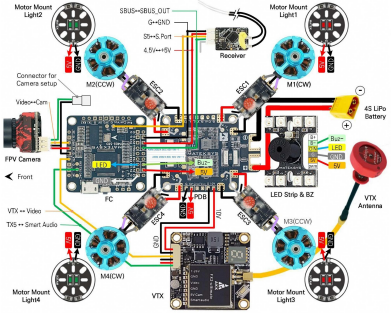

Why this course?

Kizito NKURIKIYEYEZU, Ph.D.

TAB 1. Embedded system programming paradigms

Bare metal[1]	■ simple processors ■ simple devices ■ few operations ■ you already know this	

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Embedded Linux[3]	■ very complex application ■ file-systems,networking ■ Pretty UI	

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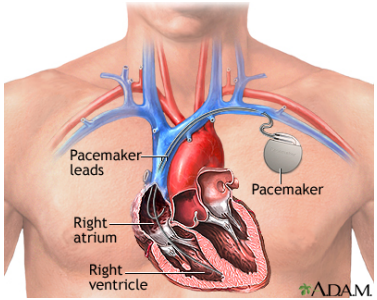

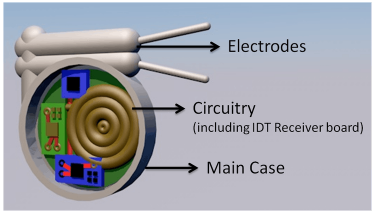

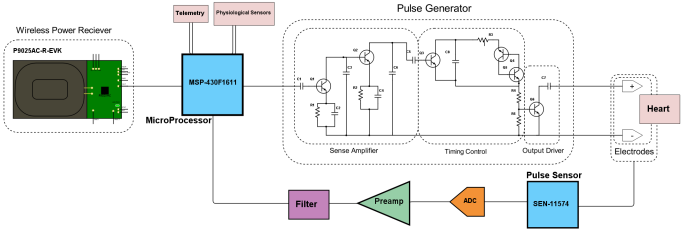

FIG 1. A pacemaker is a small, battery-operated device. This device senses when your heart is beating irregularly or too slowly. It sends a signal to your heart that makes your heart beat at the correct pace. In general, a hear pacemaker contains a small micro-controller and electrodes that connect the heart tot the generator. The electrodes carry the electrical message to the heart. A defective pacemaker can cause more harm than good

[1] https://www.paulsonandnace.com/defective-pacemaker-can-cause-harm-good/

Why this course?

- How can we prove that an unmanned aerial vehicle (UAV) will brake quickly enough if it encounters an object on its path?

FIG 2. General Atomics MQ-9 Reaper
The MQ-9 is the first hunter-killer UAV designed for ong-endurance, high-altitude surveillance. It is capable of remotely controlled or autonomous flight operations and is primarily for the United States Air Force (USAF).

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- In short, how do you know that a UAV military drone will work as expected?

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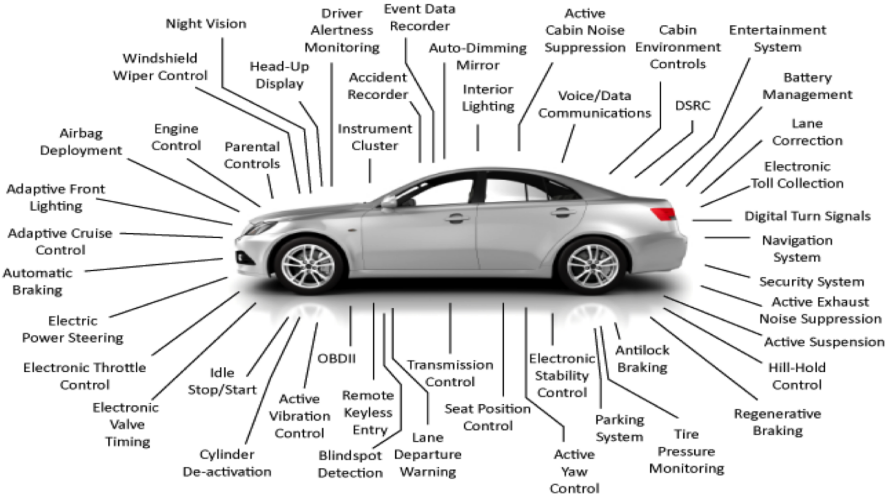

FIG 3. Embedded controllers found in a modern vehicle

[1] Should we be worried that our cars are controlled by software?

[2] How Software Is Eating the Car—The trend toward self-driving and electric vehicles will add

Why this course?

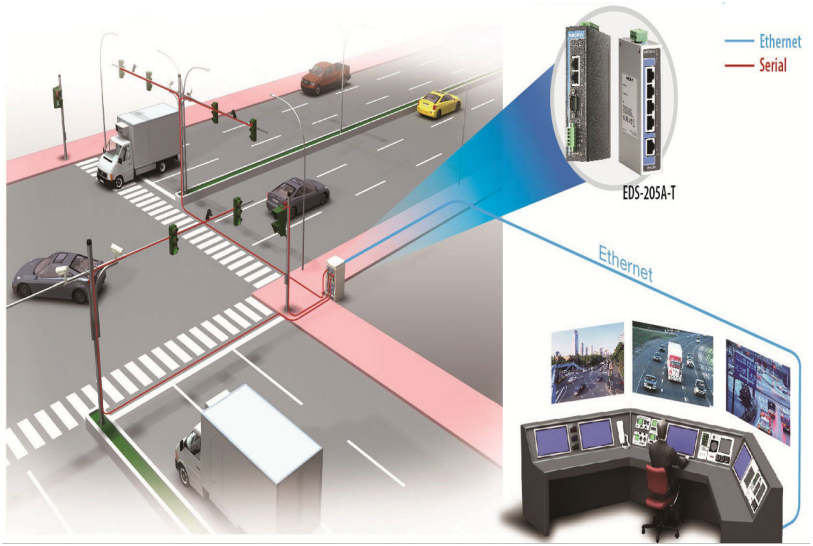

FIG 4. Traffic lights—How do you guarantee that cars won't clash into each other?

Why this course?

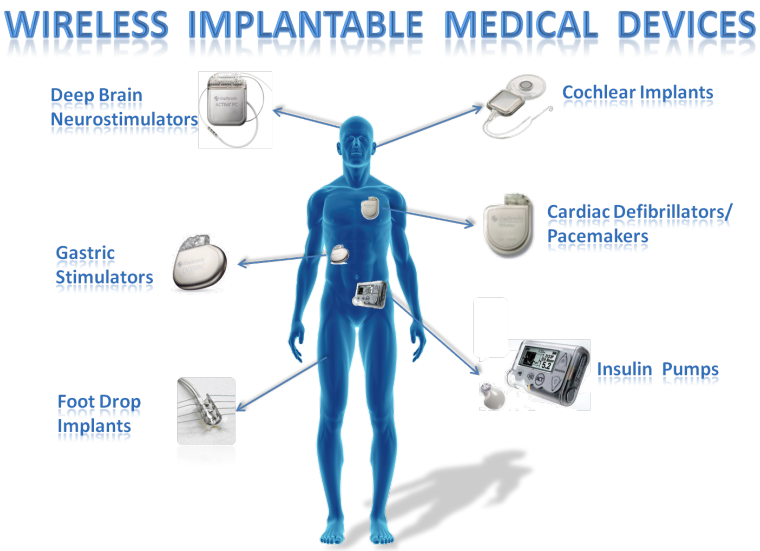

FIG 5. implantable medical devices—Fatal consequences if they fail to work as intended

Why this course?

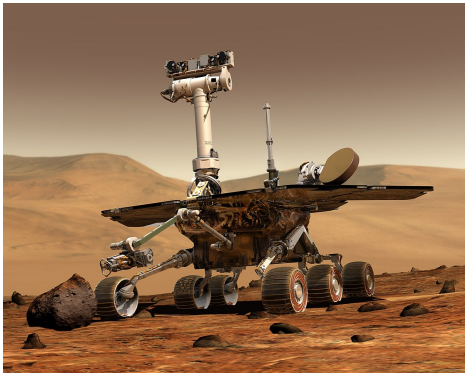

FIG 6. Artist's conception of NASA's Mars Exploration Rover on Mars. It's mission almost failed due priority inversion.

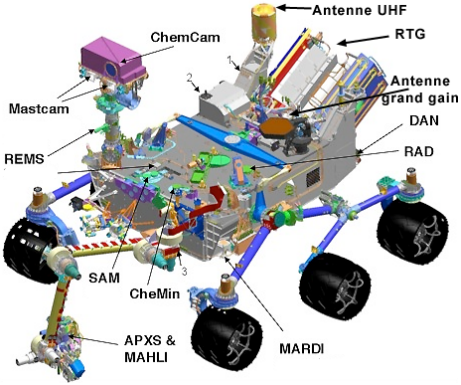

FIG 7. Instrumentation of the Mars Rover

[2] http://www.cs.cornell.edu/courses/cs614/1999sp/papers/pathfinder.html

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The end