International Network of
Women Engineers & Scientists

WFEO/FMOI

World Federation of
Engineering Organizations

Changes to the GAPC Framework and implications for Diversity and Inclusion and Industry 4.0

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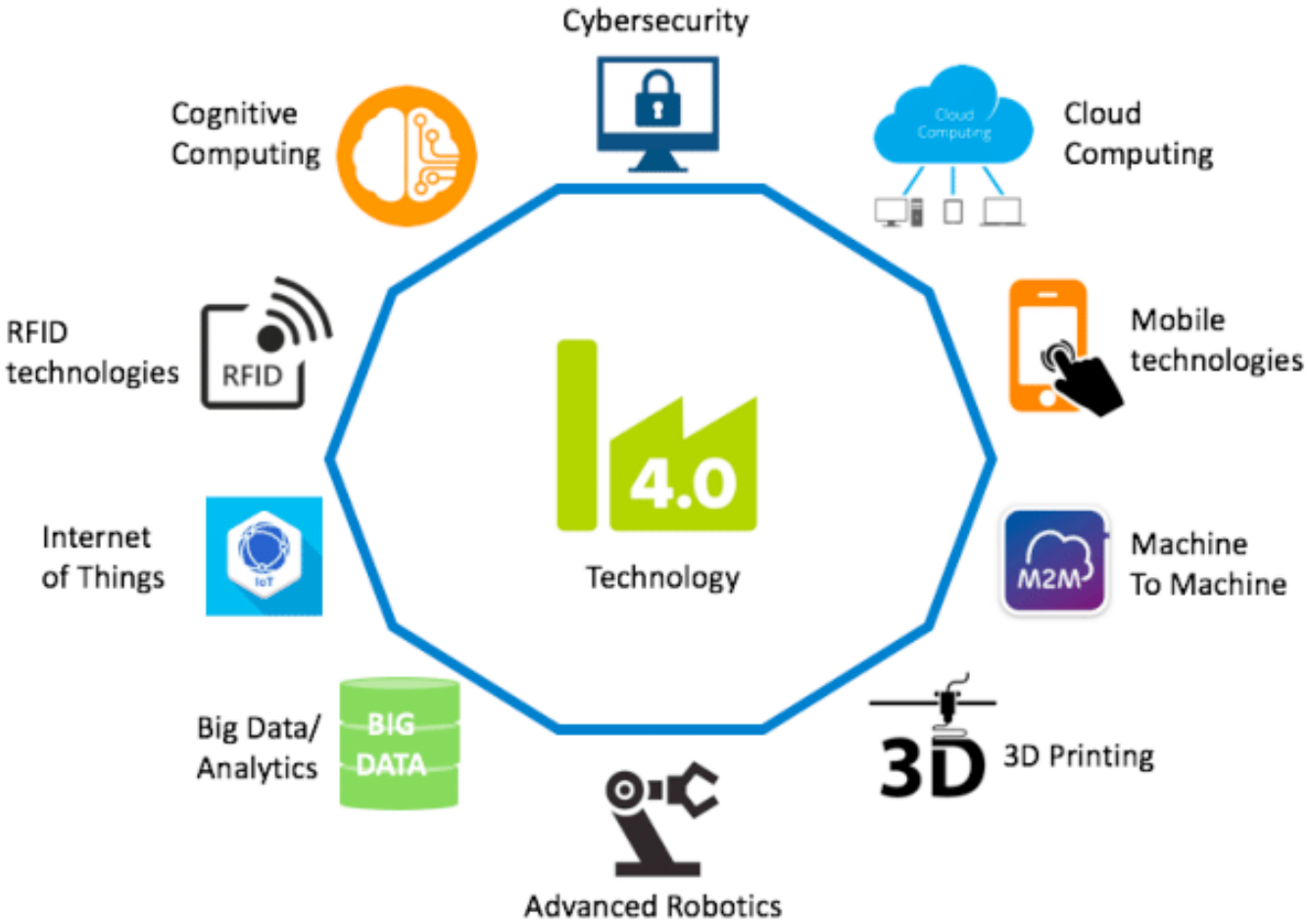
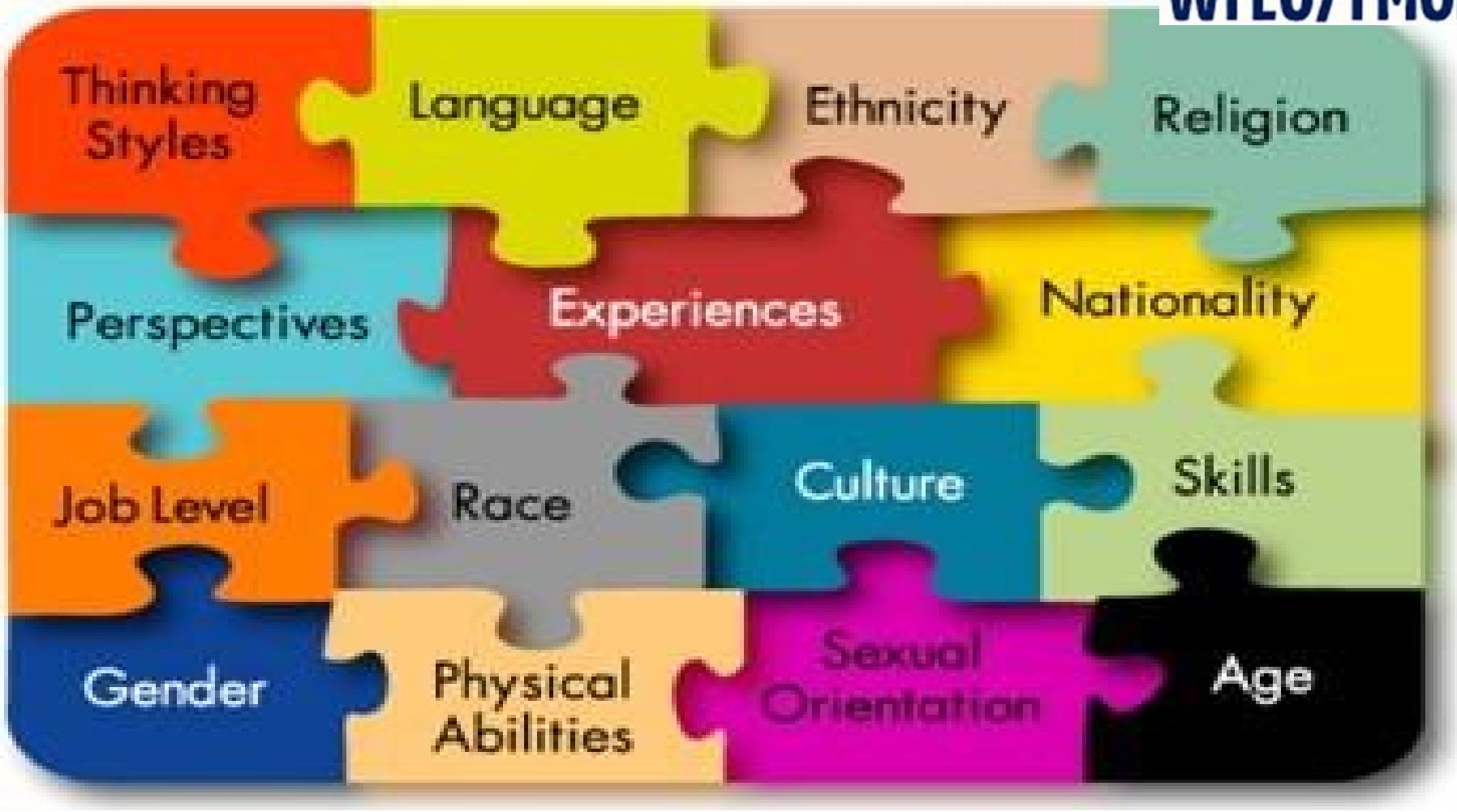
Industry 4.0 - Technological pillars



Diversity and Inclusion



5 REASONS WHY YOU SHOULD CONSIDER DIVERSITY AND INCLUSION

1

COMPANY BRAND AND REPUTATION BOOST

3

LOWER RATE OF EMPLOYEE TURNOVER

5

AN INCREASE IN PROFIT AND REVENUE

YOUR EMPLOYEES BECOME MORE ENGAGED

2

4

A MYRIAD OF VARYING PERSPECTIVES

bgc

Proposed changes to the IEA Graduate Attributes and Professional Competencies Framework

- The main changes cover the areas identified in preliminary research and a survey of IEA Signatories during December 2019 and January 2020. The six main areas identified were:
- **1. Accommodate future needs of engineering professionals and the profession** – strengthen the required attributes on team work, communication, ethics, sustainability.
- **2. Emerging technologies** – incorporate digital learning, active work experience, lifelong learning.
- **3. Emerging and future engineering disciplines and practice areas** – while retaining discipline independent approach, enhance the skills on data sciences, other sciences, life-long learning.
- **4. Incorporate UN Sustainable Goals** - in the development of solutions that consider diverse impacts – technical, environment, social, cultural, economic, financial and global responsibility
- **5. Diversity and Inclusion** – include these considerations within ways of working in teams, communication, compliance, environment, legal etc. systems.
- **6. Intellectual agility, creativity and innovation** – emphasize critical thinking and innovative processes in design and development of solutions

Diversity and Inclusion

Table 3 Knowledge and Attitude profile

A Washington Accord programme provides:	**A Sydney Accord programme** provides:	**A Dublin Accord programme** provides:	**Reason fo ange**
WK1: A systematic, theory-based understanding of the **natural sciences** applicable to the discipline and awareness of the relevant **social sciences**	**SK1:** A systematic, theory-based understanding of the **natural sciences** applicable to the sub-discipline and awareness for the relevant **social sciences**	**DK1:** A descriptive, formula-based understanding of the **natural sciences** applicable in a sub-discipline and awareness for the relevant **social sciences**	Curriculum may contain appropriate i) basic natural science courses and ii) some social science courses relevant to the discipline. Alternatively, in place of ii), some student experience (e.g., annexed to capstone design) that require inputs from social sciences relevant to that experience may be required.
WK2: Conceptually-based **mathematics**, numerical and **data analysis**, statistics and formal aspects of computer and information science to support analysis and modelling applicable to the discipline	**SK2:** Conceptually-based **mathematics**, numerical and **data analysis**, statistics and aspects of computer and information science to support analysis and use of models applicable to the sub-discipline	**DK2:** Procedural **mathematics**, numerical analysis, statistics applicable in a sub-discipline	Curriculum may contain appropriate mathematics, data analysis, numerical analysis, and statistics/probability courses along with computation and information theory experiences using contemporary tools.
WK3: A systematic, theory-based formulation of **engineering fundamentals** required in the engineering discipline	**SK3:** A systematic, theory-based formulation of **engineering fundamentals** required in an accepted sub-discipline	**DK3:** A coherent procedural formulation of **engineering fundamentals** required in an accepted sub-discipline	Curriculum must contain basic engineering courses of the discipline, such as material science, fluid mechanics, heat transfer, dynamics, circuits, and so on
WK4: 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.	**SK4:** Engineering **specialist knowledge** that provides theoretical frameworks and bodies of knowledge for an accepted sub-discipline	**DK4:** Engineering **specialist knowledge** that provides the body of knowledge for an accepted sub-discipline	Curriculum must contain appropriate contemporary courses

IR4.0

A Washington Accord programme provides:	**A Sydney Accord programme** provides:	**A Dublin Accord programme** provides:	**Reason for change**
WK5: Knowledge of efficient resource use, minimum waste and environmental impacts, whole-life cost ,resource re-use, net zero carbon and the like that supports **engineering design** in a practice area.	**SK5:** Knowledge of efficient resource use, minimum waste, whole-life cost net zero carbon and the like that supports **engineering design** using the technologies of a practice area.	**DK5:** Knowledge of efficient resource use, minimum waste, whole-life cost net zero carbon and the like that supports **engineering design** based on the techniques and procedures of a practice Area	Each design experience of the students need be taking the relevant considerations at the interface with other domains (science, law, art, humanities) into account and sustainability concepts including SDG12. Additionally, the curriculum may include specific teachings on the supporting factors of design
WK6: Knowledge of **engineering practice** (technology) in the practice areas in the engineering discipline	**SK6:** Knowledge of **engineering technologies** applicable in the sub-discipline	**DK6:** Codified **practical engineering knowledge** in recognised practice area. IR4.0	The curriculum need to transcend the theory and include teachings on the current technology and contemporary practice and thinking
WK7: 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 and benefits to advance the UN Sustainable Development Goals for economic, environmental and social benefits for all ~~cultural, environmental and sustainability~~	**SK7: Comprehension of** the role of technology in society and identified issues in applying engineering technology: ~~ethics and~~ impacts: ~~economic, social, environmental and sustainability~~ of the technology in the context of UN Sustainable Development Goals	approaches in engineering technician practice: ~~ethics,~~ financial, cultural, environmental and sustainability impacts in the context of UN Sustainable Development Goals Diversity and Inclusion	All student experiences of the curriculum need to be realized within the context that engineering has a responsibility to society. Every major design activity in the curriculum requires an integrated approach that takes into account impacts on people, the environment, economic, social, cultural, resource and other impacts as articulated in the UN SDGs.
WK8: Engagement with selected knowledge in the **research literature** of the discipline, and, awareness of the power of critical thinking and creative approaches to incorporate broader emerging issues	**SK8:** Engagement with the **technological literature** of the discipline; awareness of the power of critical thinking	IR4.0	The curriculum needs to be up to date and reflect contemporary practices and approaches. The teachings should encourage the students to ask questions, to brainstorm and, to consider alternative solutions, and balance competing objectives

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Diversity and Inclusion

A Washington Accord programme provides:	**A Sydney Accord programme** provides:	**A Dublin Accord programme** provides:	**Reason for change**
WK9: **Ethical attitude and behavior**; Awareness and ability to work in diverse teams by ethnicity, gender, age, physical ability etc. with mutual understanding and respect, and inclusive attitudes.	**SK9**: **Ethical attitude and behavior**; Awareness and ability to work in diverse teams by ethnicity, gender, age, physical ability etc. with mutual understanding and respect, and inclusive attitudes.	**DK9**: **Ethical attitude and behavior**; Awareness and ability to work in diverse teams by ethnicity, gender, age, physical ability etc. with mutual understanding and respect, and inclusive attitudes.	The students need to learn how to work in diverse teams on a range of projects in such a way that the inclusive and ethical approach is embedded in work practices.
A programme that builds this type of knowledge and develops the attributes listed below is typically achieved in 4 to 5 years of study, depending on the level of students at entry.	A programme that builds this type of knowledge and develops the attributes listed below is typically achieved in 3 to 4 years of study, depending on the level of students at entry.	A programme that builds this type of knowledge and develops the attributes listed below is typically achieved in 2 to 3 years of study, depending on the level of students at entry.	

Conclusions

Changes to the GAPC Framework :

Install the implications

for Diversity and Inclusion and Industry 4.0