Learning from Engineering

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Can we equip physics students with problem-solving, resilience and teamworking skills through real-world group projects?

How do we avoid siloed learning? Is programme-level teaching or portfolio assessment the answer?
Engineer the tools for Scientific Discovery

Physics + Mathematics = Engineering

Why + How = Engineering
School / UCAS visit day experiment

Urgent message: Your front door is open

Smart Burglar Alarm System

Front View  |  Back View  |  Side View
---|---|---
Front Door  |  Back Door  |  Garage Door
Front Window

Ready
Alarm off
Practical Examination
# MEng group projects

*On the successful completion of the course, students will be able to:*

<table>
<thead>
<tr>
<th>ILO</th>
<th>Skill Description</th>
<th>Developed</th>
<th>Assessed</th>
</tr>
</thead>
<tbody>
<tr>
<td>ILO 1</td>
<td>Communicate their work through: formal discussion, a website and a promotional video</td>
<td>X</td>
<td>X</td>
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<tr>
<td>ILO 2</td>
<td>Plan and execute group work, appraising the team's performance</td>
<td>X</td>
<td>X</td>
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<tr>
<td>ILO 3</td>
<td>Create a business plan</td>
<td>X</td>
<td>X</td>
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<tr>
<td>ILO 4</td>
<td>Design and implement analogue/digital electronic systems as dependent on the specific project</td>
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<td>X</td>
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<tr>
<td>ILO 5</td>
<td>Apply project management skills to a team engineering project</td>
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<td>X</td>
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</tbody>
</table>
The Scenario
During development, gas turbine engines are instrumented with up to 3000 individual sensors. These sensors are wired to data acquisition systems using up to 12km of cable.

The Challenge
Design a wireless sensor network capable of operating in the space between the engine casing and the nacelle.

The Potential Benefits
Improved flexibility of sensor deployment
Reduced deployment time
Reduced costs
Autonomous Robotic Technology
Enabling Minimally Invasive Surgery
Autonomous Robotic Technology
Enabling Minimally Invasive Surgery

- Wireless Communication Link
- Wireless Power Harvesting
- Biomedical and Inertial Sensing
- Scaled Dimensions
- Power Requirements
- Sensor/Actuator Interface
- Actuated Gastric Balloon Capsule Robot
- Actuator
- Actuated Model of Gastrointestinal Tract
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