Course Title: Industrial Electronics

Course Code: EE4146

Units: 3

Level: B4

Course Aims & Objectives:
This course aims to provide an overview; and the fundamental background to modern industrial electronics systems. The objective is intended for students to learn and apply conventional, and emerging intelligent based approaches. Having completed the course, student is expected to have a clear understanding of general industrial electronics techniques and would have developed the ability to both analyze and tackle practical industrial problems. Certain mathematical techniques will be systematically introduced in the order of an appropriate level to enable the objectives to be achieved.

Intended Learning Outcomes:
On completion of this course, students will be able to:

1. Understand, identify, and recognize conventional and emerging technology for handling industrial electronics problems.
2. Diagnose a given practical engineering problems using conventional methods or emerging Intelligent approaches.
3. Assess and resolve simple problems using intelligent approaches.
4. Provide a solution to a given industrial problem using intelligent approaches.

Syllabus:
Introduction to Industrial Systems
DC and AC drive control, Power sources, and industrial plant control, Classification and Recognition Industrial Problems.  

Conventional Approaches to Tackle Engineering Systems Problems
Drive Control Using Single-phrases half-wave, Single-phrases fully controlled and half controlled, Three phrase half-wave, Conventional Robust PID Control Rule.

Emerging Intelligent Technology
Introduction to Intelligent Based Technology: Supervised neural networks, Unsupervised Self-Organizing Map, Diagnostic Analysis, and Practical Case Study.

Teaching Methods:
Teaching will be in the form of lectures with complementary tutorials and/or laboratory (laboratories). Tutorials will be informal, and may include a number of different support methods. For example:

- problem solving;
- general discussions;
- student presentations;
- resolving students' difficulties.
The laboratory support, if any, will complement the lecture and reinforce students' understanding of the material.

**Teaching Pattern:**

*Duration of course:* 1 semester  
*Suggested lecture/tutorial/laboratory mix:*  
*Lecture Hour:* 26 hours  
*Tutorial Hour*:* 13 hours  
*Laboratory Hour:* 9 hours  

* may be substituted with lectures/laboratories

**Assessment Pattern:**

*Examination duration:* 2 hours, at the end of the semester  
*Percentage of coursework, examination, etc.:* 30 % CW; 70 % Exam

For a student to pass the course, at least 30% of the maximum mark for the examination must be obtained, and a laboratory attendance of at least 75% recorded.

Coursework should be based on several different exercises distributed over the period of the semester; examples include homework assignments, short test, mini projects and presentations.

**Pre-requisites:** *(please quote course code & title)*  
EE3110  Analogue Electronic Circuits

**Pre-cursor:** *(please quote course code & title)*  
Nil

**Equivalent Courses:** *(please quote course code & title)*  
Nil

**Equivalent to the Old Course Code and Title:** *(please quote course code & title)*  
Nil

**Booklist:**

*Essential Reading*  
Martin Brown & Chris Harris: Neuralfuzzy adaptive modelling and control, (Prentice Hall, 1994)

*Supplementary Reading*  
Simon Haykin: Neural Networks a comprehensive foundation, (Macmillan, 1994)