

Module Name:	Mechanical Testing and Data Analysis
Module Code:	EGTM69
Presenter(s):	Professor Martin Bache
Credit Rating:	10
Venue:	College of Engineering, Swansea University

Synopsis:

The units will cover the following: Mechanical test equipment and their operation; Furnaces and specimen grips; Extensometry and temperature measurement; Crack monitoring; Data logging; Standards and Calibrations; Data handling; Laboratory exercise; interpreting fracture surfaces.

Intended Outcomes:

On completion of the module the student will demonstrate:

- *Appreciation of how to operate advanced high performance mechanical testing equipment*
- *Understanding of the design and application of high sensitivity extensometry*
- *In depth knowledge of test techniques required to span materials evaluation at temperatures from sub-ambient to 1400°C and air/vacuum/environmental conditions*
- *Knowledge of more advanced techniques for tension, torsion, fatigue, creep, stress corrosion and fracture toughness data generation*
- *Interpretation of International standards and the importance of calibration procedures*
- *Advanced data analysis and interpretation relevant to the various testing techniques covered*

Module Aims:

To provide practical, hands on experience in a laboratory setting relating to a set of common mechanical test procedures. Associated data analysis will be considered and their context within the industrial environment will be described.

Syllabus:

The units will cover the following : Mechanical test equipment and their operation (*servo-hydraulic, electro-mechanical, resonance, creep*); Furnaces and specimen grips (*hydraulic grips, wedge grips, pin loading, threaded grips, alignment, strengths and weaknesses*); Extensometry and temperature measurement (*thermocouples, fatigue strain control, creep, uniaxial, torsion*); Crack monitoring (*optical, potential difference – DC and AC, Crack opening displacement, strain gauge, optimisation*); Data logging; Standards and Calibrations; Data handling (*analysis, archiving*); Laboratory exercise (*Equipment operation, data collection, data analysis and interpretation*); Interpreting fracture surfaces.

Assessment:

Daily class exercises and post module assignment.