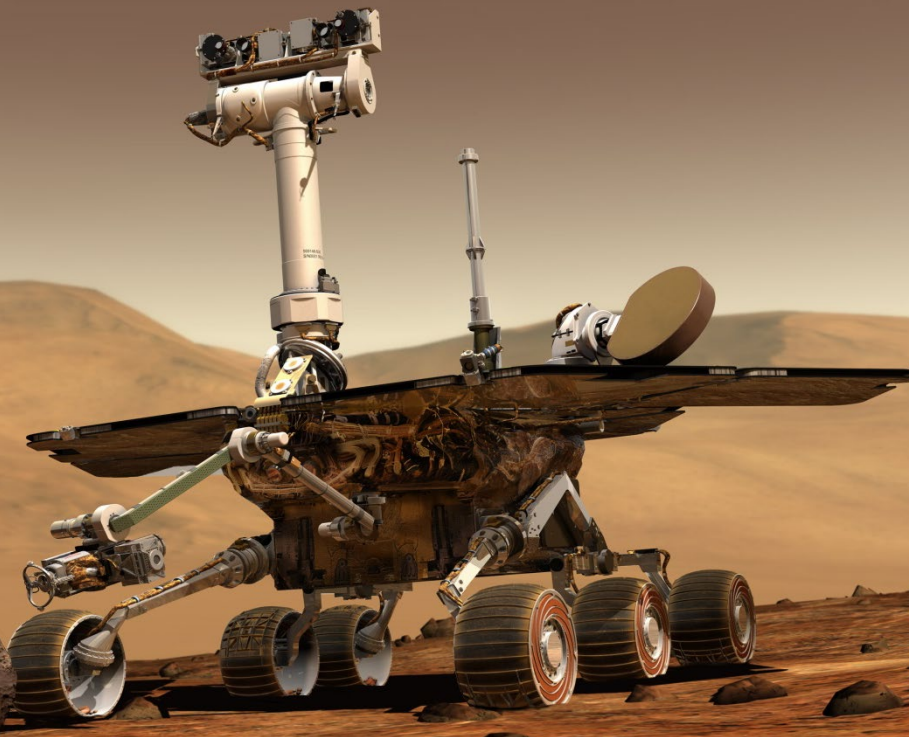


Minor ET-Mi-201

Electronics for Robotics



Ever wondered about how and where the robots' electronic heart beats?

Ever wondered about how data actually travels and controls robots?

Interested in making the difference by applying Electrical Engineering in your major?

Then choose the Electronics for Robotics minor!

Why Electronics for Robots?

Because robots are ubiquitous. And why a robot for space explorations? Because space explorations would be impossible without robots. And those robots are fully autonomous, cannot be maintained and **they deliver!** At any space robot's core there is an Electrical Engineering (EE) anatomy with a track record of impeccable operation. EE provides the energy, makes-up the robot's 'brain' and 'muscles', collects the data and relays it to inquisitive minds on Earth.

Why an Electrical Engineering minor?

Because traditional EE branches, such as communication and information processing, are continually expanding into other fields such as medicine and pharmaceuticals, infrastructure etc. EE is becoming pivotal in:

The automotive branch: fuelled by increased safety requirements (accident prevention), eco-friendliness (engine management), comfort etc.

Sensors: via the development of Micro-electromechanical Systems (MEMS). You can find these in the gravity sensor of your smartphone and Wii.

Sustainable energy (solar, wind): the only path towards a sustainable technological future – it will carry on requiring enormous engineering resources in the coming decades.

Space technology: with swarms of small but closely cooperating satellites representing the next step towards ensuring global interconnectivity.

Robotics: a field with endless opportunities emerging from the most exotic combinations of electronics and mechanics.

The field of EE is broad and knowing how to apply EE will give you the much-needed edge in your engineering major. See for information about registration www.minors.tudelft.nl

The key word used in describing electrical engineering job trends this year is “high” [...]: “High growth, high salaries, high demand, high competition among hiring companies.”

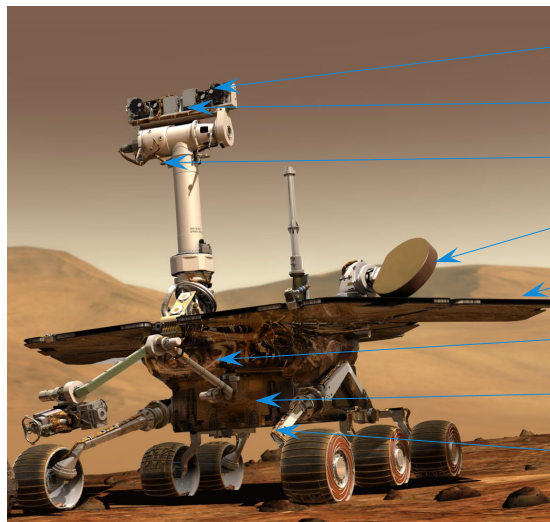
IEEE Spectrum, August, 2017



Pluto, as photographed by the New Horizons spacecraft on July 13, 2015, after a 5 billion kilometre journey.

Minor ET-Mi-201 Electronics for Robotics:

- what?
- where?
- why?



Sensors (EE3130TU)

Subsystem digital control (CSE2420)

High data-rate, wired, data link (EE3115TU, EE3120TU)

Wireless long-distance data link (EE3115TU, EE3120TU)

Solar panels + energy management (EE3125TU)

Complex (power) electronics (ET3604LR, EE3125TU)

Master digital system control (CSE2420)

(Power) linear circuitry (ET3033TU)

For whom is this minor?

This minor is of special interest to students in Physics, Mechanical Engineering, Aerospace Engineering and Computer Science. Students from other programmes may also be interested – some pre-knowledge conditions may apply.

Do you see yourself as a potential EE MSc student? This minor will allow you to validate your dream and will provide you with instruments to self-assess your readiness to enrol in such a programme.

The minor requires familiarity with basic mathematical instruments, such as vector analysis, complex algebra and Fourier analysis. Self-tests and online refresh materials are available on the minor's site.

For more information, please contact the minor coordinator.

Programme

The minor consists of six courses and a project.

Courses

Circuit Analysis (ET3033TU) focuses on the analysis of linear electrical circuits and components, laying the basis for understanding the steady-state and transient behaviour of passive circuits.

Electronic Circuits (ET3604LR) will provide, in a structured manner, insight in the function of electronics as information-processing technique in our society.

Digital Communication Systems (EE3115TU) will start from an entry-level signal processing part and will then proceed to discussing the basic concepts of signal processing for telecommunications, with an emphasis on the transmission of digital signals; the concepts will be practiced with via problems with direct applicability.

Digital Systems (CSE2420) focuses on the two fundamental notions of digital systems, namely combinational and sequential networks, and basics of Very High Speed IC Hardware Description Language (VHDL).

Guided and Wireless EM Transfer (EE3120TU) provides a non-specialist foundation of wireless transfer of information, by starting from the analysis of guided electromagnetic waves propagation and extending this knowledge to basic, but illustrative free-space propagation phenomena; the course will also contain an entry-level discussion of antennas and the applicable performance indicators; on an overall, this course is intended to familiarise the students with the wired and wireless implementation of data transfer in robots.

Advanced Electronics for Robotics (EE3125TU) will start by discussing the power electronics that are needed for a, presumably battery/solar panel operated, autonomous robot; it will then instruct you on how an optimal electronic design can be found and how design choices can (or should) be motivated.

Project

The minor concludes with the **Mars Rover Project (EE3130TU)** – a typical EE project in which you will work in a group of 4-5 students for creating a robot vehicle (rover) with some form of autonomous behaviour.

For more information about the courses and the project, see www.studyguide.tudelft.nl

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