/chartered>



Chartership pins

CONTINUOUS PROFESSIONAL DEVELOPMENT

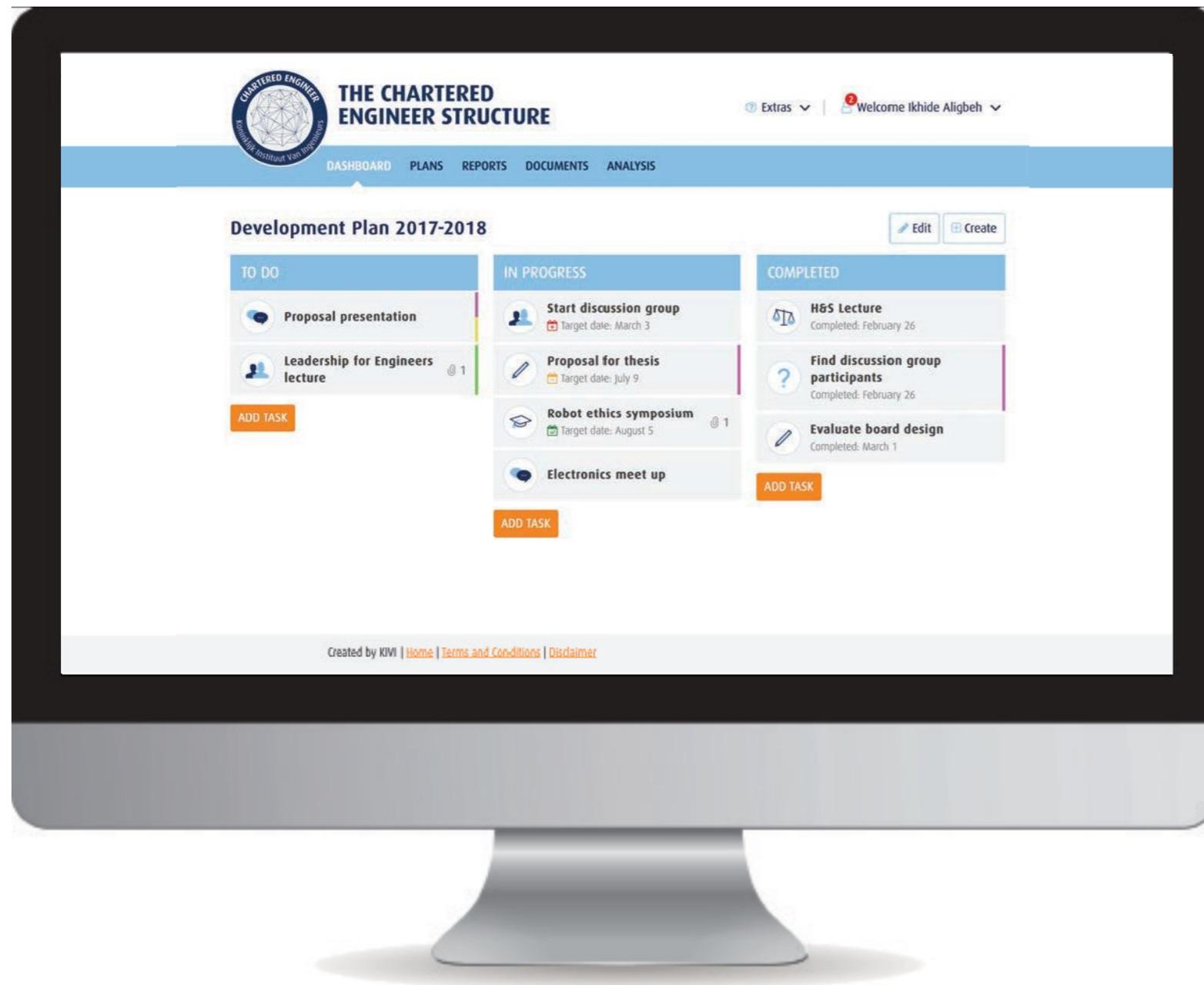
we take a broader perspective

- Formal education and courses through university and research institutions
- Non-formal learning at company
- Industry-academia research projects
- Peer-to-peer interaction within and outside sector
- Coaching of young engineers and students

The Professional framework assures that development is coherent, holistic and well-rounded

Key aim is to pursue excellence and innovation on a personal, company and industry level, and improve society

THE ONLINE PROFESSIONAL DEVELOPMENT TOOL (OPD)

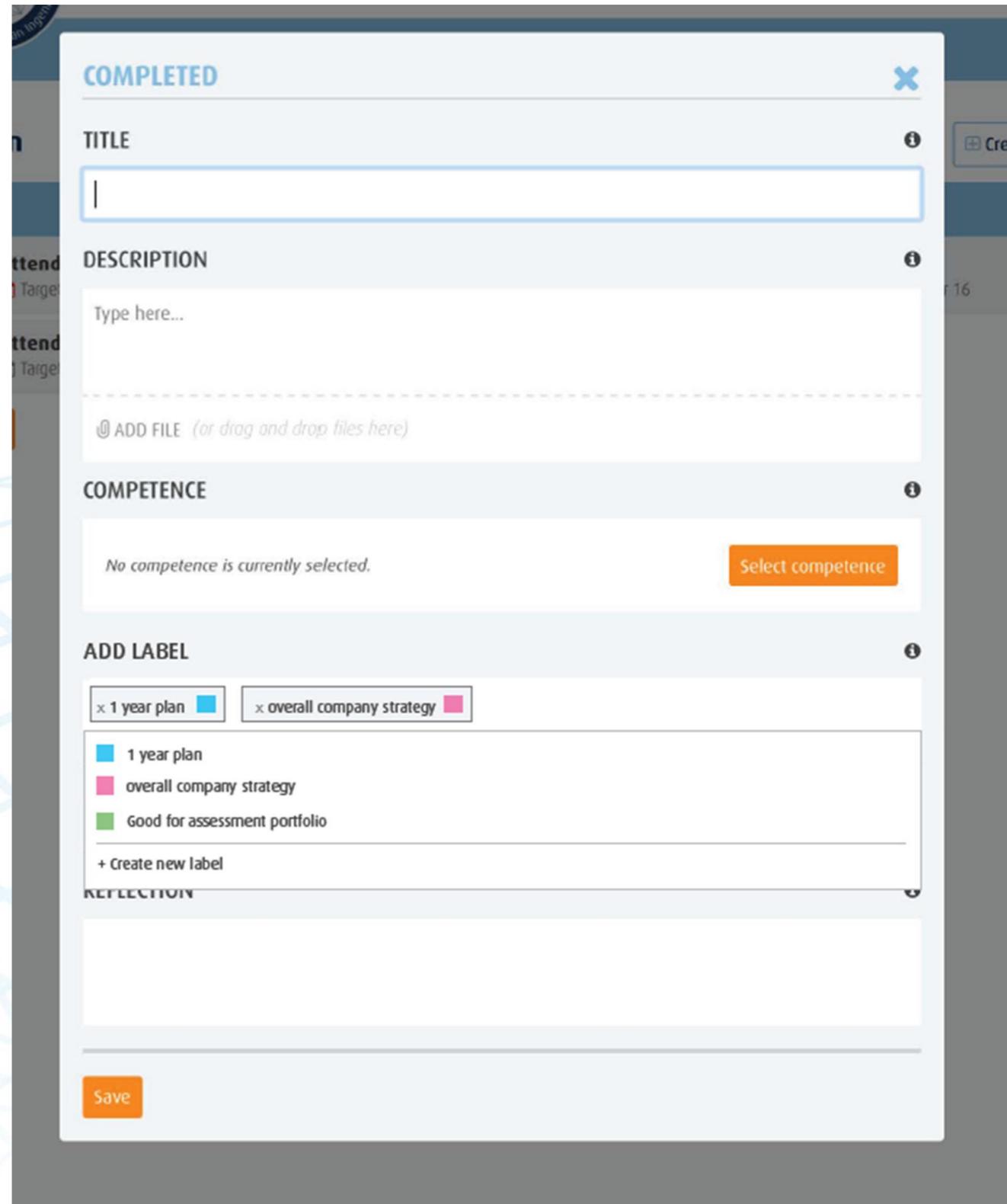


MAIN FUNCTIONS:

- Professional Planning
- Analysis and Strategy
- Portfolio Development
- Reports for yourself, mentors and employers
- Professional Registration
- CPD Tracking

PLAN STRUCTURE

Supports competence based
reflective learning
and align personal goals
with company strategy



The screenshot shows a 'COMPLETED' modal form with the following sections:

- TITLE:** A text input field.
- DESCRIPTION:** A text area with a placeholder 'Type here...' and an 'ADD FILE' button with the text '(or drag and drop files here)'.
- COMPETENCE:** A section with the text 'No competence is currently selected.' and a 'Select competence' button.
- ADD LABEL:** A section with two selected labels: '1 year plan' (blue square) and 'overall company strategy' (pink square). Below them is a list of other labels: '1 year plan', 'overall company strategy', and 'Good for assessment portfolio'. A '+ Create new label' button is at the bottom.
- REFLECTION:** A large empty text area.
- Save:** An orange button at the bottom left.

REPORTING AND ANALYSIS



ZELFBEORDELING 2017

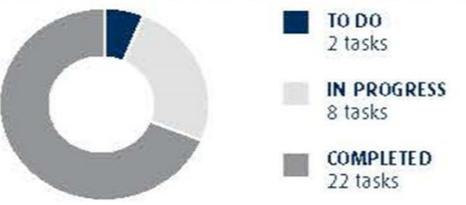
Isaac Aliqbeh
2 April 2018



DETAILS

Plans Development plan 2017 Project Bridge	Labels No labels
Competence C,D,E	Dates All dates
Status To do In progress	

TASKS

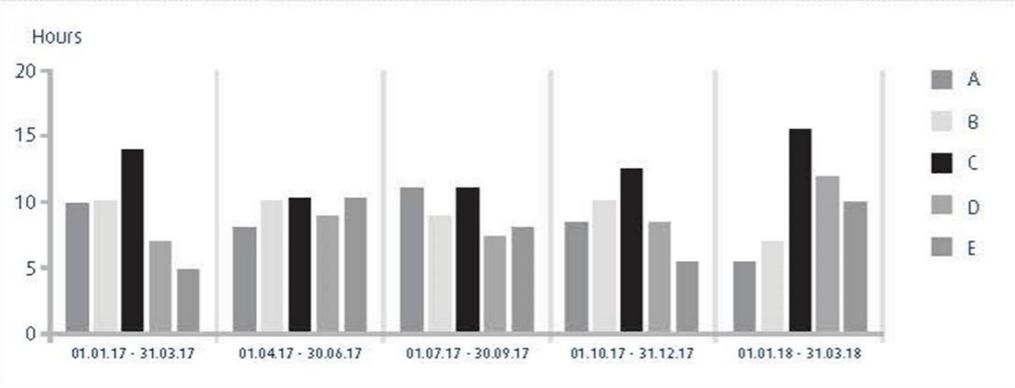


- TO DO**
2 tasks
- IN PROGRESS**
8 tasks
- COMPLETED**
22 tasks

COMPETENCE AREAS

Area	Hours	Tasks
A: Knowledge and understanding of engineering	50	9
B: Design, develop and create products, systems, processes or services	25	3
C: Leadership, responsibility & management	25	6
D: Communication & interpersonal skills	12	5
E: Professional commitment	20	6
TOTAL:	132	29
Not attributed:	0	1

TRACK COMPETENCE OVER TIME



Time Period	A	B	C	D	E
01.01.17 - 31.03.17	10	10	14	7	5
01.04.17 - 30.06.17	8	10	10	9	10
01.07.17 - 30.09.17	11	9	11	8	8
01.10.17 - 31.12.17	8	10	12	8	5
01.01.18 - 31.03.18	5	7	15	12	10



THE CHARTERED ENGINEER STRUCTURE

Extra's | Welcome Ikhide Aliqbeh

DASHBOARD PLANS REPORTS DOCUMENTS ANALYSIS

Development Strategy and Analysis

Select advanced plan

COMPETENCE AREA HOURS

Competence Area	Done	To Go
Competence A	0	15
Competence B	0	15
Competence C	0	10
Competence D	0	10
Competence E	0	15

LABELS

Bridge projects	4/12 HOURS
Bridge projects	4/12 HOURS
Bridge projects	4/12 HOURS

TRACK COMPETENCE OVER TIME

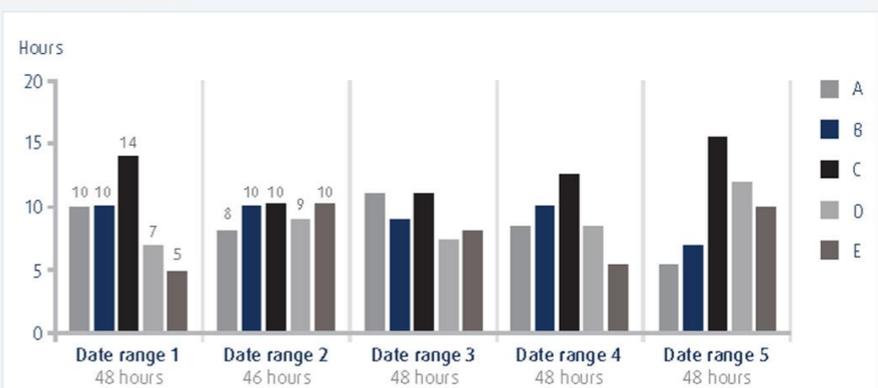
- All advanced plans -

Date range: From To Date range: From To

Date range: From To Date range: From To

+ Add Date range (5 maximum)

Generate graph



Date Range	A	B	C	D	E
Date range 1 (48 hours)	10	10	14	7	5
Date range 2 (46 hours)	8	10	10	9	10
Date range 3 (48 hours)	11	9	11	8	8
Date range 4 (48 hours)	8	10	12	8	5
Date range 5 (48 hours)	5	7	15	12	10

ASSESSMENT PROCESS



THE CHARTERED ENGINEER STRUCTURE

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- DASHBOARD**
- MY PORTFOLIO
- MY PLANS
- REPORTS
- DOCUMENTS
- MY CV

Portfolio progress

COMPETENCE A	COMPETENCE B	COMPETENCE C	COMPETENCE D	COMPETENCE E
 <p>33%</p> <p>Knowledge and understanding of engineering</p>	 <p>0%</p> <p>Design, develop, and create products, systems, processes and services</p>	 <p>80%</p> <p>Leadership, responsibility and management</p>	 <p>66%</p> <p>Communication and interpersonal skills</p>	 <p>25%</p> <p>Professional commitment</p>
A1: IN PROGRESS	B1: TO DO	C1: COMPLETED ✓	D1: COMPLETED ✓	E1: COMPLETED ✓
A2: COMPLETED ✓	B2: IN PROGRESS	C2: IN PROGRESS	D2: COMPLETED ✓	E2: TO DO
A3: IN PROGRESS	B3: TO DO	C3: COMPLETED ✓	D3: TO DO	E3: TO DO
	B4: TO DO	C4: COMPLETED ✓		E4: TO DO
		C5: COMPLETED ✓		

PLANNING AND CPD TRACKING



THE CHARTERED ENGINEER STRUCTURE

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[DASHBOARD](#) [CPD POINTS](#) [MY PLANS](#) [REPORTS](#) [DOCUMENTS](#)

CPD Record

MARCH 2017-MARCH 2019

[Generate report](#)

TO DO	IN PROGRESS	COMPLETED
<p> Labore et dolore magna aliqua</p>	<p> Consectetur adipiscing elit</p>	<p> At vero eos et accusamus Completed: October 07</p>
<p> Ut enim ad minim veniam</p>	<p> Sed do eiusmod tempor incididunt</p>	<p> Lorem Ipsum Completed: October 07</p>
<p> Sed ut perspiciatis</p>	<p>ADD TASK</p>	<p> Temporibus autem quibusdam Completed: October 07</p>
<p>ADD TASK</p>		<p> Dolor sit amet Completed: October 07</p>
		<p>ADD TASK</p>

Competence points

8/100 POINTS

Competence Area	Done	To Go
	2	38
	0	10
	3	7
	3	12

THE OPD AND COMMUNITY

Since launching the OPD Tool:

Government

- Has requested the OPD Tool to be used across multiple sectors.

Industry

- Companies using the professional competences and the OPD Tool as a professional development path for their employees.
- Industry sectors using the professional competences and the OPD Tool for the advancement of the sector and the competence of their engineers.

Universities

- Students using the OPD Tool to prepare them for professional practice.
- Competence and outcome-based approach being incorporated into curriculum.

KEY ELEMENTS TO INNOVATION AND SUCCESS

- an eco-system between engineers from companies, government, with academia and students also involved;
- a framework for the continued learning path from students to professionals throughout their career, supporting all different roles and career stages;
- recognition to those who meet and keep a high professional standard through formal professional titles;
- an online support system to support individual learning and development as well as the overall process and structure;

MUTUAL RECOGNITION

- High end professional development framework
- with codified professional titles
- And a robust process in line with today's digitization needs
- With analysis and reporting output
- Involving industry, government and academia
- Is an excellent base for mutual recognition between different countries

An engineer's career is never straightforward, but their professional development should be.

