Module Name:	**Electron Backscatter Diffraction: Theory, Technique and Applications**
Module Code:	**EGTM100**
Presenter(s):	**Soran Birosca**
Credit Rating:	**10**
Venue:	**College of Engineering, Swansea University**

Synopsis:

Electron backscattered defraction (EBSD) has been developed over recent decades to the point where it is now considered to be an essential tool available to the material engineer. Applied to a wide range of structural metallic systems, detailed characterisations of individual grain orientations, grain boundary relationships and microtexture can all be obtained using this technique. This knowledge is essential for the prediction of constitutive performance and ultimate failure in advanced engineering alloys. The course will provide a theoretical background to the technique and its practical application in conjunction with scanning electron microscopy techniques.

Intended Outcomes:

On completion of the module students will demonstrate:

- The participants of the course will be able to use HKL-EBSD system and related software at the end of the course. They will be familiar with the most of EBSD data analysis and its applications. The course will provide the students with the basics and methodologies for developing the EBSD technique further for their research studies.

Module Aims:

The participants on this course will become proficient in the use of HKL-EBASC system and related software. They should become familiar with the analysis of EBSD measurement data and their definition of crystal orientation and microstructure. The application of EBSD to the specific research requirements of individual students will be demonstrated.

Syllabus:

The module will focus on the following issues:

The course will cover fundamental (theoretical and practical) aspects of EBSD data acquisition and data analysis.

The first part of the course (Theory and Technique) will be mainly include: EBSD History, EBSD System, How EBSD Works, Kikuchi pattern Formation, Interpreting the diffraction pattern, Kikuchi pattern indexing, Image processing, Automated Indexing, Fully automated System, Hough Transformation, Band Detection, Band Identification, System Calibration, EBSD Sample Preparation.
The second part of the course (EBSD Applications) would cover: Introduction to Microtexture and Texture, Orientation Representation: Orientation Matrix, Miller Or Miller-Bravais Indices (Ideal Orientation), Pole Figure, Inverse Pole Figure, Euler Angles and Euler Space, Orientation Matrix Transformation, Examples of Typical Texture in Metals: Cube Texture Component, Goss Texture Component, Brass Texture Component, General Representation of Misorientation Data: Angle/Axis Pair, 3D Space: Cylindrical Angle/Axis Space.

Lectures from external speakers on how they use EBSD in their research form part of the course.

Assessment:

Written exercises after the course and practical assessment