





DESIRED ATTRIBUTES OF AN ENGINEER (BOEING, CA 1995)

• A good understanding of engineering science fundamentals – Mathematics, Physical and life sciences, Information technology

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- A good understanding of design and manufacturing processes
- A multi-disciplinary, systems perspective
- A basic understanding of the context in which engineering is practiced – Economics, History, The environment, Customer and societal needs
- Good communication skills written, oral, graphic, and listening
- A profound understanding of the importance of teamwork.
- Personal skills
 - High ethical standards
 - Ability to think both critically and creatively—independently and cooperatively
 - Flexibility
- Curiosity and a desire to learn for life







- <u>What</u> is the professional role and practical context of the profession(al)? (need)
- <u>What</u> knowledge, skills and attitudes should students possess as they graduate from our programs? (program learning outcomes)
- <u>How</u> can we do better at ensuring that students learn these skills? (curriculum, teaching, learning, workspaces, assessment)



Massachusetts Institute of Technology

















MORE AND MORE AUTHENTIC DESIGN EXPERIENCES IN THE EDUCATION

Design-build experiences are instructional events in which learning occurs through the creation of a <u>product</u>, <u>process</u>, or <u>system</u>

Provide the natural context in which to teach design, innovation, implementation skills

Provide a platform for training other CDIO syllabus skills (teamwork, communications etc)



F s c

Formula Student, Chalmers

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Solar-

driven aircraft,

ктн







INTEGRATE THE CURRICULUM							
An integrated curriculum has a systematic assignment of program outcomes to learning activities and features a explicit plan for progressive integration of generic skills							
Planned learning sequence Vehicle Engineering KTH							
CDIO Syllabus	Year 1		Year 2		Year 3		
3.2.3 Written	Introductory	Mech I	Mech II	dynamics	Control Theory	FEM in Engineering	
2.2 Communi	Math I	Math II	Solid Mechanics	Math III	Electrical Eng.	Bachelor	
cation in English	Physits	Numeric II Methodis	Product acvel in n	Fluid Mechanics	Statistics	Thesis	
				Sound and Vibrations	Signal Analysis	Opti- mization	







CONCLUDING REMARKS
 The CDIO approach provides a reference model for engineering education where professional practice and innovation is focused
 The CDIO approach is codified in the CDIO syllabus and standards. CDIO elements can be used as an integrated set or piecewise, are subject to adaptation to local context etc
 CDIO is an open endeavor – you are all welcome to participate and contribute - 90 universities worldwide are now members of the CDIO Initiative
• To learn more, visit <u>www.cdio.org</u> or read <i>Rethinking</i> <i>Engineering Education: The CDIO Approach</i> by Crawley, Malmqvist, Östlund, & Brodeur, 2007

