



Engineering as science: would Leonardo be EE today?

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Engineering as science

- Fundamentals of engineering curricula:
 - analytical skills
 - mathematical tools
 - programming expertise
- Building on top of fundamentals:
 - various engineering applications
 - IC designs (analog and digital)
 - tools (CAD, EDA, technology specific)
 - consumer technologies: ubiquitous computing



Engineering as science

- The difference between science and engineering:
 - science vs. engineering
 - science addresses discovery and understanding of natural phenomena: physics, chemistry, biology
 - computing science vs. engineering
 - difference in the tools and approaches



Would Leonardo be EE today?

- Challenges:
 - sheer complexity of today's engineering systems
 - chips, tools, fabrication
 - technological advances
 - examples: personal communication systems
 - need for interoperability of distinct technological solutions:
 - personal communications: wireless, WiFi
 - mobile technology: GPRS, UMTS, Bluetooth, GPS
 - sensor networks



Would Leonardo be EE today?

- Many exciting new and emerging fields:
 - biomedical engineering:
 - human genome and genetics
 - pharmaceutical advances
 - circuits and systems:
 - nanotechnologies
 - circuits and systems based on bio systems
 - communications:
 - connectivity
 - performance (quality of service, quality of experience)
 - security and privacy



Would Leonardo be EE today?

- Leonardo would embrace the challenges facing the engineering community today, which need to be addressed in hope of improving our quality of life
- Answer:
 - YES.