THE UNIVERSITY OF MANCHESTER
Programme Unit Specification

1. GENERAL INFORMATION

Title	Electrotechnics
Unit code	MATS 20332
Credit rating	10
Level	3 (Year 2)
Semester(s)	2
Pre-requisite units	None
Co-requisite units	None
School responsible	Materials (Textiles & Paper Group)
Member of staff responsible	Dr. W.R. Kennon
Other staff involved	None

2. AIMS

The programme unit aims to:

- to introduce students to electrical, electronic and integrated micro-electronic devices typical of those commonly used to control modern manufacturing machinery;
- to show how the characteristics of such devices are exploited in the current generation of manufacturing machinery, process monitoring equipment and adaptive controllers.

3. BRIEF DESCRIPTION OF THE UNIT

The following topics will be studied:

- Two state systems - basic logical elements.
- Sequential logic - pulse trains, gating logic.
- Time-dependant logic - edge triggering & storage devices.
- Bistable applications - counters, dividers and memory devices.
- Arithmetic logic - adding, subtraction, multiplication, division.
- The microprocessor - architecture & operation.
- Microprocessor-based system control.
- The ideal operational amplifier.
- Linear amplification using operational amplifiers - inverting & non-inverting configurations.
- The real operational amplifier - adding and switching circuits.
- Applied operational amplifier circuits - digital-to-analogue and analogue-to-digital conversion.
- The atomic origins of magnetism.
- The stepping motor.
- The d.c. motor.

4. INTENDED LEARNING OUTCOMES *(include unit-specific and contribution to programme)*

Category of outcome	***On completion of this unit, students should be able to:***
Knowledge and understanding	• understand two-state systems and how they may be integrated to create programmable microelectronic equipment capable of monitoring and controlling manufacturing equipment. • design electronic circuitry suitable for the interfacing of sensing equipment which might be used in the control of computerised manufacturing machinery. (contribution to programme LOs - TA2)
Intellectual skills	• relate complex digital electronic controllers and electronic signal amplification circuitry to the simple elements upon which they are founded. (contribution to programme LOs - TB1, TB2, TB5)
Practical skills	• appreciate how fast-moving electronic signals may be visualised and understood using modern laboratory test equipment. (contribution to programme LOs -)
Transferable skills and personal qualities	• analyse logically – developed during tutorial work. • synthesise theoretically – developed during tutorial work. (contribution to programme LOs – TD3, TD4)

5. LEARNING AND TEACHING PROCESSES (*methods of delivery*)

Lectures, tutorials and problem-based learning.

6. ASSESSMENT

Assessment task	Length	Weighting within unit (if relevant)
Unseen examination paper	2 hours	100%

Date of current version	4th February, 2009