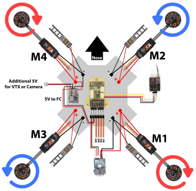
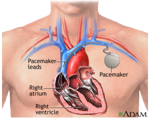
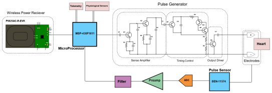


Why this course?

Kizito NKURIKIYEYEZU, Ph.D.

Why this course?





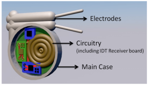


FIG 1. A pacemaker is a small, battery-operated device. This device senses when your heart is beating irregularly or too slowly. It sends a signal to your heart that makes your heart beat at the correct pace. In general, a hear pacemaker contains a small micro-controller and electrodes that connect the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

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?
- The possibility of life-or-death decisions being taken by an UAV not under the direct control of humans needs to be taken seriously
- In short, how do you know that a UAV military drone will work as expected?

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).

[1] https://en.wikipedia.org/wiki/General_Atomics_MQ-9_Reaper
[2] What is the implication of drone warfare? The following link debates their

Why this course?

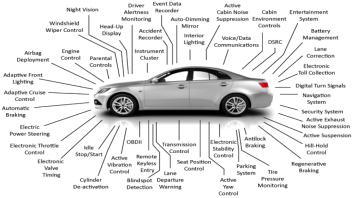


FIG 3. Embedded controllers found in a modern vehicle

[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 hundreds of millions of lines of code to cars. Can the auto industry cope?

Why this course?

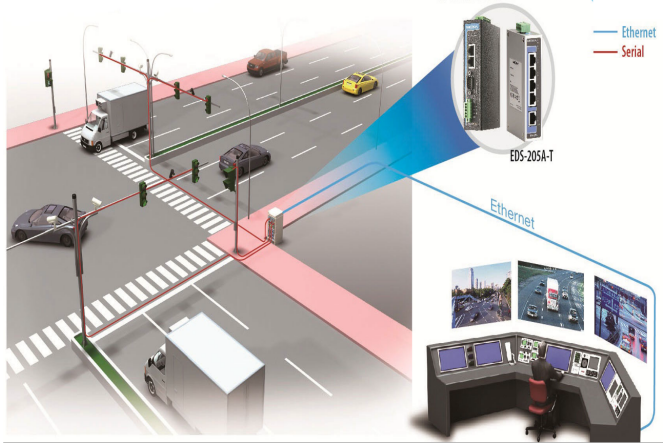


FIG 4. Traffic lights—How do you guarantee that cars won't clash into each other?

Why this course?

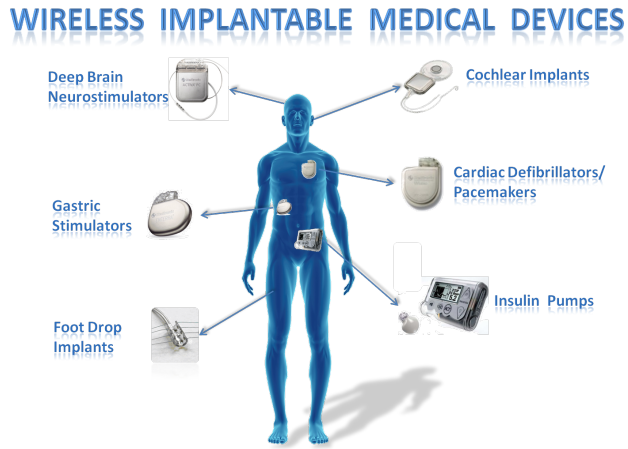


FIG 5. implantable medical devices—Fatal consequences if they fail to work as intended

Why this course?

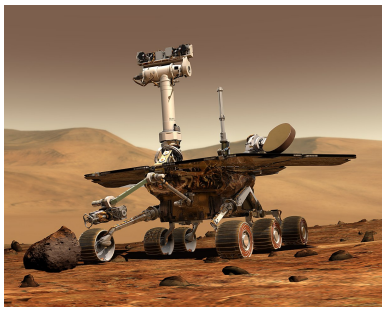


FIG 6. Artist's conception of NASA's Mars Exploration Rover on Mars. It's mission almost failed due priority inversion.

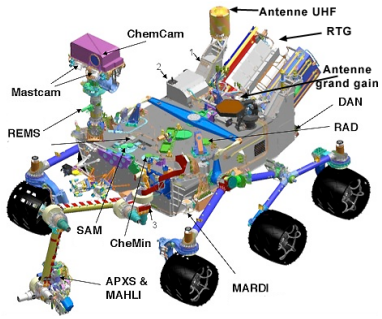


FIG 7. Instrumentation of the Mars Rover

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

Why this course?

- It's a fundamental course on embedded system[1][2]
- In this course, we explore scheduling questions like these
- The course teaches provable guarantees of timing constraints for applications including autonomous vehicles.
- The course will explore timing constraints, both when programs have static priorities and when priorities can change over time.
- The course will also explore both theoretical and practical challenges introduced by modern embedded systems with multiple processors.
- The course will be challenging—but it will serve as a cornerstone for your future career in embedded systems.

[1] Please read this book for an extensive list of what you need to know as an embedded engineer Edwards, L. (2014). So You Wanna Be an Embedded Engineer: The Guide to Embedded Engineering, from Consultancy to the Corporate Ladder. Newnes.

[2] Steve Branam also gives succinct summary of what you need to know as an