POWER ELECTRONICS, DRIVES AND ENERGY CONVERSION: 36 hours (TP1 AND TP2)

Electrical and Electronic Engineering, University College, Cork

Lecturer: John Hayes (021-4903796, john.hayes@ucc.ie)

Recommended texts: Class notes by John Hayes.

Additional reading:

1. Mohan, Undeland, Robbins, *Power Electronics, Converters, Applications, and Design*, 3nd ed., published by Wiley, 1995.

2. Fitzgerald, Kinsley, Umans, *Electric Machinery*, 5th ed., published by McGraw-Hill, 1990.

3. Mohan, *Power Electronics and Drives*, 2003 ed., published by MNPERE, 2003.

4. Erickson, *Fundamentals of Power Electronics*, published by KAP.

5. Mohan, *Electric Drives An Integrative Approach*, 2003 ed., published by MNPERE, 2003. (Available from John Hayes)

Pre-requisite courses: EE2001, EE3011, and EE3012

Lecture schedule: Tuesday at 10am in L2 and Thursday at 9:00am in L1.

Network: Course material can be found at \\Denovo\public\EE 4001.

Module Content: Power Electronic Converters; Power Semiconductors; AC Machines Analysis and Control; Permanent-Magnet and Induction Motors; Speed and Vector Control of Machines.

Course Overview: The objective of this course is to study power electronics and motor drives following an integrative approach.

This course provides a detailed study of power electronic and motion control systems which are the building blocks for smart electrification of the energy conversions required in such diverse areas as wind turbines, electric vehicles, and mobile computing.

The following is a list of technical fields addressed in this course: isolated and non-isolated power electronic converters; power semiconductors; ac machines analysis; permanent-magnet ac machines; steady state operation of induction motors; speed control of induction motor; vector control of induction motors; modulation schemes.

Assessment: Total Marks 100: End of Year Written Examination 80 marks; Continuous Assessment (In-class Written Examinations) 20 marks.

The continuous assessment consists of three in-class quizzes. The final mark will be based on the best two out of three. The first two quizzes will likely take place in TP1, with the third quiz in January. Students are strongly advised to take the first two quizzes.