# Part IIA
# Engineering Area Activity
# IC Engine Performance/Emissions

This Engineering Area Activity is suitable for students in the following Engineering Areas:
1. Mechanical Engineering
2. Energy and the Environment
3. Aerospace and Aerothermal Engineering
4. Instrumentation and Control

In this EAA we will look again at the part IA Gas Engine experiment, but in much greater detail. The engines will be equipped with shaft encoders (to give continuous crank angle position, angular velocity and acceleration), in-cylinder pressure transducers, and exhaust gas composition analysis. In fact, much of the instrumentation that is used in this EAA is the same as that used when researching on current engines, but with the advantage we can see what is "going on".

In addition we will use the gas calorimeter (which you used part IA to measure the calorific value of natural gas) to measure gases of known calorific value (propane, methane) so that we can examine the accuracy and repeatability of the instrument.

Using the material that you saw in IB Thermo concerning the $1^{st}$ Law applied to combustion, and simple chemical balances, we will be able to determine the actual energy flow associated with the exhaust gases exiting the engine.

Finally using some of the ideas that you developed in your dynamics course, we'll look at the forces generated within the machine.

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