Module Name:	**Holistic Gas Turbines and Materials Selection**
Module Code:	**EGTM93**
Presenter(s):	**Dr Mark Whittaker/Professor Jim Wickerson (Rolls-Royce plc)**
Credit Rating:	**10**
Venue:	**Swansea University**

Synopsis:

The module aims to give a complete understanding of the main aspects of gas turbine design. It is "holistic" in its emphasis on the links between performance aerodynamics, mechanics and the associated materials selection. These design criteria will be applied to the case study of a simple turbofan or intercooled/recuperated marine/industrial engine, using only hand calculations on paper (i.e. without the aid of a computer) and working in small teams.

Intended Outcomes:

On completion of the module the student will demonstrate:

- In depth knowledge of how a gas turbine operates in order to understand why gas turbine jet engines have largely replaced propellers driven by piston engines.
- The appropriate selection of materials to meet the demands of gas turbine designs.
- A critical understanding of why civil airliners employ large engines with low jet velocity while fast military aircraft require small engines with high jet velocity.
- An ability to individually sketch designs of a simple turbojet / turbofan engine.
- An in depth knowledge of the key features of a Rolls-Royce engine on a large general assembly picture, and perform a comparison of these features with the aforementioned engine design.
- A recognition of specific engine hardware, through comprehensive studies of video media and on-site engine build exhibits.

Module Aims:

To provide the student with basic design rules for aero or land derivative gas turbine engines, based on aerodynamic principles and the associated selection of key materials systems.

Syllabus:

- Gas turbine fundamentals and applications
- Thermal and propulsive efficiency
- Total and static pressure and temperature
- Performance calculations
- Temperature profiles
- Materials requirements
- Materials selection

Assessment:

Assignment to be submitted within three weeks, after the course presentation